RESEARCH

EPIDEMIOLOGICAL PROFILE OF PEOPLE WITH VISCERAL LEISHMANIASIS IN THE MUNICIPALITY OF PARACATU, BRAZIL FROM 2007 TO 2010

PERFIL EPIDEMIOLÓGICO DAS PESSOAS PORTADORAS DE LEISHMANIOSE VISCERAL NO MUNICÍPIO DE PARACATU – MG NO PERÍODO DE 2007 A 2010

PERFIL EPIDEMIOLÓGICO DE LAS PERSONAS CON LEISHMANIASIS VISCERAL EN LA CIUDAD DE PARACATU-MG, BRASIL, EN EL PERÍODO 2007 A 2010

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ABSTRACT

Objective: To analyse the epidemiological profile of visceral leishmaniasis in the municipality of Paracatu. **Methods:** It is a descriptive and epidemiological study based on cases notified to the Information System for Notifiable Diseases between 2007 and 2010. We analysed the following variables: age, sex, skin colour (race), years of schooling, type of input, and disease outcome using absolute and relative frequencies. **Results:** A total of 128 cases of visceral leishmaniasis had been notified. Average incidence rate in the period was 39/100,000 inhabitants. Among these, 56.2% were men; 56.2% were aged between 0 and 14 years; 7.8% were recurrent cases; 87.5% were cured; and 4.7% died. **Conclusion:** The incidence of visceral leishmaniasis in Paracatu in the studied period was high when compared with the state and national averages. On the other hand, the low coefficient of lethality encourages the re-evaluation of local strategies to control the disease.

Keywords: Leishmaniasis, Visceral; Epidemiology, Descriptive; Information Systems; Disease Notification.

RESUMO

Objetivo: analisar o perfil epidemiológico das pessoas portadoras de leishmaniose visceral no município de Paracatu. Métodos: estudo epidemiológico descritivo, realizado no município de Paracatu, Minas Gerais, Brasil, com base nos casos de leishmaniose visceral notificados ao Sistema de Informação de Agravos de Notificação no período de 2007 a 2010. Foram analisadas, por meio da apresentação de frequências absolutas e relativas, as seguintes variáveis constantes da ficha de notificação compulsória da doença: faixa etária, sexo, cor da pele, escolaridade em anos de instrução, tipo de entrada do caso e evolução da doença. Resultados: foram notificados 128 casos de leishmaniose visceral, sendo a média do coeficiente de incidência no período de 39/100.000 habitantes. Desse total, 56,2% eram homens e 56,2% tinham idades entre zero e 14 anos. Verificou-se que 7,8% eram casos reincidentes, 87,5% obtiveram cura e 4,7% evoluíram para óbito. Conclusão: a leishmaniose visceral no município de Paracatu, nos quatro anos estudados, apresentou alta incidência quando comparada com as médias estadual e nacional, ao mesmo tempo em que mostrou como ponto positivo baixa letalidade, estimulando, então, a reavaliação local das estratégias de controle da doença.

Palavras-chave: Leishmaniose Visceral; Epidemiologia Descritiva; Sistemas de Informação; Notificação de Doenças.

RESUMEN

Objetivo: Analizar la epidemiología de la leishmaniasis visceral en la ciudad de Paracatu, estado de Minas Gerais, Brasil. Métodos: Estudio epidemiológico descriptivo, desarrollado en la ciudad de Paracatu, Minas Gerais, Brasil, basado en los casos de leishmaniasis visceral informados al Sistema de Información de Desenlaces de Notificación en período de 2007 a 2010. Fueron analizadas, por medio de la presentación de frecuencias absolutas y relativas, las siguientes variables contenidas en el formulario de notificación compulsoria de la enfermedad: edad, sexo, color de la piel, escolaridad en años de educación, tipo de contaminación y progresión de la enfermedad. Resultados: Fueron notificados 128 casos de leishmaniasis visceral, siendo el coeficiente de incidencia en el período de 39/100.000 habitantes. De este total, 56,2% eran varones y 56,2% tenían edades entre 0 e 14 años. Se han verificado 7,8% de casos reincidentes, 87,5% se curarán y 4,7% han muerto. Conclusión: La leishmaniasis visceral en Paracatu mostró una alta incidencia en comparación a las medias estatal y nacional, mientras muestra como punto positivo, la baja letalidad de la enfermedad, fomentando la reevaluación local de las estrategias de control.

