

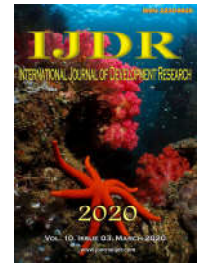


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RESEARCH ARTICLE

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EPIDEMIOLOGICAL PROFILE OF VISCERAL LEISHMANIOSIS IN GURUPI - TOCANTINS BETWEEN THE YEARS 2013 TO 2018

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ABSTRACT

Introduction: Visceral Leishmaniasis is an endemoepidermal anthrozoosis caused by a protozoa of the species *Leishmania chagasi*. According to Brazilian health surveillance, in recent years, there has been increasing the number of cases in the northern region. **Objective:** Because it is an endemic pathology of great relevance in the world scenario and due to the increase in the number of cases in the north region and especially in Tocantins, research is justified to quantify and compare the trend of epidemiological indicators related to leishmaniosis. **Methods:** A descriptive, retrospective and documentary cross-sectional study of cases registered in the Informatics Department of the Unified Health System was conducted from 2013 to 2018. Two epidemiological indicators and an operational indicator in addition to statistical software were used to compose and analyze the results. **Results:** The year 2013 presented the highest number of reported cases, 279 in Tocantins and 10 in Gurupi. There was a significant drop in 2015 and 2016 in Gurupi, with a significant increase in 2017 and 2018, including the number of hospitalizations. At the municipal and state level, children under 10 years of age remain as the age group with the highest prevalence and number of hospitalizations in Gurupi, as well as the predominance of incidence in males. **Conclusion:** The results indicate that was an increase in reported cases of visceral leishmaniosis and that this high incidence prevails in males and children under 10 years of age, besides being influenced by environmental, economic and sociocultural factors. Prophylactic measures have been insufficient to avoid the incidence of pathology, as hospitalizations have increased. The need for prophylactic actions, with socio-educational measures and an early diagnosis, especially in children, to morbidity and mortality reduction.

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INTRODUCTION

Leishmaniosis are vector transmitted diseases and are part of a group of infectious tropical diseases in which they are considered neglected. Despite the global distribution, they usually occur in the poorest countries of Africa, Asia and the Americas, especially in the most susceptible populations and with difficult access to health services (PAHO/WHO, 2019). In Americas, leishmaniosis is an endemic parasitosis, which in line with the Pan-American Journal of Public Health report affects more than 60,000 people on the continent a year, and that number that has been growing (PAHO/WHO, 2019 and PAHO/WHO, 2015).

In this region, Brazil is the country with the largest endemic disease, with about 97% of the cases on the continent (Pastorino Antonio, 2002). Visceral Leishmaniosis is considered an endemic pathology in the four of the five regions of Brazil, except of only the Southern Region, this is due to a growth of the geographical area and urbanization (Furlan Mara Beatriz Grotta, 2010). The disease obtained medical importance, due to some factors such as: epidemic of acquired immunodeficiency syndrome and urbanization of vectors, in which disordered occupation had an influence of urban spaces and deforestation in rural areas (Aguiar Paulo Fernando, 2017). The first report of the disease in Brazil was in 1934, in which amastigote forms of *Leishmania* were found in histological liver cuts. The first cases were restricted to rural

