Epidemiological overview of tuberculosis-HIV co-infection among adolescents and young adults in southern Brazil

Panorama epidemiológico da coinfecção tuberculose-HIV entre adolescentes e adultos jovens na região sul do Brasil

Panorama epidemiológico de la coinfección tuberculosis-VIH en adolescentes y adultos jóvenes del sur de Brasi

RESUMO

Objetivo: identificar o perfil epidemiológico dos casos de coinfecção tuberculose-HIV entre adolescentes e adultos jovens na Região Sul do Brasil. Método: estudo epidemiológico observacional, descritivo com abordagem quantitativa com os casos de coinfecção entre adolescentes e jovens da Região Sul do Brasil notificados pelo Sistema de Informação de Agravos de Notificação, no período de 2010 a 2020, com análise de estatística descritiva. Resultados: identificados 1.504 casos, o Rio Grande do Sul apresenta maior prevalência, sexo masculino (59,44%), raça/cor branca (62,57%) e escolaridade até 7 anos (47,81%). O tipo de entrada foram casos novos (66,69%) e abandono (18,88%). Observou-se um pequeno percentual que usavam alcoolismo, tabagismo e drogas ilícitas. Além de apresentarem comorbidades como diabetes (0,86%), doença mental (4,12%). O Tratamento Diretamente Observado foi presente (37,17%) e o desfecho de cura (38,90%). Conclusão: a ocorrência da coinfecção na Região Sul pode estar relacionada às características sociodemográficas, epidemiológicas e clínicas.

DESCRITORES: Tuberculose; HIV; Saúde do adolescente; Adultos Jovens; Coinfecção

ABSTRACT

Objective: to identify the epidemiological profile of tuberculosis-HIV co-infection cases among adolescents and young adults in the southern region of Brazil. Method: an observational, descriptive epidemiological study with a quantitative approach with cases of co-infection among adolescents and young people in the Southern Region of Brazil notified by the Notifiable Diseases Information System, from 2010 to 2020, with descriptive statistical analysis. Results: 1,504 cases were identified, Rio Grande do Sul has the highest prevalence, male sex (59.44%), white race/color (62.57%) and schooling up to 7 years (47.81%). The type of entry were new cases (66.69%) and abandonment (18.88%). There was a small percentage who used alcoholism, smoking and illicit drugs. In addition to having comorbidities such as diabetes (0.86%), mental illness (4.12%). Directly Observed Treatment was present (37.17%) and the cure outcome (38.90%). Conclusion: the occurrence of co-infection in the South Region may be related to sociodemographic, epidemiological and clinical characteristics.

DESCRIPTORS: Tuberculosis; HIV; Adolescent health; Young Adults; Coinfection;

RESUMEN

Objetivo: identificar el perfil epidemiológico de los casos de coinfección tuberculosis-VIH entre adolescentes y adultos jóvenes de la región sur de Brasil. Método: estudio epidemiológico observacional, descriptivo, con enfoque cuantitativo con casos de coinfección entre adolescentes y jóvenes de la Región Sur de Brasil notificados por el Sistema de Información de Enfermedades de Declaración Obligatoria, de 2010 a 2020, con análisis estadístico descriptivo. Resultados: fueron identificados 1.504 casos, Rio Grande do Sul tiene la mayor prevalencia, sexo masculino (59,44%), raza/color blanca (62,57%) y escolaridad hasta 7 años (47,81%). El tipo de ingreso fueron casos nuevos (66,69%) y abandono (18,88%). Había un pequeño porcentaje que usaba alcoholismo, tabaquismo y drogas ilícitas. Además de tener comorbilidades como diabetes (0,86%), enfermedad mental (4,12%). Se presentó el Tratamiento Directamente Observado (37,17%) y el resultado de curación (38,90%). Conclusión: la ocurrencia de coinfección en la Región Sur puede estar relacionada con características sociodemográficas, epidemiológicas y clínicas.