Palabras clave: Leishmaniasis Visceral; Epidemiología Descriptiva; Sistemas de Información; Notificación de Enfermedades.

INTRODUCTION

Leishmaniasis is a zoonosis transmitted by protozoa of the *Leishmania* genus. The most common forms of people getting infected with such parasites are visceral leishmaniasis and cutaneous leishmaniasis, when in contact with its cycle[1].

It is estimated that these diseases affect populations of 88 countries worldwide with estimated 14 million people infected and about 2 million new cases each year. Furthermore, another 350 million people are currently at risk of becoming infected. Hence, leishmaniasis is among the six endemic diseases cpnsidered priority around the world. Notification of new cases is compulsory.[1]

Visceral leishmaniasis (VL), also known as calazar, is a chronic and systemic disease whose clinical features may lead to a severe outcome; therefore, diagnosis should be early and accurate. It used to be an eminently rural disease but it has recently migrated to urban areas.[2]

In the last few years the average incidence rate of VL was 1.9 cases per 100,000 inhabitants. Its lethality increased from 3.4% to 5.5% between 1994 and 2008.[3] In the period, the average number of cases was 3,379.

In the state of Minas Gerais, the spread of the disease began in the nineties, proving to be an endemic infection with growing morbidity and mortality in large urban centres such as Belo Horizonte. Its incidence in atypical areas and among populations of higher socioeconomic status points to the possibility of a change in the natural history of the disease hitherto restricted mostly to the low-income population of Northeast Brazil[4]. According to data from the Information System for Notifiable Diseases (SINAN) in the state of Minas Gerais there were 445 confirmed cases of VL between 2001 and 2010.[5]

VL is the most severe form of leishmaniasis, given its high lethality among untreated individuals and malnourished children. Its emergence among people with the human immunodeficiency virus (HIV) makes it one of today's most threatening infections. It presents a wide clinical spectrum, with wide-ranging manifestations that can lead to patient's death if not treated[2]. The main risk factors leading to death are infectious complications and haemorrhage. Early diagnosis and implementation of effective therapeutic and prophylactic measures are crucial to reduce mortality.[6]

A study of clinical cases demonstrated that VL displayed great clinical variability: infected patients had normal weight and height and absence of chronic malnutrition, which emphasizes that the diagnosis can be made even in the absence of such classic symptoms. Fever was observed in most cases.[4]

Leishmania are typical of regions with annual precipitation less than 800 mm[3] and physical environment consisting of valleys and mountains. In this context, increasing urbanization, rural exodus and periodic droughts are factors that contribute to the expansion of endemic areas and the emergence of new foci, facilitating the occurrence of epidemics.[2]

The wide distribution of VL in the urban area of Paracatu is a good example of the process of urbanization of the disease. Although the city's environmental conditions and the socioeconomic conditions of the population are favourable to endemic leishmaniasis, only the canine strain is documented in scientific literature.[7] There are no studies on the VL profile in Paracatu until now. According to the classification of the Brazilian Department of Health, the municipality is characterized as an area of intense transmission of VL. However, the control of the disease is restricted to the supervision of kennels and spraying of insecticides that are ineffective in reducing cases. Moreover, the number of government agents to control endemic diseases is insufficient and directed mostly to dengue control.

The present study aimed at analysing the epidemiological profile of people with VL in the municipality of Paracatu, state of Minas Gerais. The study findings could increase knowledge about the epidemiology of the disease, providing subsidies to local health managers to redesign strategies for its prevention and control.

METHODOLOGY

This is a descriptive study using epidemiological data of VL confirmed cases in the municipality of Paracatu, state of Minas Gerais from 2007 to 2010.

