

EPIDEMIOLOGICAL BEHAVIOR OF SOME PARASITIC DISEASES IN THE FEDERATIVE REPUBLIC OF BRAZIL

Comportamento epidemiológico de algumas doenças parasitárias na República Federativa do Brasil

Comportamiento epidemiológico de algunas enfermedades parasitarias en la República Federativa del Brasil

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ABSTRACT

Objective: to describe the epidemiological behavior of some parasitic diseases in Brazil between 2013 and 2017. **Methods:** ecological and descriptive study based on data from Hospital Information Systems. It were collected the variables: Brazilian regions, age groups, sex and color/race. **Results:** it were found five diseases: amoebiasis, schistosomiasis, leishmaniosis, malaria and trypanosomiasis. There were record of 33.285 hospital admissions and 951 deaths by these diseases, corresponding to a mortality of 2,86%. The region with higher prevalence of hospital admissions, deaths and mortality was north (38,42%), northeastern (50,47%) and southeast (4,68%), respectively. Leishmaniosis has obtained higher morbidity (43,19%) and deaths (59,41%), already trypanosomiasis evidenced highest mortality (10,81%). The highest mortality rate by parasitic diseases was observed among males (2,97), self-declared white and black persons similarly (3,85) and aged ≥ 80 years old (9,64). **Conclusion:** the study revealed increasing behavior in deaths and mortality due parasitic diseases in Brazil, making it necessary the strengthening of sanitary measures especially in the southeast region for presenting greater mortality.

Descriptors: Epidemiology; Parasitology; Information systems.

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RESUMO

Objetivo: descrever o comportamento epidemiológico de algumas doenças parasitárias no Brasil entre 2013 e 2017. **Métodos:** estudo ecológico e descritivo realizado com dados do Sistema de Informações Hospitalares. Coletou-se as variáveis: regiões brasileiras, faixa etária, sexo e raça/cor. **Resultados:** encontrou-se cinco doenças: amebíase, esquistossomose, leishmaniose, malária e tripanossomíase. Registrou-se 33.285 internações e 951 óbitos por tais doenças, representando mortalidade de 2,86%. A região com maior morbidade, óbitos e mortalidade foi a norte (38,42%), nordeste (50,47%) e sudeste (4,68%), respectivamente. A leishmaniose obteve maior morbidade (43,19%) e óbitos (59,41%), já a tripanossomíase evidenciou maior mortalidade (10,81%). A maior mortalidade ocorreu em homens (2,97), em pessoas autodeclaradas brancas e pretas de igual modo (3,85) e com idade ≥ 80 anos (9,64). **Conclusão:** evidenciou-se nesse estudo comportamento crescente nos óbitos e mortalidade pelas doenças parasitárias no Brasil, tornando necessário o fortalecimento de medidas sanitárias especialmente na região sudeste, por apresentar maior mortalidade.

Descritores: Epidemiologia; Parasitologia; Sistemas de informação.

RESUMEN

Objetivo: describir lo comportamiento epidemiológico de algunas enfermedades parasitarias en Brasil entre 2013 y 2017. **Métodos:** estudio ecológico y descriptivo realizado con datos del Sistema de Información Hospitalaria. Fueran recolectados datos de internaciones, muertes y tasa de mortalidad asociados a las variables: regiones brasileñas, grupo de edad, sexo y color/raza. **Resultados:** fueran encontradas cinco enfermedades: amibiasis, esquistosomiasis, leishmaniosis, malaria y tripanosomiasis. Se han registrado 33.285 internaciones y 951 muertes, lo que corresponde a una mortalidad de 2,86%. La región con mayor prevalencia de internaciones, muertes y mortalidad ha sido la norte (38,42%), nordeste (50,47%) y sudeste (4,68%), respectivamente. La leishmaniosis obtuvo mayor morbilidad (43,19%) y muertes (59,41%), ya la tripanosomiasis evidenció mayor mortalidad (10,81%). La mayor mortalidad por las enfermedades parasitarias ha sido observada en las personas de género masculino (2,97), auto declaradas blancas y negras igualmente (3,85) y grupo etario ≥ 80 años (9,64). **Conclusión:** este estudio se evidenció comportamiento creciente en las muertes y mortalidad pelas enfermedades parasitarias en Brasil, haciendo necesario lo fortalecimiento de las medidas sanitarias especialmente en la región sudeste, por presentar mayor mortalidad.

