



**Research Article**

**EPIDEMIOLOGICAL PROFILE OF PATIENTS WITH TEGUMENTAR LEISHMANIOSE IN UNDERDEVELOPED COUNTRY**

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**ABSTRACT**

It is estimated that 1.5 million new annual cases of leishmaniasis are reported in the world. Currently Brazil is the South American country with the highest number of new cases of cutaneous leishmaniasis. Its incidence has grown about eight times in the past fifteen years. North and Northeast regions had the highest percentages of cases in 2007. Therefore, this study aimed to characterize the epidemiological profile of patients affected by cutaneous leishmaniasis in the city of Ananindeua (PA), using the data from the Electronic Database of SUS (DATASUS). It also aimed to check the incidence of the disease in Ananindeua in the years of 2012 and 2013, according to age, race, education and gender. The present study characterized by being ecological, longitudinal and retrospective. The sample corresponded to 99 cases and the incidence of cutaneous leishmaniasis was analyzed according to the mentioned variables. Descriptive statistical analysis was applied. Software used were Excel and Microsoft Word 2010. The literature review included articles published in PubMed and Lilacs. There was a higher incidence in males (73 in total), aged between 20 and 39 years (54 in total), and in the skin color category known in Brazil as “parda”, also called brown people. In conclusion, the health profile consisted of males, aged between 20 and 39 years, and people who hadn’t completed their studies.

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**INTRODUCTION**

It is estimated that 1.5 million new annual cases of leishmaniasis are reported worldwide (GOTO e LINDOSO, 2012). Among the many countries where such cases happen, most of the cutaneous injury occurs in Afghanistan, Brazil, Iran, Peru, Saudi Arabia and Syria, as well as 90% of mucocutaneous injury occur in Bolivia, Brazil and Peru (GOTO e LINDOSO, 2012).

Currently, Brazil is the South American country with the highest number of cases of American cutaneous leishmaniasis (LTA). The increase in its incidence was about eight times higher in 15 years, going from 4,560 cases in 1980 to 35,748 in 1995 (BRAZIL, 2013). The nation recorded an average of 26,000 new cases per year between 2003 and 2007 and is considered one of the ten countries that have approximately 75% of the cases of LTA in the world (ALVAR *et al.*, 2012).

LTA is a transmissible disease, with high persistence, prevalence and geographical distribution, besides, it has a potential to develop into severe and mutilating forms (WHO, 2012).

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Despite that, it continues being a disease which is neglected by many world health authorities and affects mostly vulnerable and poor populations (WHO, 2013).

This pathology is in a phase of geographic expansion in Brazil, a country where, until the 1980s, the cases were registered in only 19 Brazilian states; but, from 2003, all the Federated Units began to register autochthonous cases. North and Northeast regions had the highest percentage of cases in 2007, 46.5% and 27.9%, respectively. The highest detection coefficient was recorded in the North region: 69.2 cases per 100,000 inhabitants (BRAZIL, 2013).

The main vectors of LTA in Brazil are: *Lutzomyia whitmani*, *Lu. intermedia*, *Lu. umbratilis*, *Lu. wellcomei*, *Lu. flaviscutellata* and *Lu. migonei*. However, the vector role of each of these sandflies depends on the species of *Leishmania* that colonizes them (BRASIL, 2007). Usually these insects have nocturnal activities, performing hematophagy at the beginning and at the end of the night. In damp and humid places, sandflies may sting animals and man during the day (WHO, 2013). The vectors are adapted to the different types of climate and geographic patterns, reservoirs (domestic and wild) and parasites. The species *Leishmania (Viannia) braziliensis* is widely distributed and present in all countries

(except the United States), evidencing its propagation from the wild to the intra-domicile (PAHO, 2013).

According to a report elaborated by World Health Organization, the phenomenon of urbanization in Americas is considered the main risk factor for the spread of leishmaniasis. Given the correlation between urban and rural environments, estimates suggest that within 50 years, about five billion people will live in urban centers, contributing to an adaptation of the vectors of the pathology (BRASIL, 2013). Therefore, we need to investigate more about the disease in order to verify if the attempts of its control are effective to reduce the number or to avoid severe cases.

Thus, the objective of this study was to characterize the epidemiological profile of patients affected by American Cutaneous Leishmaniasis in Ananindeua (PA), using data from the Information System of Notification Diseases (SINAN), according to incidence, race, schooling and gender.