The municipality of Paracatu is located in the northwest of the state of Minas Gerais and has a population of 84,718 inhabitants, spread over 8,230 km2, mostly Brazilian savannah. A total of 13% of its population live in rural areas. The climate is relatively dry; the land relief can be undulating, flat or mountainous. Mineral extraction and agriculture are the main economic activities. There are 28 public health care units and 15 private institutions.[8]

In the last year, the leading cause of hospital deaths and morbidities were related to the respiratory and circulatory systems, to external causes, to digestive tract disorders, and infectious and parasitic diseases, in order of occurrence.[9]

According to the Brazilian Department of Health patients reported with fever and splenomegaly with or without hepatomegaly, confirmed by laboratory and clinical epidemiological criteria are considered VL cases.

Laboratory diagnosis is performed by blood collection and serological testing (indirect immunofluorescence/IFA or enzyme-linked immunosorbent assay/ELISA) or the Montenegro skin reactive test. Bone marrow aspirate and splenic aspirate usually show the parasite. FA and enzyme immunoassays – positive at 1:80 dilutions – are the most used in Brazil. Clinical and laboratory data are corroborated by a serological reagent

test that confirms the diagnosis. However, a reagent test with no clinical manifestations does not authorize the beginning of treatment. In most patients Montenegro or leishmanin skin test comes out positive only after clinical cure from six months to three years after completion of treatment.[2]

Data from the SINAN with the following variables listed in the compulsory notification of VL was used: age, sex, race/colour, years of schooling, type of case input and disease outcome.

The researchers analysed the cases based on the absolute and relative frequencies of the above variables and calculated incidence and mortality rates per year. Clinical features of confirmed cases were evaluated according to variables "type of case input" and "disease outcome".

The annual base population was obtained from DATA-SUS. Population estimates to calculate the incidence rate per 100,000 inhabitants were provided by IBGE (Brazilian Institute of Geography and Statistics)

Data were analysed by Excel (Windows version), Epi-Info (version 3.5.1) and Statistical Package for Social Science (SPSS) software version 15.0.

RESULTS

GENERAL FEATURES OF NOTIFIED CASES

There were 128 VL reported cases from 2007 to 2010 in Paracatu. The average incidence and mortality rates were 39/100.000 inhabitants and 4.2%, respectively.

Demographic features of the cases are shown in Table 1: the majority were male (56.2%); aged between 0 and 14 years (56.2%); predominant skin colour was brown or black (67.2%). As per level of education, when applicable, the cases were distributed as follows: 50% studied up to the 4th grade of primary school and 50% between 8th grade of elementary and middle school.

Table 1 - Demographic features of VL cases in Paracatu, Minas Gerais, from 2007 to 2010

Features	No.	%
Sex		
Female	56	43,8
Male	72	56,2
Age		
0 to14	72	56,2
15 to19	11	8,6
20 to 49	31	24,2
Over 50	14	11,0

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Tabela 1 - Demographic features of VL cases in Paracatu, Minas Gerais, from 2007 to 2010

Features	No.	%
Race/skin colour		
Brown	61	47,7
White	21	16,4
Black	25	19,5
Yellow	04	3,1
Not known	17	13,3
Level of education		
Illiterate	01	0,8
1st to 4th grade	13	10,2
5th to 8th grade	09	7,0
Middle school	05	3,9
N/A	57	44,5
Not known	43	33,6

Source: Brazil (2011).[9]

Clinical features of VL cases are shown in Table 2: most subjects were young (88.3%) and death rate was low (4.7%).

table 2 - Clinical features of VL cases in Paracatu, Minas Gerais, from 2007 to 2010

Features	No.	%
Type of case input		
New	113	88,3
Relapse	10	7,8
Not known	05	3,9
Outcome		
Cure	112	87,5
Death	06	4,7
Not known	10	7,8

Source: Brazil (2011).[9]

TEMPORAL ANALYSIS OF NOTIFIED CASES

The 128 VL cases were temporally distributed as follows: 22 in 2007, 37 in 2008, 42 in 2009 and 27 in 2010.