DESCRIPTORES: Tuberculosis; VIH; Salud adolescente; Adultos jovenes; Coinfección

RECEBIDO EM: 11/05/2022 **APROVADO EM:** 04/07/2022

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DOI: https://doi.org/10.36489/saudecoletiva.2022v12i78p10950-10963

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INTRODUCTION

Tuberculosis (TB) is an infectious and transmissible bacterial disease that mainly affects the lungs and is caused by Mycobacterium tuberculosis. It represents a serious public health problem, as it is considered one of the main causes of death worldwide. According to the World Health Organization (WHO), in 2019, it was estimated that approximately 10 million people became ill with TB and 1.4 million deaths occurred as a result of the disease. [1,2]

In the case of Brazil, in 2020, the country recorded 66,819 new cases of TB, with an incidence rate of 31.6 cases per 100,000 inhabitants. In 2019, around 4,500 deaths from the disease were reported, with a mortality rate of 2.2 deaths per 100,000 inhabitants. In the same year, two states in the southern region of the country had the highest proportions of TB-HIV co-infection among the Brazilian Federated Units, Rio Grande do Sul and Santa Catarina, respectively. The state of Paraná also stood out in terms of the highest percentage of HIV testing in the country. [3]

Active Mycobacterium tuberculosis infection is considered opportunistic when associated with Human Immunodeficiency Virus (HIV) infection, an overlap known as TB-HIV coinfection. This causes an exacerbation of the viral load and a decrease in the T-CD4 lymphocyte count, being, therefore, directly related to mortality. [4]

It is found that people living with HIV (PLHIV) are approximately 30 times more likely to develop TB compared to those who are not infected with HIV. [3-5] It is also important to note that Brazil is among the 30 countries with a high burden of TB and TB-HIV co-infection, being considered by the WHO as one of the priority countries for the control of the disease in the world. [3]

In view of this, in order to be able to control TB and TB-HIV co-infection in the southern region and, consequently, in Brazil and in the world, it is essential that the state implement public policies aimed at increasing the early diagnosis of both infections and at the timely initiation of treatments. [6]

One must consider the enormous challenge imposed on health services for the daily supply of care and surveillance actions in a wide spectrum, including the search for new cases, timely diagnosis and treatment, linking people to teams, articulating these and the services of the care network for comprehensive and integrated care, adequate follow-up of treatments, evaluation of contacts and promotion of health education with a view to prevention, promotion and supported self-care.

In the face of such complexity, in order to implement adequate policies for the control of TB-HIV coinfection in the south of the country, it is necessary that actions are directed individually to people, and specific to communities, considering their characteristics and behavior. Therefore, the importance of identifying and knowing the socioeconomic, epidemiological and clinical characteristics of people with TB-HIV coinfection living in the southern region of Brazil is highlighted, as a strategy to support the development of assertive public policies for TB control in this population. Thus, this study aimed to identify the epidemiologi-

DOI: https://doi.org/10.36489/saudecoletiva.2022v12i78p10950-10963

cal profile of TB-HIV coinfection cases among adolescents and young adults in the southern region of Brazil from 2010 to 2020.

METHOD

This is a descriptive observational epidemiological study with a quantitative approach,

constituted by the analysis of the epidemiological profile of all cases of TB-HIV co-infection among adolescents and young adults residing in the southern region of Brazil notified by the Information System on Notifiable Diseases (Sinan), in the period from 2010 to 2020. For the study, adolescents and young adults were considered to be individuals aged between 15 and 24 years. [7]

TB-HIV co-infection was considered to be all cases reported for pulmonary tuberculosis in Sinan-TB that were "yes" for the condition AIDS or "positive" for HIV.

The variables investigated were sociodemographic, epidemiological and clinical. The sociodemographic variables included were: age, sex, race/color and education. Regarding the epidemiological and clinical variables, they were: type of entry into Sinan, use of alcohol, tobacco and/or illicit drugs, diabetes, mental illness, other diseases, performance of directly observed treatment, type of termination. The type of termination variable is related to the outcome of the TB treatment, classified as: cure, abandonment, transfer, death, multidrug-resistant TB (MDR TB).