areas of the Northeast, reaching later other indenes regions, reaching mainly the periphery of large urban centers (Gontijo Célia Maria Ferreira, 2004). In Brazil, etiologial agent of visceral leishmaniasis (VL) is a protozoan of the *Trypanomatidae* family, *Leishmania* genus, which penetrating host cells, especially from the immune system (circulating and fixed macrophages) initially causes cell hyperplasia causing an increase in volume of organs, mesenchymal cells and functional impairment of the lymphocytic and hematopoietic system. *Phlebotomes* or *phlebotomines*, known as hematophagous, when they are infected by protozoan causes transmission to man (Maurício, 2000). Some studies have observed that this kind of leishmania can be transmitted by other vectors, such as *Migonemyia migonei* that is easily found with Le DNA. *in. chagasi*, in an endemic area in Brazil (Carvalho Maria Rosimery de, 2007 and Santos Eric Fabrício Marialva dos, 2019). This species has a wide distribution throughout South America; in Brazil, *Mi. migonei* is present in the states of Acre, Amapá, Amazonas, Pará, Rondônia, Tocantins, Alagoas, Maranhão, Ceará, Paraíba, Pernambuco, Bahia, Rio Grande do Norte, Goiás, Mato Grosso, Mato Grosso do Sul, Espírito Santo, Minas Gerais, Rio de Janeiro, São Paulo, Paraná, Rio Grande do Sul and Santa Catarina (Aguiar Gustavo, 2018). Phlebotomines are susceptible to sudden temperature changes and generally opt for regions where low variation occurs between minimum and maximum temperatures since their survival can be reduced if the climate is at high temperature and low humidity and, thus, high temperatures also decrease cases of human LV (Oliveira Iara Brito Bucar, 2012). Among the aggravating factors for lv dissemination there is the fact that Brazil and the state of Tocantins have favorable ecoepidemiological characteristics and also maintenance of simple habits of forest-related activities, such as animal breeding in the backyards, loose in the streets, forest waste in the urban perimeter, intense migratory flow and the lack of basic and sanitary structure that promotes urbanization and spread of the disease (Jayme, 2016). The disease occurs due to precarious health infrastructure, breeding of animals that act as parasite deposits, climatic conditions favorable to vector proliferation, vegetation cover with predominance of fruit trees that i comb fear vector transmission (Oliveira Iara Brito Bucar, 2007 and Silva Karolyne Botelho Marques, 2017). Regarding symptoms, their presentation may not occur or even have a typical case of parasitosis.

Thus, presenting fever, anemia, hepatosplenomegaly. Other characteristics are dry cough, increased number of lymphocytes, decreased number of figurative elements of the blood. Yellowish staining may also occur on the skin, weight loss, peripheral edema, diarrhea which may inhibit the identification of the pathology (Sousa Natanael Aguiar de, 2018). Due to non-specific symptoms, it is necessary to use complementary methods for the diagnosis of this condition. The means differ in two types: direct or indirect. The first consists of the identification of amastigotes in the most common regions, such as spleen, liver, bone marrow and lymph node, and bone marrow is usually performed. The second are serological tests, including ELISA or indirect immunofluorescence (RIFI), which indicate contact with current or past leishmania, in addition to immunochromatographic tests (Lindoso, 2006). Other methods also used are PCR and culture, which is a time-consuming examination, taking on average 30 days to obtain results (Boelaert Marleen, 2014). Regarding use, the most common

immunological examination for VL is indirect immunofluorescence (IFR) and immunoenzymatic assays. However, the tests serve as complements the clinical observations. Thus, a reagent test, in the absence of typical clinical manifestations of VL, does not authorize the initiation of treatment (Brazil., 2006). Although Visceral Leishmaniasis is considered severe, it has treatment for humans. It is free and available on the Unified Health System (SUS) service network. The drugs currently used to treat VL do not completely suppress the parasitism in humans. The first-choice drug treatment for VL is the antimoniate of N-methyl Glucamina (Meglumina Animoniate), but there are specific situations in which Anfotericin B is used, preferably in its liposome form (Brazil, 2014). Antimoniate-N-methyl glucamina is distributed by the Ministry of Health in 5 ml ampoules containing 405mg of Sb+5, administered intravenously (IV) or intramuscular (MI), for a maximum of 40 days. The maximum limit is 3 ampoules/product day (Brazil, 2006a). In addition to leishmanicide activity, antimonial scans can induce pro-inflammatory responses that play an important role in controlling the progression of VL (Alvarenga, 2020 and Pelissari Daniele Maria, 2011). Because it is an endemic pathology of great relevance in the world scenario and due to the increase in the number of cases in the northern region and especially in Tocantins, research is justified in order to quantify and compare the trend of epidemiological indicators related to leishmaniasis.

