

EPIDEMIOLOGICAL PROFILE OF LEPTOSPIROSIS CASES IN BRAZIL FROM 2015 TO 2019

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Abstract: Leptospirosis, considered a public health problem, is an acute febrile infectious disease of compulsory notification with a lethality of up to 40% in the most severe forms, being caused by the bacterium of the genus *Leptospira* sp and transmitted by exposure to the urine of infected animals, such as the rats. Therefore, the objective of the study is to analyze the epidemiological profile of reported cases of leptospirosis in Brazil between 2015 and 2019. The research has a quantitative, cross-sectional, descriptive and retrospective nature with data collected in the Department of Informatics of the Unified Health System (DATASUS), disregarding information that is not present in the established time frame. In the period from 2015 to 2019, 16,938 cases of leptospirosis were reported, with a highlight in 2015 (25.29%), in the South region (36.58%), in the urban area (75.80%), in males (81.53%), in the age of 20 to 39 years (38.3%), in whites (47.76%). In addition, the majority obtained the Cure (82.96%). In view of this, there is a need to create public measures of a resolute nature in the face of health shortages, especially in regions of low socioeconomic status, to combat the incidence of this disease. **Keywords:** Leptospirosis; leptospira; disease notification; epidemiology.

INTRODUCTION

Leptospirosis is characterized as an acute febrile infectious disease of immediate compulsory notification, which can affect human beings and animals. It is transmitted through exposure to the urine of infected animals, mainly rats, by the bacteria of the genus *Leptospira* sp, which penetrates the human body through lesions on the skin or mucous membranes (DIZ and CONCEIÇÃO, 2021).

The transmission of this pathology is influenced by local socioeconomic conditions, since the absence of adequate

sanitation services favors the dissemination of rodents. Furthermore, climatic factors, such as rainfall, are also capable of favoring the propagation of the bacteria, due to the occurrence of floods. In view of this, it is noted that leptospirosis is more prevalent in developing and tropical countries (GRACIE; XAVIER; MEDRONHO, 2021).

Regarding the symptoms, it can be asymptomatic or cause fever, nausea, myalgia and headache. In more severe cases, there may be severe renal and hepatic involvement, reaching a lethality rate of up to 40%. In addition, leptospirosis infection can cause absences from work activities and exacerbate costs to the Unified Health System. (SUS) (LELITSCEWA et al., 2018; MAGALHÃES e ACOSTA, 2019).

In Brazil, it is considered endemic, with outbreaks occurring during the wettest periods of the year, especially in metropolitan regions (DUARTE and GIATTI, 2019). In addition, despite being previously associated with rural areas, its incidence is higher in urban areas, due to the large number of individuals who live in houses close to streams or other places more susceptible to contact with the etiological agent (LARA et al, 2019).

This disease is considered an important public health problem. According to estimates, there are around 1 million cases of leptospirosis in the world per year, with 58,900 deaths caused by the pathology. In Brazil, there are approximately 4,000 cases per year, with a mortality rate of 8.5% (SOUZA et al., 2020).

However, leptospirosis still has little visibility in the mass media, which prevents the dissemination of knowledge about the disease to the general population, especially with regard to forms of prevention. According to Martins and Spink (2020), this pathology is classified as a Neglected Tropical Disease (NTD), due to its predominance in places

with low socioeconomic conditions. In this way, there is a lack of interest on the part of the public authorities and the pharmaceutical industry in providing preventive or curative measures to residents of areas at greater risk.

Therefore, knowledge about the public most affected by leptospirosis is essential in order to create more effective public policies to reduce cases of this disease. Therefore, the present study aims to analyze the epidemiological profile of reported cases of leptospirosis in Brazil from 2015 to 2019.

METHODOLOGY

RESEARCH TYPE

This is a quantitative, cross-sectional, descriptive and retrospective study with secondary data on the notification of leptospirosis cases from 2015 to 2019 in Brazil, as available in the Department of Informatics of the Unified Health System (DATASUS).

LOCATION AND PERIOD OF THE RESEARCH

The research was carried out in the State of Pará, during the months of January 2021 to February 2021.