In order to calculate the prevalence, notifications referring to TB-HIV co-infection among adolescents and young adults were selected. Prevalence was calculated as the ratio between the number of cases of TB-HIV co-infection and the total population of adolescents and young adults in the same year and place, according to sex, multiplied by 100,000 inhabitants.

All information was organized in spreadsheets using Microsoft Office Excel® software and later analyzed using descriptive statistics, presented by absolute and relative frequency.

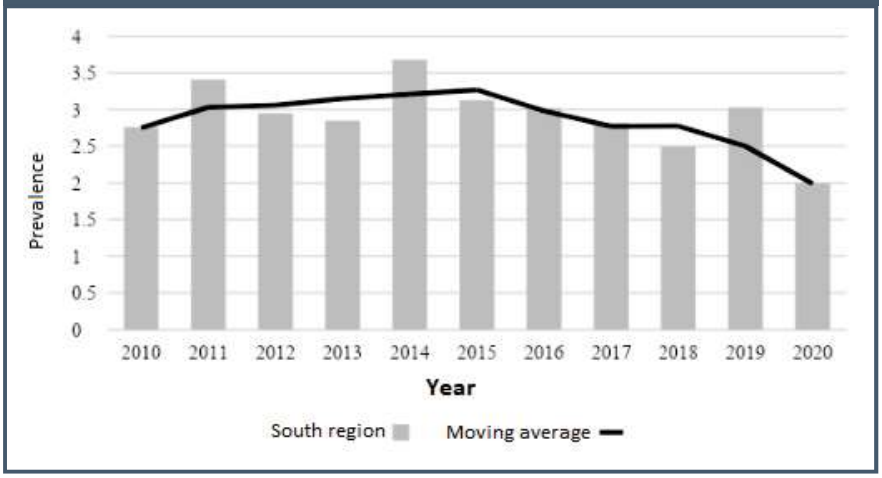
Because it is secondary data in the public domain and without personal identification, the study does not need to be evaluated by the Permanent Committee on Ethics in Research Involving Human Beings.

RESULTS

From 2010 to 2020, 1,504 cases of adolescents and young adults with TB-HIV co-infection were identified in the southern region. In the southern region, rates began to increase in 2011 with 3.40 cases per 100,000 inhabitants, reaching 3.67 cases per 100,000 inhabitants in 2014; and significantly reducing to 1.99 cases per 100,000 population in 2020 (Figure 1).

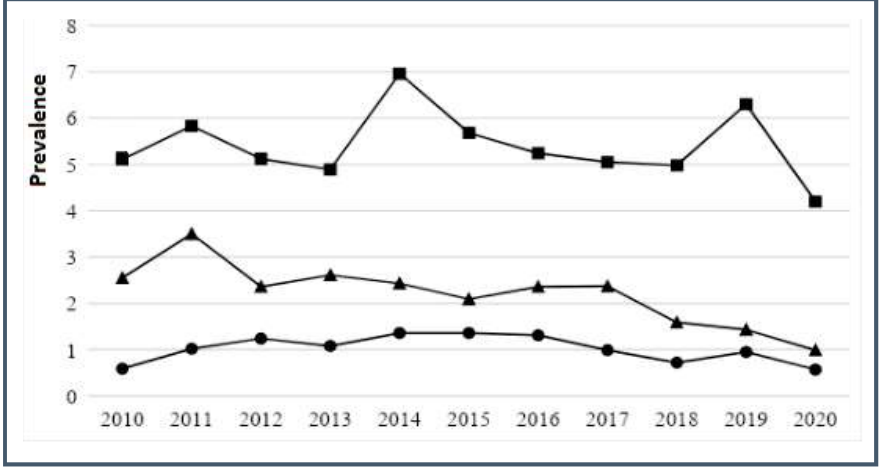
It is noted that the highest rates of TB-HIV co-infection are concentrated in

Figure 1 – Distribution of the prevalence of cases of TB-HIV coinfection among adolescents and young adults in the southern region of Brazil from 2010 to 2020.