MATERIALS AND METHODS

Descriptive cross-sectional epidemiological research, retrospective documentary base extracted from the database of the Computer Department of the Unified Health System (DATASUS) in the interval between 2013 and 2018. Two epidemiological indicators and a statistics program were used to make available and research. Data were collected in December 2019, with all proven and informed occurrences of visceral leishmaniasis covered to the DATASUS database between January 2013 and October 2019. Statistical investigation was carried out using the tack chi-square test to verify whether or not there was divergence between the arithmetic mean of confirmed cases of Visceral Leishmaniasis, expected values, and the number of cases observed. Subsequently, as there was evidence of significant differences between these two values ($p < 0.05$) the Residue Analysis test was performed to demonstrate in which follow-ups the greatest divergences occurred between the expected and observed values. The data were tabulated using the Excel 2019 program.

RESULTS AND DISCUSSION

During the study period, the increase in the prevalence of cases of visceral leishmaniasis was reported and confirmed, causing high morbidity and mortality rates. According World Health Organization in this period analyzed worldwide, it found about 500,000 new diagnoses of VL and mortality of 59,000 per year, and in America the largest number of new cases applies to Brazil with approximately 96%, followed by Paraguay with 3.2% and Colombia 0.4% [2]. At first in a national scenario in 2013 reached a total of 3472 reported cases, corroborating data at the state level in Tocantins, 279 cases were recorded and in municipal competence in the same year, 10 cases were established, in which 7 culminated in hospitalization, in the age group from 1 to 4 years were most vulnerable and susceptible to non-favorable prognostic evolution (Figures 1

and 2). According to data collected from DATASUS, in ecumenical scenario of notifications from 2013 to 2018, 22,525 cases were elucidated throughout Brazil and Gurupi obtained a total of 68 LV records, these data explained during the years that from 2013 to the year 20 15, had a close quantity. In the following year, the number of cases halved. Shown in Figure 3.

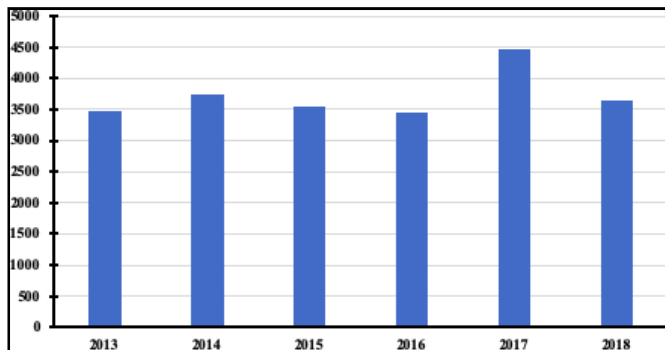


Figure 1. Notified cases of Visceral Leishmaniasis in Brazil [Source: DATASUS, 2020]

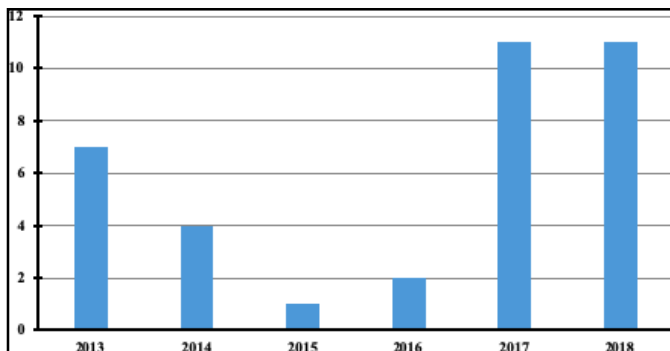


Figure 2. Hospitalizations per year in Gurupi [Source: DATASUS, 2020]

