Childhood tuberculosis in the state of Paraná

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1 INTRODUCTION

Tuberculosis (TB) is a disease that affects a heterogeneity of people, including the child population. Childhood TB is most often in a primary way, rapidly and progressively resulting from the inability of the immune system to respond to pathogens (ABREU SUAREZ et al., 2020).

Childhood TB occurs mainly in endemic countries for the disease, and epidemiological knowledge is limited when compared to evaluations performed in the adult population. However, monitoring the occurrence of childhood tuberculosis represents a valuable indication of its transmission, especially in countries with high incidence. The identification and examination of the contacts of infected children and adolescents is an effective strategy in the identification of the source case (MENDES et al., 2021).

Although TB is an existing disease for thousands of years it is still a global public health problem, being one of the top ten causes of death from infectious diseases. Studies show that in 2016 1 million new cases of Childhood TB emerged worldwide, with India, Indonesia, China, the Philippines, Pakistan, Nigeria, and South Africa being the countries with the highest incidence of cases (64%) (WORLD HEALTH ORGANIZATION, 2021). In the Region of the Americas in 2015, TB had 3.0% of the global load with a total of 268,000 new cases distributed in Brazil (33.0%), Peru (14.0%), Mexico (9.0%) and Haiti (8.0%) (BUENO, 2018).

In Brazil, in 2015, 83,617 tb cases were recorded, of which 7,106 (8.5%) occurred in children under 19 years of age (MENDES et al., 2021). In 2020, 66,819 new tb cases were recorded. In 2019, records indicated about 4,500 deaths resulting from the disease. Approximately 15% of the incidence of TB affects...
the population under the age of 15 years (ABREU SUAREZ et al., 2020; PEREIRA; WALNUT; CAMPOS, 2021).

Despite the advances made in tb control in recent years, it is still necessary to develop measures and indicators for prevention, control, and reduction of the incidence and mortality rate in the world (BUSSI; GUTIERREZ, 2019), since to the detriment of the lack of these measures, in recent years there has been a significant increase in cases of childhood TB in Brazil, evidencing the need for studies with this population to know the epidemiological and territorial clinical profile of this disease. With this view, this study aims to describe the cases of childhood tuberculosis in the State of Paraná in the years 2008 to 2018, as well as its incidence and spatial distribution in the State.

2 METHODOLOGY

This is an ecological study conducted in the state of Paraná. The state has 399 municipalities and is subdivided into four macro-regional health, namely: East, West, North, and Northwest.

The population studied was composed of all TB cases reported in the Notifiable Diseases Information System (SINAN) of the Paraná Health Department, from 2008 to 2018. The inclusion criterion was under 15 years of age and was duly notified in the notification form without presenting missing data.

The statistic analysis was developed in two stages. The first stage was the exploratory phase of the data, in which descriptive statistics were used with the calculation of absolute frequency measures and categorical variables using statistic software (12.0), and the incidence rate of cases per 100,000 inhabitants is calculated according to the number of individuals living in the municipality according to ibge 2010.

In the second stage, the georeferencing of infant TB was performed by the municipality, and thematic maps were elaborated in the ArcGIS software version 10.5, using color gradation with red tones, the stronger the tonality, the greater the number of cases of infant TB in the municipality and/or higher the incidence rate.

The study was approved by the Research Ethics Committee of the Ribeirão Preto School of Nursing of the University of São Paulo (EERP/USP) under the Certificate of Presentation for Ethical Appreciation (CAAE) 24963319.1.0000.5393.

3 CONCLUSION

In the State of Paraná between 2008 and 2018, 29,499 cases of TB were reported, of which 887 were less than fifteen years old. There was a higher prevalence for females (n=438; 50.8%), aged between 10 and 14 years (n=403; 46.8%), followed by less than 4 years (283; 32.8%) and 4 to 10 years (n=176; 20.4%). As for race/color, white was the most prevalent (n=525; 60.9%), brown (n=203; 23.5%), and black (n=120; 13.9).
Table Chart 1- Prevalence of cases of Childhood Tuberculosis in the State of Paraná from 2009 to 2018.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>438</td>
<td>50.8%</td>
</tr>
<tr>
<td>Age between 10 and 14 years</td>
<td>403</td>
<td>46.8%</td>
</tr>
<tr>
<td>Age Under 4 years</td>
<td>283</td>
<td>32.8%</td>
</tr>
<tr>
<td>Age between 4 and 10 years</td>
<td>176</td>
<td>20.4%</td>
</tr>
<tr>
<td>White Race</td>
<td>525</td>
<td>60.9%</td>
</tr>
<tr>
<td>Brown Race</td>
<td>203</td>
<td>23.5%</td>
</tr>
<tr>
<td>Black Race</td>
<td>120</td>
<td>13.9%</td>
</tr>
</tbody>
</table>

In a study conducted in 2021, a divergence was observed, since they indicate a prevalence for males with an average of 10.9 years (Kontturi, 2021). The study developed in Benin, Burkina Faso, Faso, Cameroon, and the Central African Republic corroborated this study, which presented the same observations as this study, with a higher prevalence of TB among females (Schwoebel, 2020).