Source: Ministry of Health/SVS - Notifiable Diseases Information System - SINAN.

Figure 2 – Historical series on the prevalence of TB-HIV co-infection among adolescents and young adults in the Federation Unit of the southern region of Brazil from 2010 to 2020.



Source: Ministry of Health/SVS - Notifiable Diseases Information System - SINAN.

DOI: https://doi.org/10.36489/saudecoletiva.2022v12i78p10950-10963

Rio Grande do Sul, where the highest rate was in 2014 with 6.96 cases per 100,000 inhabitants, and in 2019 with 6.30 cases per 100,000 inhabitants, reducing to 4.20 cases per 100,000 inhabitants in 2020. In Santa Catarina, in the first year of the study, 2010, the rate was 2.55 cases per 100,000 inhabitants. There was a decrease over the period, reaching 0.99 cases per 100,000 inhabitants in 2020.

In the state of Paraná, in 2010, the rate was 0.56 cases per 100,000 inhabitants, increasing until 2016 when it reached 1.31 cases per 100,000 inhabitants, decreasing to 0.57 cases per 100,000 inhabitants in 2020 (Figure 2).

With regard to sociodemographic characteristics, throughout the historical series, males represented the majority of cases, totaling 894 (59.44%). In relation to race/color, whites totaled 941 (62.57%) and non-whites 529 cases (35.17%). Regarding education, it was observed that 719 cases studied up to 7 years (47.81%),

419 cases studied from 8 to 11 years (27.96%) and 39 cases studied more than 12 years (2.59%) (Table 1).

With regard to epidemiological and clinical characteristics, regarding the type of entry, it can be seen that new cases totaled 1003 (66.69%), followed by readmissions after abandonment with 284 cases (18.88%), of transfers with 103 cases (6.85%) and relapses with 102 cases (6.78%). Alcoholism was present in 234 cases (15.56%), followed by smoking in 250 cases (16.62%), in addition to 296 cases of illicit drug use (19.68%). Regarding comorbidities, it is noted that there were 13 cases of diabetes (0.86%), followed by 62 cases with mental illness (4.12%) and 295 cases with other diseases (19.61%) (Table 2).

Directly Observed Treatment (DOT) was performed by 559 cases (37.17%) throughout the historical series, and, in terms of the type of case closure, the cure outcome was observed in 585 (38.90%), treatment abandonment was present in 438 cases (29.12%), death in 204 cases (13.56%), transfers occurred in 162 cases (10.77%), MDR-TB occurred in 31 cases

Table 1. Sociodemographic characteristics of TB-HIV co-infection cases among adolescents and young adults (15 to 24 years old), from 2010 to 2020, South Region, Brazil.

Variable	n= 1504	%*
Gender		
Male	894	59,44
Female	609	40,49
Ethnicity/color		
White	941	62,57
Non-white	529	35,17
Education		
<7 years	719	47,81
from 8 to 11 years	419	27,86
12 years or more	39	2,59

Source: Ministry of Health/SVS - Notifiable Diseases Information System - SINAN.
*Absolute number and percentage (Totals may differ due to not having the subjects' answers or the professional not filling in some data in the tuberculosis notification form).

Table 2. Epidemiological and clinical characteristics of TB-HIV co-infection cases among adolescents and young adults (15 to 24 years old), from 2010 to 2020, Southern Region, Brazil.

Variable	n= 1504	%
Input type		
New case	1003	66,69
Relapse	102	6,78
Re-entry after abandonment	284	18,88
Transfer	103	6,85
Alcoholism		
Yes	234	15,56
No	1201	79,85
Smoking		
Yes	250	16,62
No	572	38,03
Illicit drugs		
Yes	296	19,68
No	528	35,11
Diabetes		
Yes	13	0,86
No	1421	94,48
Mental disease		
Yes	62	4,12
No	1374	91,36
Other diseases		
Yes	295	19,61
No	1036	68,88

DOI: https://doi.org/10.36489/saudecoletiva.2022v12i78p10950-10963

(2.06%) and the change in regimen totaled 23 cases (1.53%) (Table 2).