Descriptorios: Epidemiología; Parasitología; Sistemas de información.

INTRODUCTION

Parasitic Diseases (PD) are considered one of the major causes of morbidity and mortality in tropical countries. These diseases are harmful to human health¹ caused by helminths or protozoa and are endemic in developing countries.²

The epidemiology of PD is a socioeconomic indicator, safety and collective health of a given geographical area, since parasitism is due to lack of infrastructure, precarious health security, lack of information^{1,3} and neglect of the public power.⁴

Currently, in the literature, there are about 300 species of helminths described and more than 70 species of protozoa that have already been diagnosed in the human race.⁵ It is estimated that 200,000 people annually evolve to death as a result of PD,⁶ especially when there is no adequate treatment, either due to lack of professional training in the prescription or the therapeutic conduct of the user.

Parasites can grow and develop asymptotically or induce various clinical manifestations in the host's organism. It is noteworthy that some PD cause more serious outcomes in immunocompromised people and especially in children, as it interferes with their nutritional status, growth and development.²

Nevertheless, in general, parasite infections result in diarrhea, intestinal obstruction, malnutrition, anemia, among others⁷, which in turn increases hospitalization rates and costs to health services.

Problems arising from parasites in Brazil should be treated with seriousness and sanitary commitment, since there is in the country a lack of effective educational policies to combat the problem. For the eradication of PD, it is essential to achieve improvements in socioeconomic conditions, health, education and the change of some cultural behaviors.⁸

In addition, due to the geographical, cultural and socioeconomic heterogeneity among people from the same city in the country⁹ and other conditions that favor infections, the development of actions to combat PD becomes relevant. To implement them, it is essential to have knowledge of their distribution, the species prevalent in each region, and above all, the zones and risk behaviors.¹⁰

In this context, the dissemination of epidemiological data on PD is an essential tool for directing actions to control and eradicate these diseases. Therefore, the objective of this study is to describe the epidemiological behavior of some PD in Brazil, from 2013 to 2017.

METHODOLOGY

This is a descriptive study of the ecological type made from data from the Hospital Information System (SIH – Sistema de Informações Hospitalares) of the Department of Informatics of the Unified Health System (DATASUS - Departamento de Informática do Sistema Único de Saúde). Data collection took place in March 2018 and Brazil was selected as the study scenario.

Epidemiological behavior data (morbidity, deaths and mortality) were collected according to records dated between January 01, 2013 and December 31, 2017 and correlated to the variables: all Brazilian regions, age group (< 1 year to ≥ 80 years), sex (male and female) and race/color (white, black, brown, yellow and indigenous).

As inclusion criteria, we selected all cases available in the SIH referring to parasitic diseases that had information on epidemiological behavior in all years selected for the study.

In this perspective, five diseases were found: Amebiasis; Schistosomiasis; Leishmaniasis (visceral, cutaneous, cutaneous-mucous, and unspecified); Malaria (*Plasmodium falciparum*, *Plasmodium vivax*, *Plasmodium malariae*, other forms of malaria according to parasitological examinations and unspecified malaria) and Trypanosomiasis.

The data were analyzed using simple descriptive statistics (absolute and relative frequencies) to present the number of hospitalizations and hospital deaths; and mortality coefficient calculated under the ratio between deaths and the number of hospitalizations, multiplied by 100. This study was developed using secondary data from a public domain information system, and consequently, there was no need for approval by the Research Ethics Committee, according to Resolution No. 466/2012 of the National Health Council.