## METHOD

The present study focused on the topic addressed. The data collected followed the precepts of the Declaration of Helsinki and the Nuremberg Code, respecting the Research Guidelines Involving Human Beings (Res. 466/12) of the National Health Council and occurred after the acceptance of the advisor. The data were used in this research according to Law Res. 466/12.

This research is characterized by being ecological, longitudinal and retrospective, based on the Electronic Database of SUS (DATASUS), which uses as a source the files of the Information System of Notification Diseases (SINAN), which is based on the notification form for leishmaniasis. For the accomplishment of the research, we considered records from 2012 and 2013. The data collection was one on September 19, 2015, being the last update of SINAN data on September 24, 2014.

The casuistry corresponded to a total of 99 cases and was obtained from the notification records in the city of Ananindeua during the determined period. All 2012 and 2013 DATASUS cases were included. Therefore, no exclusion criteria were applied to this project.

After obtaining the casuistry, the incidence of American Cutaneous Leishmaniasis was analyzed according to four variables: age, race, schooling and sex, in order to characterize the epidemiological profile of the disease in the period of time and space determined.

Data were organized into two main groups, for the year in which they occurred, ie 2012 or 2013. They were then divided into age groups (organized in the following age groups: 0 to 19, 20 to 39, 40 to 59 and 60 to 79 years); sex; race (caucasian, black, brown, indigenous or ignored / blank); and scholarship. The collected data were stored in a database created by the researchers themselves using the Excel 2010 software. Subsequently, the variables were analyzed and compared between the two years, searching the basement literature to explain the often exacerbated variation of the incidence in certain subgroups.

The statistical study was performed according to the nature of the variables, and descriptive statistical analysis was applied, informing the percentage values of the data analyzed, which were later organized into tables and graphs. For the creation of

a database and elaboration of the graphs and tables, the researchers used the programs Excel and Microsoft Word 2010.

It was elaborated a review of the articles published in the PubMed and Lilacs databases. There were no published articles that presented the epidemiological profile of the patients with American Tegumentary Leishmaniasis in Ananindeua, therefore we emphasize the importance of performing studies focusing on the epidemiological profile of the disease in the city.

To define the descriptors were used the DeCS; for their equivalents in English, the MeSH.

## RESULTS

**Tabela 1** Incidence of LTA in Ananindeua (PA) according to gender, in 2012 and 2013

Gender/Year	2012	%	2013	%
Feminine	05	20,84	21	28
Masculine	19	79,16	54	72
Total	24	100	75	100

Source: DATASUS - Ministério da Saúde/SVS

**Tabela 2** Incidence of LTA in Ananindeua (PA) according to age in 2012 and 2013

Age/Year	2012	%	2013	%
0-19 years	03	12,5	10	13,33
20-39 years	16	66,67	38	50,67
40-59 years	04	16,67	19	25,33
60-79 years	01	4,16	08	10,67
Total	24	100	75	100

Source: DATASUS - Ministério da Saúde/SVS

**Tabela 3** Incidence of LTA in Ananindeua (PA) according to race in 2012 and 2013

Race/Year	2012	2013
Caucasian	01	09
Black	23	06
"Pardos"	00	57
Indians	00	01
In blank	00	02
Total	24	75

Source: DATASUS - Ministério da Saúde/SVS

**Tabela 4** Incidence of LTA in Ananindeua (PA) according to scholarship in 2012 and 2013

Scholarship/Year	2012	2013
Illiterate	0	1
1 <sup>st</sup> to 4 <sup>th</sup> grades incomplete	0	9
4 <sup>th</sup> grade complete	2	14
5 <sup>th</sup> to 8 <sup>th</sup> grades incomplete	6	8
Elementary School	3	10
High School incomplete	7	8
High School complete	0	7
College incomplete	1	1
College complete	0	3
Not applicable	0	2
In blank	5	12
Total	24	75

Source: DATASUS - Ministério da Saúde/SVS

## DISCUSSION

In the last few years, Brazil's population and economic growth has resulted in new dilemmas for Public Health. In fact, urban expansion was accompanied by the emergence or aggravation of many pathologies that previously were restricted to the rural environment (GOMES *et al.*, 2014). Many epidemiological

studies have pointed to an increase in the incidence of American tegumentary leishmaniasis (ATL), which would be related to a greater contact of man with the wild environment (rich in pathogen reservoirs) (BRASIL, 2007).

