

# Tuberculosis in Brazil: Difficulties in Case Control During the Pandemic Period

Laryssa Nascimento<sup>a</sup>.

<sup>a</sup> University Center of the States of Pará, Pará, Brazil. laryssavieira@outlook.com

**Introduction:** The COVID-19 pandemic represented a period of intense difficulties in controlling tuberculosis cases in the country due to various causes. **Research method:** For this analysis, the number of confirmed cases made available on the TABNET website during the years 2018 to 2022 were analyzed according to the regions of Brazil. **Results:** As a result, all regions show a decrease followed by an increase in the number of tuberculosis cases during and after the pandemic. **Discussion:** This scenario can be related both to factors related to the patient and the presence of patient comorbidities, highlighting HIV, the fear of contracting SARS-CoV-2 and the worsening of social conditions with the increase in unemployment, both government-related factors such as reduced government investment in strategies to control the incidence of tuberculosis, reduced access to health facilities. The presence of increased bacterial resistance to available treatments is also important when observing the possibility of treatment failure. **Conclusion:** Therefore, the fluctuation in case results must be analyzed carefully, with a slight reduction in notifications being expected during the pandemic, followed by an increase in cases post-pandemic. To try to alleviate this scenario, there is a need to reinforce investment in control strategies against tuberculosis and facilitate access to treatment.

**Keywords.** Tuberculosis, Pandemic, Difficulties.

## 1. Introduction

Tuberculosis represents a bacterial disease resulting from the infection of *Mycobacterium tuberculosis*, which is highly transmissible, mainly in its laryngeal and pulmonary forms, since particles of this bacteria are released in the form of aerosols and are highly resistant to environmental temperatures [1-2]. Due to its high global incidence, the World Health Organization (WHO) established goals and specifications for three lists of countries that should present stricter rules for tuberculosis control [2-3].

Among the priority countries, Brazil appeared on two of these lists, which led the country to adopt increasingly strict measures to reduce the high burden of the disease in the country. In 2017, the National Plan for Second Tuberculosis Control was created based on the objectives proposed by the WHO that organized the goals that should be achieved at the national, state and municipal levels, mainly reinforcing the differences of each location and how strategies could be determined in the search to reduce the incidence in the country [2].

However, during the pandemic, several health dynamics had to be changed to combat COVID-19, which led to a change in strategies and highlighted

the differences between the states of Brazil. In this scenario, tuberculosis was not included as a health priority, which contributed to making it difficult to achieve the goals already set for disease control [3-5].

Therefore, comparing the number of tuberculosis cases in the pre- and post-pandemic period is to visualize the impact that the COVID-19 pandemic had on the records of this disease in Brazil, understanding the possible factors for these variations, as well as helping to define better health strategies for obligations, decreasing its prevalence.

## 2. Research Methods

This work is a retrospective, cross-sectional study, based on the analysis of the number of confirmed cases per year of diagnosis and made available on the TABNET website, the main source of information on diseases in Brazil, during the years 2018 and 2022 according to the regions of the country.

## 3. Results

**Tab. 1** - Confirmed cases by year of diagnosis according

to region between 2018 and 2022.

Region	2018	2019	2020	2021	2022
North	10.413	11.691	10.491	11.588	13.008
North East	25.230	25.036	22.238	23.853	26.803
South east	43.031	42.981	39.021	41.109	44.990
South	11.476	11.854	1.497	10.887	12.053
Midwest	4.585	4.622	4.167	4.339	4.952
Total	94.735	96.184	86.414	91.776	101.806

#### 4. Discussion

The COVID-19 pandemic has directly influenced the behavior of global diseases. In Brazil, this scenario was no different, highlighting tuberculosis as a serious disease that had a direct impact on its incidence containment policy.