ETHICAL ASPECTS

As it is a research that involves human beings, this study complied with the recommendations of resolution 466/12 of the National Health Council, which regulates research with human beings, and “incorporates, from the perspective of the individual and collectivities, the four basic references” of bioethics: autonomy, non-maleficence, beneficence and justice, among others, and aims to ensure the rights and duties that concern the scientific community, research subjects and the State”. The work respects the precepts of the Declaration of Helsinki and the Nuremberg Code (Res.

CNS 196/96) of the National Health Council. Approval by the Ethics Committee is allowed as the study was descriptive and based exclusively on secondary data. Regarding biosafety aspects, the study will offer minimal risks to the population under study and to the researchers, considering that the data are secondary.

SUBJECT OF THE RESEARCH

To achieve the objective of the study, epidemiological data will be collected on leptospirosis cases from 2015 to 2019 in Brazil registered in the aforementioned Database

INCLUSION AND EXCLUSION CRITERIA

As inclusion criteria, all data made available by DATASUS that report cases of leptospirosis in the period from 2015 to 2019 in Brazil will be considered. Missing information in the Database, or data that are not present in the established time frame and those outside the age parameters of analysis were disregarded.

DATA COLLECTION

Data collection was carried out in January 2021 through access to the database of the Department of Informatics of the Unified Health System (DATASUS). Entering the Database, the initial search was carried out under the topic “Epidemiological and Morbidity”, then “Notifiable Diseases and Diseases - 2007 onwards (SINAN)”, “Leptospirosis”, with delimitation of notifications referring to cases Data collection was then carried out through “row/column” crossings, using the fields to verify the data “Notification year”, Notification region”, “education”, “Race”, “Sex”, “Age” and “Evolution”.

DATA ANALYSIS

In the period from 2015 to 2019, in Brazil, 16,938 cases of leptospirosis were reported.

RESULTS AND DISCUSSION

In the period from 2015 to 2019, in Brazil, 16,938 cases of leptospirosis were reported.

Year	Number of cases	%
2015	4.337	25,29
2016	3.064	17,87
2017	3.019	17,60
2018	3.079	17,95
2019	3.646	21,26
Total	17.145	100,00

Table 1 - Distribution of leptospirosis cases in Brazil, per year, from 2015 to 2019.

Source: SINAM – Notifications Disease Information System.

Distribution of leptospirosis cases in Brazil, by region, from 2015 to 2019.

Year	Number of cases	%
South	6.273	36,58
Southeast	4.919	28,69
North	3.301	19,25
Northeast	2.298	13,40
Mid-West	354	2,06
Total	17.145	100,00

Table 2 - Distribution of leptospirosis cases in Brazil, by region, from 2015 to 2019.

Source: SINAM – Notifications Disease Information System.

Regarding epidemiology, it is observed that, among Brazilian regions, the South and Southeast stand out with the highest percentages of notification of leptospirosis. Thus, it can be seen that factors present in large metropolitan areas, such as greater population density and precarious health

coverage, favor the prevalence of the disease (VASCONCELOS et al, 2012). On the other hand, the North and Northeast regions, although they have risk factors associated with the pathology in question, have lower reporting rates. This fact may be related to the underreporting of the disease in endemic areas, which makes it difficult to calculate the actual incidence (DA SILVA et al, 2018).

Area type	Number of cases	%
Urban	12.995	75,80
Countryside	4.150	24,20
Total	17.145	100,00

Table 3 - Distribution of leptospirosis cases in Brazil, by Area type of notifications, from 2015 to 2019.

Source: SINAM – Notifications Disease Information System.

The urban area of developing countries has been identified as a facilitator for the proliferation of rodents and outbreaks of leptospirosis. It is believed that the speed of city growth and population growth were not accompanied by adequate health planning, which contributes to the formation of densely occupied regions, high accumulation of waste and poor sanitation (GALAN et al., 2021). In the present study, 75.80% of the cases reported in Brazil were identified in urban areas, numbers that follow the trend of developed countries, but the rural area still occupies an important portion of Brazilian cases (24.20%), as well as in other countries. other underdeveloped countries, such as Iran, with 82.7% of cases reported in rural areas, pointing to work activities in the open and in contact with animals (SAHNEH et al., 2019).

However, it is important to emphasize that even in developed countries, leptospirosis in urban areas has been reasserting alerts due to strong urbanization and population migrations. In addition, both high rainfall and

climate change, if combined with the lack of basic sanitation and hygiene, can contribute to outbreaks and epidemics of leptospirosis, as they facilitate contact with rodent urine (Naing et al., 2019; Sohail. et al., 2018; Jorge et al., 2017). The impacts of climate change are being observed even in developed countries, with the fear that this factor will influence the dynamics of exposure to rodents (Nau et al., 2019; Dupouey et al., 2014; Vitale et al., 2018).