Incidence rates of VL cases in the period are shown in figure 1. There was a progressive increase in the incidence of cases between 2007 and 2009 and decline in 2010.

Figure 2 displays "type of case input" and "disease outcome". New and cured cases predominated throughout the period (over 75%). However, there were high rates of "unknown" for "type of case input" and "disease outcome" in 2009

and in 2008, respectively. Such fact hindered a more accurate analysis of the features.
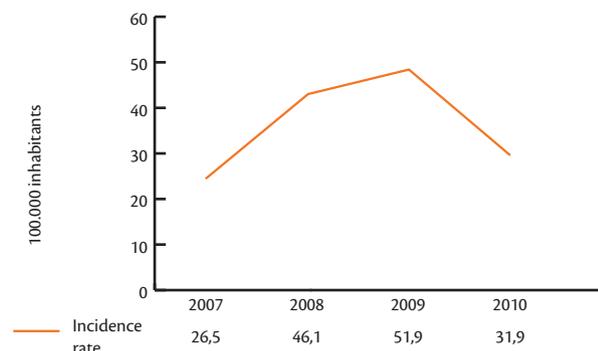

Figure 1 - Incidence rate (per 100,000 inhabitants) of visceral leishmaniasis in Paracatu, Minas Gerais, from 2007 to 2010.
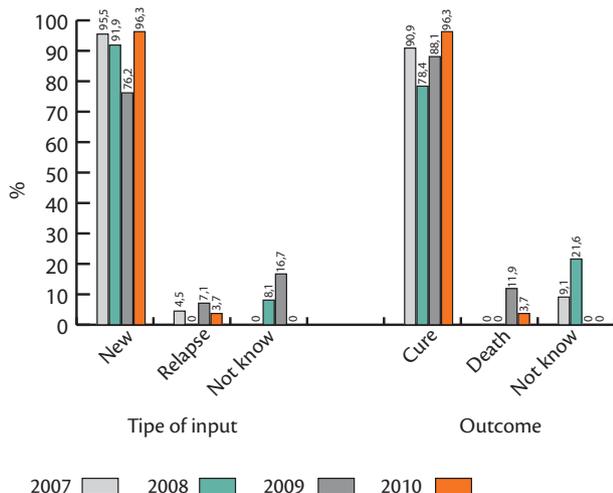Source: Brazil (2011)[9].

Figure 2 - "Type of case input" and "disease outcome" of VL cases in Paracatu, Minas Gerais, from 2007 to 2010.
Source: Brazil (2011)[9].

Features regarding "gender" and "age group" are shown in figure 3. In 2007, the majority were women, whereas in 2008, there were more cases among men. In the following years, 2009 and 2010, percentages were approximately 50% for both sexes. In relation to age, the majority of cases were in the 0 to 14 years age group, followed by 20 to 49 years age group.

DISCUSSION

In recent years, VL has shown a worryingly tendency to increase in incidence, geographic expansion and intensity of transmission in Brazil. The main areas of transmission in Minas Gerais are Belo Horizonte, the state capital, and the northwest

macro-region where Paracatu is situated[7, 8]. In 2010, the Brazilian incidence rate was 1.7/100,000 inhabitants; in the state of Minas Gerais the highest coefficient in the south-eastern region reached 2.6/100,000 inhabitants[5]. In the same year, Belo Horizonte registered 5.8/100.000 inhabitants[5]. The incidence rates of VL in Paracatu obtained in this study – the average between 2007 and 2010 was 39/100.000 inhabitants, excepting 2009 with 51.9/100,000 – demonstrate that the municipality has one of the highest incidence rates in the state.
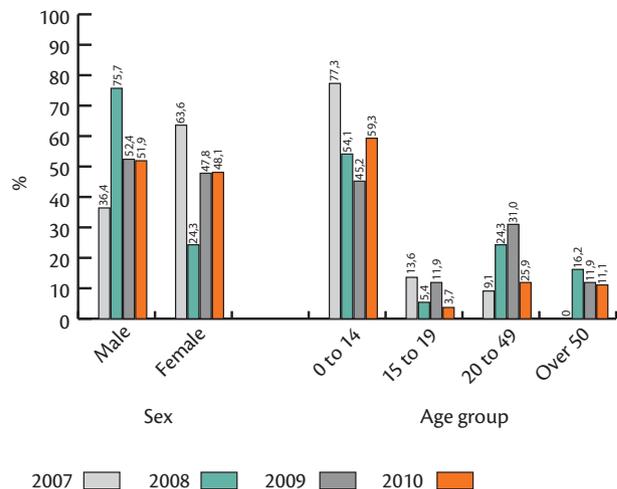