Firstly, it is important to highlight the lockdown policy as a direct influence on the scenario mentioned. Among the various risk factors for acquiring tuberculosis, crowding and closed environments help spread the disease, as it facilitates contact between people and bacilli [6]. The lockdown represented an attempt to contain contact between people, which works for both COVID-19 and tuberculosis. However, an increase in incidence post-pandemic was already expected, as there would be new contacts between people, which can be observed in the years 2021 and 2022, a period of time marked by the progressive exit from social isolation in the country [7-8]

Another important risk factor, the social factor associated with the disease must not be forgotten. The activity of Mycobacterium has low pathogenicity and can present pathological activity when there is little immunological resistance on the part of the host to the proliferation of the bacillus. Among the various causes that contribute to reducing this resistance, little access to healthy food, little physical activity and stress control are correlated with social and economic factors. During the pandemic, the increase in unemployment led part of the population to live below the poverty line, generating stress that impacts the patient's immune response. According to the Institute of Applied Economic Research (IPEA), in 2021 Brazil faced poverty levels below the 1990 level, which has a direct connection with an individual's greater susceptibility to contracting tuberculosis, a disease with a direct correlation with purchasing power [9-11].

In addition to this, there is difficulty among the population in seeking care at health centers. Basic

Health Units are considered places of action for the national tuberculosis control policy in Brazil as they represent the gateway for all patients and the place where medicines against the disease are dispensed [2]. In the emergency situation of the pandemic, controlling the transmissibility of SARS-CoV-2 was the main objective, which led to the displacement of a large number of health agents to the front lines of the fight, such as secondary and tertiary hospitals and field accommodation, keeping them away from UBS. As a consequence, the affected population found itself restricted to the few health centers that still provided medicines, hampering the effective treatment of the disease [12-13].

Moreover, contamination between SARS-CoV-2 and Mycobacterium must be considered. As described, the tuberculosis bacteria has the ability to live inactively in the human body, being activated when the immune system is low. In the line of controlling the mitigation of SARS-CoV-2 infection, corticosteroids were frequently used to alleviate pulmonary inflammation, however, as an adverse effect, these medications have the possibility of decreasing the user's immunological resistance. As a consequence, the bacteria bacilli that are latent in the body can be activated, causing the disease [14-15].

Among the various comorbidities associated with tuberculosis, HIV presents itself as an important cause for intervention. As observed with corticosteroids, the Human Immunodeficiency Virus (HIV) has a direct link with the decline of the immune system, which is possible for replication by decreasing the activity of CD4+ lymphocytes in the human body, enabling its host not only to manifest the disease AIDS as well as several other opportunistic diseases, including tuberculosis. During the pandemic, several factors contributed to making access to HIV control treatment difficult, such as the reduction in the supply of medicines and the fear of people suffering from leaving home and looking for the nearest healthcare system, thus favoring the manifestation of AIDS and tuberculosis during and post pandemic [16- 17].

Another reality is the limited government investment in tuberculosis control programs, especially during the pandemic. In periods of emergency, the main health approaches are based on containing a new disease, which was no different during COVID-19. The rapid rush and intense investment in the production of vaccines and safety measures against SARS-CoV-2 have led to restrictions on the number of tests for tuberculosis and the availability of treatment, as can be seen in data on the global decline in reported cases in all regions of the country. Associated with this, there is a lack of investment in programs against the disease, with less than 50% of the budget planned for the years 2019 and 2020 combined. This scenario is worrying, as we see the distance from the goal of controlling the disease, which returns to its pre-pandemic value from 2021 onwards, a year marked

by a better understanding of COVID-19. [13, 18-19].

In addition, another detail to be highlighted would be the growing bacterial resistance to the available treatment. Before the pandemic, methylations in the RNA of *Mycobacterium tuberculosis* were observed, leading to inhibition of affinity for lycosamines and macrolides, the main classes of medications used to treat tuberculosis [20]. When this reality is added to the reduction in access to UBS, patients who did not complete their treatment properly, being susceptible to multiresistant bacteria, worsening the disease [21].

## 5. Conclusion

It is concluded, then, that the control of tuberculosis faced serious difficulties during the pandemic, whether due to individual reasons such as the fear of contracting the virus when seeking health care outside the home or the reductions in the government's own strategies regarding the disease and prioritization of intervention under COVID-19. Therefore, an increase in tuberculosis cases is already expected in the post-pandemic period until its subsequent stabilization, which requires greater intervention and strict strategies against transmissibility and better treatment provision for those infected by *Mycobacterium*.

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