Divergent from the years described above, in 2017 and 2018 there was an important expansion of the number of cases (residue = 2.44). In 2017, in the whole state there were 221 occurrences, 27 cases in Gurupi, with 11 hospitalizations highlighting the occurrence of 4 cases for age group from 1 to 4 years. Keeping constant in 2018 with a total of 11 hospitalizations being 2 cases in the age group from 1 to 4 years, maintaining a constant of reported cases (Figure 2). After the analysis of data of the same years through the QuiQuad Test of adherence, there is sufficient evidence at the significance level of 5% that there is a relevant variation between the number of individuals affected by visceral Leishmaniasis in this period evaluated and the values expected by statistical observation ($p < 0.05$). Subsequently, the residue analysis was performed and two years presented significant values. The first was 2016 which had a decrease in the number of cases (residue equal to -3.0923) and the second was 2017 that showed a high increase in the number of reported cases on Visceral Leishmaniasis (residue equal to 5.99). Evidencing changes in the years and increased reported cases. In contrast to other states, Tocantins had the highest prevalence, 12.2 cases/100,000 inhabitants and a total number of cases in 198, followed by Maranhão, 7.8 cases/100,000 inhabitants (Brazil, 2017). Given this visceral leishmaniasis endemic, Tocantins is of importance, because despite the low demographic density, it presents a high number of cases, with a total of 1358 cases recorded in the years studied. It is noteworthy that Tocantins is located in the north of the country, with a territorial area of

277,720 km², which corresponds to 3.26% of the national territory and 7.2% of the Northern Region with a population of 1,559,530 inhabitants.

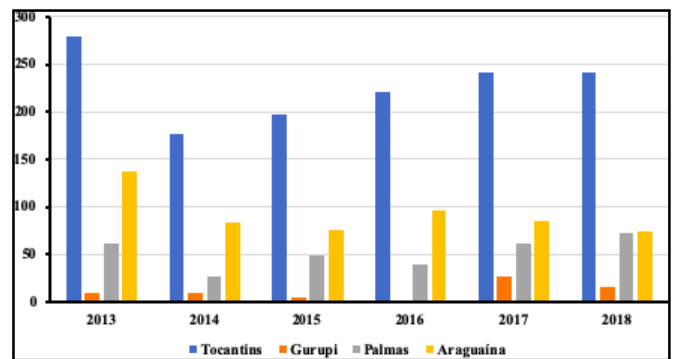


Figure 3. Visceral Leishmaniasis reported cases [Source: DATASUS, 2020]

In Tocantins, the pathology assumes a serious epidemiological emblematic, eminent endemic region by the high degree of incidence in society, in line with the total number of cases found in the success of this study, patent alarming situation, since the most vulnerable group are under 4 years of age. In accordance with information linked to disease is linked to low economic socio-economic conditions continuously affect individuals residing in poor living conditions, leading to a circuit of underdevelopment. This incidence of LV in the state can be based on the climatic characteristics of the region, because the occurrences fall according to the growth of temperature during the day, favorable conditions in the ecosystem that allows vector reproduction, however the behavior of the population and the animal reservoir cannot be ruled out (Reis Lisiane Lappe dos, 2019). In the state capital, in 2015, it reached 49 cases thus constituting an area of intense spread, being behind only the municipality of Araguaína a large city with population density of 37.62 inhabitants/km² were recorded with 75 autochthonous cases, already in the city of Gurupi southern region of the state the index decreased, presenting only 5 confirmed cases, leading in considerations that throughout the state the total number of cases was 198 and no deaths registered (Brazil, 2019). In contrast in 2016 throughout the state had an increase in cases recording 221 cases, also increasing in Araguaína and Palmas with 96 and 39 respectively, comparing Gurupi who presented a drastic reduction to only 1 case of the disease, assuming that problems in the data recording and sub notifications occurred in this municipality since it is an endemic region and there were no data from interventions to control the disease. In the subsequent year in 2017 throughout the country there were 4456 cases, recording the highest rates, and in the state there were 242 occurrences of 27 cases in Gurupi, with 11 hospitalizations highlighting 4 cases for age group between 1 and 4 years, in other cities in the same year obtained 61 cases in Palmas and 85 in Araguaína. The total number of deaths in Brazil in this were 10 cases, 1 case being 1 case in Gurupi. In Brazil, LV affects citizens with the most different age groups, however in most endemic areas 80% of the cases indicated occur in children under 10 years of age. In the few urban foci evaluated there remains a permutation aptitude in the organization of cases by age group, with an incidence of high rates also in the group of young adults, but the higher prevalence is for vulnerable groups children and the elderly (Silva Antonio Rafael da, 2008). States that visceral leishmaniasis (VL) is a serious disease, affecting children,