This research, when reviewing the LTA notification data in Ananindeua, found that there was a threefold increase in the number of cases reported between 2012 and 2013. This is possibly related to the already mentioned processes of deforestation and urbanization in the municipality, which reached an amount of 99.75% in 2010; in addition, the annual rate of population growth in the municipality was 1.83% between 2000 and 2010, while that of Brazil was 1.71% (BRAZIL, 2015). Increased anthropic action may have favored a higher incidence of pathology in the region.

Guerra *et al.* (2006) highlight the change in epidemiological profile of transmission of the disease in South America; specially LTA as multifactorial, with emphasis on the increase of cutaneous leishmaniasis domicile in Brazilian municipalities. Thus, as the data encompasses general population notifications (both rural and urban), the higher incidence of the disease in Ananindeua is more related to a translocation of vectors to the home and peri-domiciliary environment than to a direct contact with the wild environment by workers rural areas.

No previous publications about the epidemiological profile of patients with ACL in the city in question were found in literature review of the research, which is somewhat worrying, since the authors Gomes *et al.* (2014) refer to the disease as difficult to diagnose and therefore requires an association between epidemiological, clinical and laboratory data for early detection. Due to this need, the aforementioned project analyzed the epidemiological profile based on gender, age, race, and schooling of patients with LTA; using comparisons between 2012 and 2013.

In the present study, it was found that among the individuals from the city of Ananindeua (Pará) affected by the disease, they were more frequent in males in the two years analyzed: male sex corresponded to 79.16% of cases in 2012 and 72% in 2013. This finding is in agreement with most of the studies (Gomes *et al.*, 2014, Marlow *et al.*, 2013, Haouas *et al.*, 2015).

Authors such as Name *et al* (2005) associate this prevalence in men with greater exposure; such as working in crops and rural areas and living habits, such as sleeping on the porch of the house and not wearing shirt for much of the day. The studies of Oliart-Guzmán *et al.* (2013) obtained the notification of 680 cases of LTA in the city of Assis Brasil (Acre) between 2003 and 2010, of which 63% were male; and also highlighted the possibility of the same findings in neighboring states given the similarity of the demographic characteristics in the Legal Amazon.

Other studies have also shown that males have a higher prevalence of infection for cutaneous leishmaniasis, as in the study by Guerra *et al.* (2006) who also related this fact to the greater accomplishment of extradomiciliares activities by the men than by the women. Although the authors Bamba *et al.* (2013) find in their research the disease with the greatest female involvement (around 52.9% of cases), this was due to the fact that they used data from health centers that, in this case, were more frequented by women .

On the other hand, children and women are also frequently affected by the disease after contact with areas of the mosquito vector domain. That shows that the endemic lose its character of transmission only in a forest region (linked to occupational activities) to predominate in the urban environment and reach individuals of both sexes and of all age groups (BRASIL, 2000).

Even though the female sex was not predominant, the research in question found a small increase in cases for this genre between 2012 and 2013 (from 20.89% to 28%). There is, therefore, an important casuistry of female patients. The acquisition of the disease in these cases, including children, may have occurred due to infected sandflies, which were attracted towards the houses by several factors (the presence of domestic animals for example); suggesting a peri / intradomiciliary transmission (GUERRA *et al.*, 2006).

Regarding the age group, the majority of the cases were described in the subgroup with 20-39 years (66.67% in 2012 and 50.67% in 2013); followed by the subgroup with 40-59 years (26.67% in 2012 and 25.33% in 2013). When reviewing the epidemiological profile of patients with ACL in Rio de Janeiro, Bustamante *et al.* (2009) also obtained similar results: 58.8% of cases aged 15-49 years.

Oliart-Guzmán *et al.* (2013) confirmed that this condition also occurred in Acre; while associating it with the economic dynamics of the adult population, since the extra-homeless work would expose more individuals to environments with proliferation of vectors and reservoirs of the disease. According to the authors, this may also be applicable to other municipalities of the Legal Amazon, given the similarity in the sociodemographic conditions of the regions that comprise it (such as, in question, Ananindeua).

In parallel, Estani *et al.* (2001) pointed out that the exposure to extradomiciliary factors as a risk condition for the pathology remains with a 95% confidence level (such as people who spend more than 10 hours out of the home; or who work in more peripheral locations, close to rural environments). Taking into account that Ananindeua presents areas of streams and rivers (FERREIRA *et al.*, 2012), this aspect may be associated to the high occurrence of ATL; mainly in the adult population with activities, both domestic and economic, near these places.