Figure 3 - Features regarding "gender" and "age group" of VL cases in Paracatu, Minas Gerais, from 2007 to 2010.
Source: Brazil (2011)[9].

In the present study, the incidence of VL was higher in the male population. Such finding is similar to that of other studies such as those conducted in Rio de Janeiro between 1977 and 2006[10], Várzea Grande, between 1998 and 2007[11], and Belo Horizonte in 2006[12]. This discrepancy is probably due to more exposure to phlebotomine vectors and does not suggest a male susceptibility to the disease[10].

The disease frequency identified in children under 14 years in the present study was also observed in a study carried out in Rio de Janeiro, which associated this tendency to the subjects' regular contact with animals, nutritional deficiency and immature immune system.[10] The study emphasizes the number of notifications of cases in children aged 1 to 4 years that account for 31.2% of the sample. The same prevalence was observed between 2001 and 2010 (43.2% of confirmed cases)[5]. The susceptibility to the disease is universal; it may affect individuals of any age and sex, but occurs more frequently in children.[10]

Most people with VL had low level of education since only a small number (3.9%) had finished high school.[12] It is noteworthy that higher educational level means better health care knowledge and greater potential for epidemiological control. On the other hand, absence or low educational level re-

flects poor or no disease prevention. The high number of cases (78.1%) with no data about education level or whose data did not apply to the study may be due to the fact that 33% of the individuals were less than 4 years old, therefore below school-age. As previously mentioned, there was a high percentage of reported cases among preschool children.

The lethality observed in this study ranged from 3.7 to 11.9%, with an average of 4.2%, lower than the national average in the same period (5.5%) and also lower than the average in Minas Gerais (9.2%). Of the 14,675 confirmed cases in Brazil between 2007 and 2010, there were 821 deaths (5.6% lethality average). In Minas Gerais, mortality ranged from 6.4 to 13.6% from 2007 to 2010[5]. The large proportion of cure may be due to good public health care or to a prompt referral of patients to municipalities with better infrastructure.

On the other hand, 7.8% of those apparently cured, relapsed. This can be because of ineffective treatment, treatment dropout, decreased immune response, or comorbidities associated with VL.

VL presents extremely high incidence rates in Paracatu, probably owing to failures in the implementation of guidelines established by the Brazilian Department of Health. The numbers above may be even higher if underreported cases and deaths are considered. A positive aspect of this study was the low mortality rate, below region and national averages.

This study was based on secondary databases that depend on the reporting of confirmed cases. Despite the lack of data for some variables, the information was useful to understand the nature of the disease in Paracatu and to confirm its classification as an endemic area.

Finally, the study findings support the need for reassessment of the strategies for disease control and the evaluation of public policies.

FINAL CONSIDERATIONS

In order to analyse the profile of people with VL and discuss the characterization of the disease in the city of Paracatu this study evaluated important variables of compulsory notification forms and described worrying incidence rates. The results demonstrated that Paracatu has a high incidence of VL when compared with state and national averages, whereas it presents a low lethality rate. The researchers believe that the figures shown are in fact larger, considering the underreporting

of cases and deaths. Despite data limitations, the information obtained is useful to better understand the epidemiological behaviour of the disease that is spreading across the municipality.

The research highlights the need for strict sanitary surveillance to identify risk areas and assess the real impact of current control strategies.

The dissemination of information about the disease among health professionals and the population at risk cannot be underrated since health education and community awareness are vital to the eradication of the disease, not to mention the necessary public investments.

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