young adults or immunosuppressed people, and when left untreated, may present lethality in 95% of cases (Alves Waneska Alexandre, 2004). The child's vulnerability ratio is linked to the greater fragility of the immune response, caused by the immaturity of humoral and cellular immunity, and by immunodepression dragged by malnutrition in some circumstances that characterizes a number of propensity for contamination. In this sense, it is noted, according to the graph above (Figure 4) that the highest number of hospitalizations is in the age group in which the disease is most prevalent; children under 10 years of age (Santana Jacira Sá, 2020). Considering the year 2018 nationally, 3651 cases were reported and at the state level 241 cases were recorded, in Palmas 73 value were recorded near the municipality of Araguaína with 74 cases last the city of Gurupi presented 15 cases of the same period with a number of 11 hospitalizations. Total national mortality due to leishmaniosis were 15 cases being 1 case at municipal level.

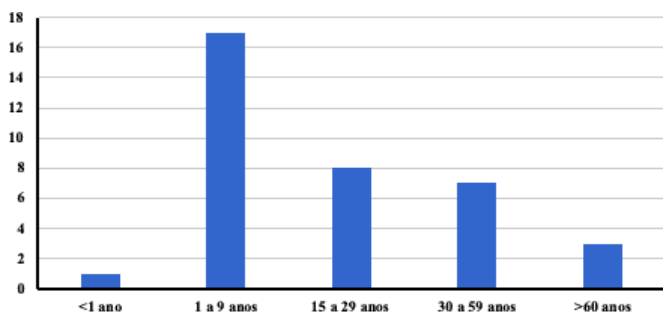


Figure 4. Hospitalizations by Age Group [Source: DATASUS, 2020]

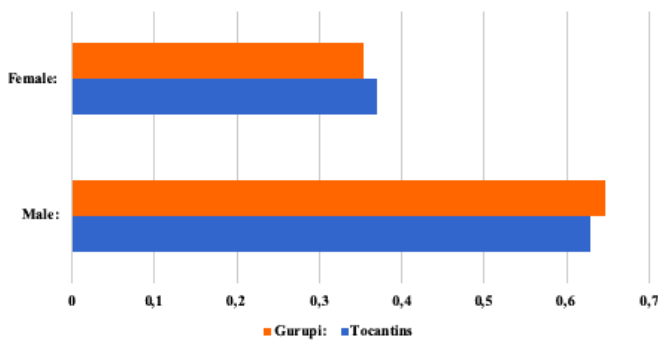


Figure 5. Percentage gender in the municipality of Gurupi and Tocantins [Source: DATASUS, 2020]

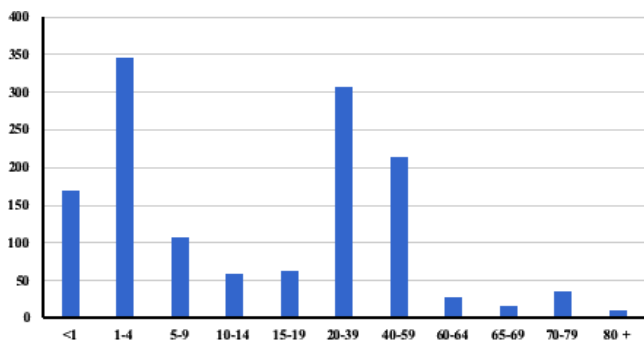


Figure 6. Cases by age group in Tocantins [Source: DATASUS, 2020]