In fact, the fact that the disease is more common in the age group is not questionable. After all, most of the population of Ananindeua presents in the subgroup with 15 to 64 years (69.93%) and in the condition of economically active (67.8%) (BRAZIL, 2015). Thus, the municipality reveals a broad economic dynamics and capable of conditioning the individuals to activities more and more extradomiciliary

In addition, case records among children and adolescents in LTA (0-19 years old) showed a small increase from 12.5% in 2012 to 13.33% in 2013. The authors themselves Qasmi *et al.* (2008) have confirmed that although the reports of childhood cutaneous leishmaniasis are few in the literature, it is important to understand the pathology in this group in order to avoid facial disfiguration.

Regarding the prevalence of tegumentary leishmaniasis in the different races, there were 23 black patients in 2012 and 57 brown patients in 2013 (with the black group in second place). Oliart-Guzmán *et al.* (2013) found similar results in an acriana

region, with 32.6% of the patients declared as pardos and, secondly, 23.7% declared blacks.

This condition may be a consequence of changes at the national level; since the 2010 Census itself showed that the percentage of pardos increased from 38.5% to 43.1% (82 million people in Brazil) and the percentage of blacks from 6.2% to 7.6% (15 million people) (BRAZIL, 2012). Thus, the population dynamics of Ananindeua may have followed this trend and shown a new distribution of their pathologies in the different groups.

Regarding the genetic influences of the different breeds in the LTA, there are no clear studies that already prove this relation. In fact, there are researches that highlight the degree of kinship between individuals affected as consanguineous and, thus, suggest the existence of a genetic predisposition for the development of the disease (DE BUSTAMANTE *et al.*, 2009).

As the last variable, there is a predominance of cutaneous leishmaniasis divided into levels of schooling. Thus, the aforementioned research showed that the majority of the cases were registered at the lowest levels of schooling, 7 of them with incomplete High School in 2012 and 14 with incomplete Elementary School II (until the 4th full grade). This is in agreement with the other scientific findings (ESTANI *et al.*, 2001; BRITO *et al.*, 2008; OLIART-GUZMÁN *et al.*, 2013).

Some authors even correlate low schooling with the most disadvantaged strata of the population, in which, according to them, individuals do not have the conditions to combat the vectors. This aspect would be contemplated in the fact that prophylactic forms would require certain expenses: money to loom windows and doors; to buy insecticides; among others. (GONTIJO *et al.*, 2002).

Estani *et al.* (2001), based on a case-control study, also associated the low level of predominant schooling with other unfavorable socioeconomic factors, such as: families residing in peripheries without economic conditions to perform all their domestic activities in an in-home environment. house) or that do not have basic sanitation.

The occurrence of cutaneous leishmaniasis is usually associated with low level of education, whether in rural workers, whether in urban workers (young and old), according to studies by Nunes *et al.* (2010). These authors also pointed out that the risk of acquiring LTA is mainly related to factors both at home and outside home, being socioeconomic status an aggravating. Because a large part of these factors is based on the socioeconomic behavior and the level of schooling of the regional population, the causes of the disease can vary in time and space.

De Bustamante *et al.* (2009) observed in his studies in the state of Rio de Janeiro that 29% of the patients with ACL had incomplete primary education.

These authors have confirmed that low level of education of patients can limit their access to important information, such as the preventive means of the disease, the forms of transmission, the main symptoms, among others.

Although there is a predominance of the population who completed high school in Ananindeua (36.3% as recorded in the 2010 Census), there is still a percentage of 31.6% of people within complete primary education (BRAZIL, 2015). There

fore, it is possible to understand that the actual levels of schooling in the population of this municipality reflect in the distribution dynamics of the disease in question. It was noticed the absence of articles that contemplated the epidemiological profile of tegumentary leishmaniasis in Ananindeua; even if an area of high incidence. Which is something to worry about. After all, the first steps for the eradication of the disease start with a proper epidemiological tracking, either for notifications, either by other guidelines of the Unified Health System (OLIVEIRA and DE PAULA, 2011).

Thus, scientific and social relevance was found in this context, as well as justification for the research proposed here.

## CONCLUSION

The present study defined the epidemiological profile of patients affected by the disease in the municipality of Ananindeua. There were, therefore, predominance of the findings in male sex; age group of 20 to 39 years; brown and black races; and in groups with Elementary School II incomplete (until 4th grade complete) and incomplete High School. The results were in agreement with the municipal population dynamics (according to Census 2010), which was decisive to elucidate the epidemiology found in the municipality for the disease.

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