Carrying out the directly observed treatment		
Yes	559	37,17
No	725	48,20
Type of closure		
Cure	585	38,90
Abandonment	438	29,12
Death	204	13,56
Transfer	162	10,77
Multidrug resistant tuberculosis	31	2,06
Scheme Change	23	1,53

Source: Ministry of Health/SVS - Notifiable Diseases Information System - SINAN.
*Absolute number and percentage (Totals may differ due to not having the subjects' answers or the professional not filling in some data in the tuberculosis notification form).

DISCUSSION

The study showed that there was a variation in the prevalence of TB-HIV co-infection in the southern region of the country over the 11 years analyzed, pointing to a significant drop in the prevalence of TB-HIV co-infection among adolescents and young adults in recent years.

In this context, it is worth considering the existing difficulties for the control of both infections, such as the growing and disorderly urbanization; inequality in income distribution; precarious housing and overcrowding; food insecurity; low schooling; as well as the difficulty in accessing public services and goods; the association of tuberculosis with HIV infection and the emergence and spread of resistant strains. [8] The reduction in rates observed in the study followed the pattern observed in Brazil. This fact may be associated with the Brazilian government's efforts to combat the disease, highlighting the tuberculosis and HIV/AIDS control programs in municipalities and states. [9,10]

However, ahead of the pandemic period installed in 2020, it is essential to consider that with the recommendations of social distance, reorganization of health services to face Covid-19 to the detriment of other aggravations, the decrease in TB-HIV cases may be related to the restructuring of services and care network to face the pandemic. A study in China that analyzed the impact of Covid-19 on TB control showed a significant reduction in the notification of TB cases compared to the three years before the pandemic. [11] Therefore, the effective decrease in TB cases in response to public policies to control the disease, or the possibility of being a reflection of the interruption and reduction of access to health services during the Covid-19 pandemic, is questioned.

In this logic, it is important to highlight that the use of analyzes based on the prevalence coefficient has been an appropriate tool to support the planning of actions in the face of the occurrence of diseases. [12] Furthermore, the importance of identifying the profile of people affected by the diseases is added to support and implement more effective actions in the control of diseases.

In this sense, the present study points out that cases of TB-HIV co-infection among adolescents and young adults in southern Brazil have the highest proportion among males. This finding is related to a study that shows that inconsistent condom use during anal intercourse and multiple male sexual partners are risk factors for these cases. [13] In addition, it is worth noting that health risk behaviors (HRS) are more present in adolescence and youth, highlighting unprotected sexual behaviors. [14]

The distribution of cases considering the race/color variable presents social inequities in health, in which it was observed that the co-infection affects whites more, this finding shows a difference in the epidemiological profile between regions. A descriptive and retrospective study of individuals registered in a municipal reference unit located in a capital city in the Brazilian Northeast, identified that the black race/color is the most affected. [15] Regarding the classification of race/color in studies with secondary data, it is not possible to state the self-reported race because it is very subjective, however the findings may be helping to characterize the population under study. [16]

There was also a predominance of co-infection in people with low and up to 7 years of schooling. It is noted that lower education is common in unfavorable social conditions, reflecting in unhealthy housing conditions, lack of adequate food, difficulty in accessing transport and access to health services, consequently reflecting on diagnosis and treatment. [17]

Regarding the condition of entry of co-infection cases, the study showed that 85.57% of the entries in the southern region, of which were new cases (66.69%) and re-entry after abandonment (18.88%). In 2019, the federative units with the highest rate of new TB-HIV co-infection were Santa Catarina (16.2%) and Rio Grande do Sul (18.3%). [18] It is important to point out that an investigation is needed on factors related to non-adherence to clothing treatment, estimating the variables involved in falling ill due to TB and HIV/AIDS co-infection. [19]