The age group that accounts for the highest percentage of cases recorded in the evaluation period of the present study at the state level was the age group from 1 to 4 years (residue = 23.22) that represents a vulnerable group to acquire the

disease. Although VL occurs in people of all ages, the prevalence of the disease in this age group from 1 to 4 years, in Gurupi, is similar to that found in other national studies, where the age group prevails in children under 10 years of age (Brazil, 2014). This dominance occurs due to the child's increased susceptibility, as it presents an immune response still immature, in addition to immunodepression driven by malnutrition, which is a frequent situation in the most deprived populations (Santana Jacira Sá, 2020 and Silva Larissa Barros da, 2016). Followed by the 20-39 year age group (residue = 18.79) emphasizing that 94.7% of them had completed high school up to complete high school which assumes a low level of education. Also noteworthy that males were the most prevalent with 62.9% of the cases.

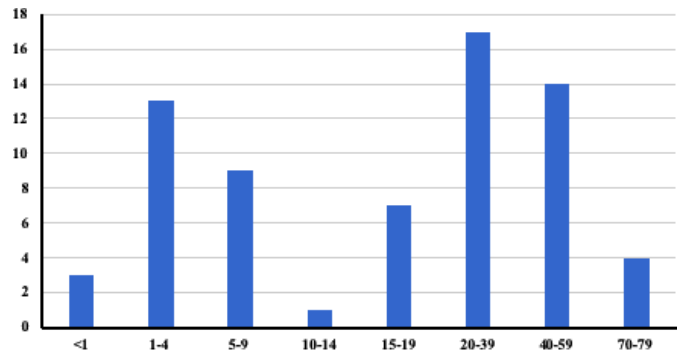


Figure 7. Cases by age group in Gurupi [Source: DATASUS, 2020]

This predominance of male cases coincides with the result described in other studies (Alvarenga Daniel Gomes de, 2010), which suggests that men are more exposed to the vector, mainly because functions and activities that perform are closer to the source of infection. At the municipal level, the highest indicators of morbidity due to LV were between 20 and 39 years followed by 40 and 59 a young age group. Of these 96.7% had up to complete high school. With a degree of education compatible with incomplete elementary school. Corroborating these data other studies indicate that LV reaches, especially population of lower socioeconomic degree, therefore the low circumstances and the greater manifestation to the vector pacify the transmission of pathology, however attested in recent years, there has been a greater diversification of the epidemiological properties of the disease (Brazil, 2014 and 20. Pelissari Daniele Maria, 2011). The relationship between the incidence rate of VL and the characteristics detected in this study is encouraged by the occurrence of VL in the state of Tocantins and Gurupi city. Considered that the state is granted heterogeneity between the North and Midwest regions of Brazil, whose divergent biomes subsidize for the multiplication of pathology. However, other factors not commented here also trim being predisposing for the development of VL, in addition to the population group, as well as lifestyle sanitary conditions and lifestyle (Toledo Celina Roma Sánchez de, 2017).

Conclusion

Results show high prevalence of LV morbidity in the state of Tocantins and Gurupi city, although the data shown in this study do not seem favorable to LV elimination, the projections made for the years 2013-2018 show advances in the epidemiological disease. Although the disease presents itself softly, the endemic picture should be accompanied by

preventive measures and intervention actions, in the fight against the mosquito and in the interest of controlling and preventing the development of the disease. It is noteworthy that epidemiology is an imminent instrument in the control of endemic diseases such as leishmaniasis, being extremely important to prestresses the quality of the data and inputs necessary for notification, the attention of professionals is supposed to discovery of new cases and notification as a fundamental axis, therefore, direct action in the maintenance and updating of these epidemiological findings, is of utmost importance for health policies to be focused on the needs of the population. It was necessary to know the variables to describe the epidemiological profile of this group of people affected by this disease and, from then on, contribute to the development of public policies as a measure to expand surveillance in the areas of higher incidence, adoption of preventive measures and the early diagnosis of visceral leishmaniasis and their complications, as well as the awareness of health professionals so that it can outline treatment protocols increasingly directed to needs population aiming at reducing the number of hospitalization and mortality rate due to the disease.

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