Regarding the clinical characteristics of TB, the majority (n=796; 92.3%) were new cases and pulmonary TB was the most diagnosed (n=642; 74.5%), followed by extrapulmonary (n=187; 21.7%). For the treatment outcome, 80.8% of the cases progressed to cure, (2.9%) abandonment, and 1.4% died.

Clinical manifestations of TB occur through the immune response to bacterial infection. Primary infection occurs at the beginning of the disease with the action of neutrophils that began to be replaced by macrophages within one week. The immunological response is triggered by late-type hypersensitivity. Infection and immune response can be studied by combining low molecular weight proteins such as tuberculin, which when purified is designated purified protein derivative (PPD) (Silva et al., 2018).

Although TB has a great social impact, it is noted that about (80.8%) of the cases evolved to cure. The fact that TB is nonspecific in childhood makes the appropriate treatment a challenge for health professionals and is extremely important for changing the course of the disease in the long term (Carvalho, 2018).

According to the Ministry of Health, treatment for pulmonary and extrapulmonary TB in children under 10 years of age consists of a two-month virus attack phase with rifampicin, isoniazid, and pyrazinamide and a four-month maintenance phase with isoniazid. In over 10 years, ethambutol is added to the attack phase (Brasil, 2019; Carvalho, 2018).

Table Chart 2- Clinical Characteristics of Tuberculosis.

<table>
<thead>
<tr>
<th>Clinical Characteristics</th>
<th>Numbers</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Cases</td>
<td>796</td>
<td>92.3%</td>
</tr>
<tr>
<td>Pulmonary Tuberculosis</td>
<td>642</td>
<td>74.5%</td>
</tr>
<tr>
<td>Extrapulmonary Tuberculosis</td>
<td>187</td>
<td>21.7%</td>
</tr>
</tbody>
</table>

Table Chart 3 - Outcome of Tuberculosis Treatment.

<table>
<thead>
<tr>
<th>Treatment Outcome</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healing</td>
<td>80.8%</td>
</tr>
<tr>
<td>Abandonment</td>
<td>2.9%</td>
</tr>
<tr>
<td>Death</td>
<td>1.4%</td>
</tr>
</tbody>
</table>
When analyzing Figure 1, it was possible to observe that the municipalities of Curitiba (cases=163), Umuarama (cases=61), Paranaguá (cases=55), Londrina (cases=51), Santa Terezinha do Itaipú (cases=44) and Cascavel (cases=28) were the municipalities with the highest number of cases in the State. On the other hand, when observing the incidence rate of childhood TB, it is noted that Santa Terezinha de Itaipu (tx=211.12), Umuarama (tx=60.59), Campo Bonito (tx=45.38), Iguatu (tx=44.76), Matinhos (tx=44.18) and Paranaguá (tx=39.15) were the most incident.

Figure 1 - Distribution of the incidence and cases of childhood tuberculosis in the State of Paraná

It is observed that TB has a significant relationship with the territories in which the municipalities have a greater number of people, after creating greater numbers of cases. By observing the incidence rate, it is possible to identify that the highest number of cases come from municipalities with a high population index, which consequently causes an overload of health services, disruption, increased marginalization, a deficit in the demand for primary health care services and increased social contact, especially in public transport, which facilitates the transmission of diseases.

These characteristics were also observed by Schwoebel et al., (2020), and Kontturi et al., (2021) who mention that the territory has a great relationship with the development of health problems including TB.

The development of this study identified territories in Paraná with a high incidence of childhood TB, a worrisome characteristic since according to the recommendations of the Strategy and TB and the National Plan for the End of Tuberculosis it is necessary to reduce the incidence coefficient to less than ten cases per 100,000 inhabitants, indicating that the State should intensify health actions within these
territories with the highest number of cases, as well as immunization, dissemination and prevention conduct.

Finally, this work contributes to the scientific development of the theme and helps in the identification of the profile of the disease in the State so that health prevention and promotion measures are implemented. Moreover, it is important to develop new studies of this nature so that the profile of childhood TB is traced, especially after the COVID-19 pandemic period.

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REFERENCES


2) BRASIL, Manual de recomendações para controle da Tuberculose no Brasil, 2° edição atualizada, 2019.

3) BUENO, N.S. Principais fatores e medidas para prevenção do abandono do acompanhamento de crianças com tuberculose doença ou infecção latente. UNIVERSIDADE FEDERAL DO PARANÁ, 2018.