Gender	Number of cases	%
Male	13.978	81,53
Female	3.167	18,47
Total	17.145	100,00

Table 4 - Distribution of leptospirosis cases in Brazil, by sex, from 2015 to 2019.

Source: SINAM – Notifications Disease Information System.

In addition, in the present study, it was identified that males account for a considerably greater share of the number of leptospirosis cases, representing 81.53% of cases, which is corroborated by other studies on several continents (Mohd-Taib et al, 2020; Tan et al., 2016; ECDP, 2012). This asymmetry could be explained by the cultural tendency of males to occupy most of the outdoor work activities, such as agriculture, and to be more exposed to leptospirosis reservoir animals than females, impacting the time of life free of disabilities (Tan et al., 2016; Togerson et al., 2015).

Age	Number of cases	%
15 to 19 years	1.478	8,62
20 to 39 years	6.567	38,30
40 to 59 years	5.915	34,50
Other	3.185	18,58
Total	17.145	100,00

Table 5 - Distribution of leptospirosis cases in Brazil, by age, from 2015 to 2019.

Source: SINAM – Notifications Disease Information System.

Regarding the characterization of these patients, it was found that the age group with the highest number of infected people is determined by the interval between 20 and 39 years, which corresponds to 38.3% of the total analyzed. The data found are in agreement with the literature, where we found that adult individuals (between 20 and 45 years old), male and with low socioeconomic conditions are the most affected by leptospirosis in the past decade (DA SILVA et al, 2020).

Breed	Number of cases	%
White	8.188	47,76
Brown	6.669	38,90
Other	2.288	13,34
Total	17.145	100,00

Table 6 - Distribution of leptospirosis cases in Brazil, by race, from 2015 to 2019.

Source: SINAM – Notifications Disease Information System.

Regarding the race variable, in the present study most cases occurred in individuals who declared themselves white (45.76%) and mixed race (38.9%), data that corroborate other studies carried out in the country, in which people white were more affected - 53.8% and 46.1%, respectively (LARA et al, 2019; MARTINS and SPINK, 2020). However, in the two studies evaluated, this variable was not filled in properly, being absent and/or ignored, and it was not possible to establish a significant relationship between the involvement of leptospirosis and race.

Education	Number of cases	%
Incomplete elementary school	4.150	24,20
Complete high school	2.314	13,50
Other	10.681	62,30
Total	17.145	100,00

Table 7 - Distribution of leptospirosis cases in Brazil, by schooling, from 2015 to 2019.

Source: SINAM – Notifications Disease Information System.

Individuals with lower education are the most affected by this infection, with 24.20% having incomplete elementary school and 13.50% having completed high school. Thus, when analyzing the schooling profile, it can be understood that most affected individuals are of lower economic class, who most of the time have precarious living and working conditions, thus being constantly exposed to the causative agent. of the disease. (DA SILVA et al, 2020).

a significant percentage died from the disease, which highlights the importance of measures related to its prevention, especially by minimizing underreporting, responsible for the difficulty in understanding the geographic distribution of the disease, as well as the implementation of measures to enhance health coverage, especially in regions of low socioeconomic status.

Area type	Number of cases	%
Cure	14.224	82,96
Death	2.921	17.04
Total	17.145	100,00

Table 8 - Distribution of leptospirosis cases in Brazil, evolution of the disease, from 2015 to 2019.

Source: SINAM – Notifications Disease Information System.

Regarding the evolution of the disease, we noticed that the data found in the work are in agreement with the literature and that the number of deaths represents a relatively low percentage in relation to the total number of patients. However, as it is a neglected disease, we realize the importance of implementing public sanitation policies so that there is no more loss of life due to preventable causes, as in leptospirosis (DA SILVA et al, 2018).

CONCLUSION

Therefore, it is noted that the highest number of cases occurred in 2015 and the South region had more notifications than the others. In addition, there was a prevalence of the disease in the urban area. Among those affected by leptospirosis, there was a predominance of male individuals, aged between 20 and 39 years, white and with incomplete primary education. Although more than half of those infected were cured,

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