Regarding the occurrence of other diseases, there was a small percentage linked to alcoholism (15.56%), smoking (16.62%) and illicit drugs (19.68%) among adolescents and young adults. The difference between these diseases may be related to social conditions, for example, individuals with less schooling use alcohol and other drugs, consequently falling ill due to co-infection. [19]

As for comorbidities, it is noted that

DOI: https://doi.org/10.36489/saudecoletiva.2022v12i78p10950-10963

diabetes (0.86%), mental illness (4.12%) and other diseases (19.61%) were present in patients with coinfection. As this finding was not very representative, it is pertinent to point out that the coexistence of these conditions may be contributing to poor results in the treatment of TB-HIV co-infection and the resistance in seeking care at the health service has made early diagnosis difficult. [20]

Observing the performance of DOT, (37.17%) of the cases had a record of this treatment follow-up modality, which is recognized as an important strategy to favor a greater bond between users and health professionals, providing better adherence to drug treatment and, consequently, it may reflect in obtaining better outcomes and quality of life. An ecological study related to 10,389 new cases of co-infection reported in the state of São Paulo from 2010 to 2015, points out that lower coverage of DOT was related to the formation of risk territories for TB-HIV co-infection and treatment abandonment. [21]

Regarding the treatment outcome, most were cured (38.90%), followed, however, by a significant percentage of treatment abandonment (29.12%). Such findings show that treatment dropout as a termination outcome is still a major challenge. The Ministry of Health and the WHO consider the maximum dropout rate of 5% for people undergoing TB treatment, a considerable difference from the almost 30% dropout rate observed in the present study. It is urgent to consider strategies aimed at strengthening treatment adherence, considering that non-adherence may be related to psychosocial aspects, lack of bond with the team, economic conditions, side effects of drugs and even as an effect of alcoholism and the use of other drugs. [4]

Although HIV/AIDS and TB are communicable and infectious diseases, they also represent chronic conditions due to the involvement for a long period of time and the need for the health system to have comprehensive care, requiring continuous, comprehensive and permanent care. [4] Thus, it is essential that services that serve people with HIV/AIDS and those responsible for TB control promote integrated care, providing reception and humanization, facilitating access to the Unified Health System network and social assistance, whenever necessary. [22] In this way, there is a greater probability of favoring people's attachment to services, adherence to treatment and the achievement of favorable outcomes, such as curing TB and controlling HIV.

It is found that people living with HIV (PLHIV) are approximately 30 times more likely to develop TB compared to those who are not infected with HIV.

Although the findings of this study allow us to reflect on the panorama of TB-HIV coinfection in the southern region of Brazil, it has some limitations regarding the method, given that it was a retrospective design using secondary data, over which the researchers have no control over the quality of the information.

CONCLUSION

The study identified, among the cases of TB-HIV co-infection in adolescents and young adults in the southern region of the country, the highest prevalence in the state of Rio Grande do Sul. As for the sociodemographic profile, the predominance of males, of white race/color, and of education up to 7 years. Regarding the epidemiological and clinical profile, users of illicit drugs, smoking and alcoholism prevail, respectively, and the cases that performed the directly observed treatment obtained a cure outcome superior to abandonment.

Given the epidemiological relevance of the southern region of Brazil for the surveillance and control of HIV and TB in the country, actions aimed at the control of TB-HIV co-infection are indispensable. It is necessary to establish an articulated work between the programs of both diseases, with a joint care planning that includes well-designed care flows and pathways. Special attention should be given to linking people to services and adherence to treatment.

Therefore, recognizing the profile of this population and the overlap between TB and HIV becomes an important tool for disease control and for the search for improvements in the provision of quality care. Thus, the importance and contribution of studies like this one for the planning of health actions in line with the conformation of the care network and the demands and needs of the considered population.

FINANCING

The present work was carried out with the support of the Coordination for the Improvement of Higher Education Personnel - Brazil (CAPES) - Financing Code 001.

DOI: https://doi.org/10.36489/saudecoletiva.2022v12i78p10950-10963

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