RESULTS

According to Table 1, there is a variety in the distribution of morbidity and mortality among Brazilian regions. The northern region recorded a higher prevalence of hospitalizations with 12,789 (38.42%). The northeast region had a higher number of deaths with 480 (50.47%), and the southeast showed a higher mortality rate with 4.68%.

Analyzing the prevalence of parasites in Table 2, it is observed that Leishmaniasis had a higher prevalence of hospitalizations and deaths in Brazil, corresponding to 14,377 (43.19%) and 565 (59.41%), respectively. Trypanosomiasis stood out with mortality of 10.81% among the PD studied.

In relation to sex, Table 3 shows that the male population obtained higher mortality from PD in Brazil throughout the study period, making up a rate of 2.97%. In addition, there is an increasing behavior in the values presented.

Table 1 – Hospitalizations, deaths and mortality rate for some PD in Brazil according to the regions and year of care. Jequié, BA, Brazil, 2018

| VARIABLES | 2013 | 2014 | 2015 | 2016 | 2017 | Total | % |
|-------------------------|------|-------|-------|-------|-------|--------|-------|
| HOSPITALIZATIONS | | | | | | | |
| North | 221 | 3.367 | 3.117 | 3.159 | 2.925 | 12.789 | 38,42 |
| Northeast | 261 | 3.338 | 3.054 | 2.730 | 2.827 | 12.210 | 36,68 |
| Southeast | 92 | 1.307 | 1.314 | 1.361 | 1.526 | 5.600 | 16,82 |
| South | 22 | 219 | 172 | 134 | 132 | 679 | 2,04 |
| Midwest | 43 | 576 | 495 | 477 | 416 | 2.007 | 6,03 |
| Total | 639 | 8.807 | 8.152 | 7.861 | 7.826 | 33.285 | 100 |
| DEATHS | | | | | | | |
| North | - | 19 | 27 | 22 | 34 | 102 | 10,73 |
| Northeast | 9 | 126 | 122 | 110 | 113 | 480 | 50,47 |
| Southeast | 5 | 49 | 59 | 76 | 73 | 262 | 27,55 |
| South | - | 3 | 4 | 4 | 3 | 14 | 1,47 |
| Midwest | 1 | 21 | 30 | 20 | 21 | 93 | 9,78 |
| Total | 15 | 218 | 242 | 232 | 244 | 951 | 100 |
| MORTALITY | | | | | | | |
| North | - | 0,56 | 0,87 | 0,7 | 1,16 | 0,8 | 0,8 |
| Northeast | 3,45 | 3,77 | 3,99 | 4,03 | 4 | 3,93 | 3,93 |
| Southeast | 5,43 | 3,75 | 4,49 | 5,58 | 4,78 | 4,68 | 4,68 |
| South | - | 1,37 | 2,33 | 2,99 | 2,27 | 2,06 | 2,06 |
| Midwest | 2,33 | 3,65 | 6,06 | 4,19 | 5,05 | 4,63 | 4,63 |
| Total | 2,35 | 2,48 | 2,97 | 2,95 | 3,12 | 2,86 | 2,86 |

Source: Ministry of Health - SUS Hospital Information System (SIH/SUS)
- - Numerical data equal to 0 not resulting from rounding

Table 2 – Hospitalizations, deaths and mortality rate for some PD in Brazil according to regions. Jequié, BA, Brazil, 2018

| VARIABLES | North | Northeast | Southeast | South | Mid West | Brazil | % |
|-------------------------|--------|-----------|-----------|-------|----------|--------|-------|
| HOSPITALIZATIONS | | | | | | | |
| Amebiasis | 3.673 | 3.292 | 576 | 385 | 464 | 8.390 | 25,21 |
| Schistosomiasis | 28 | 342 | 355 | 9 | 25 | 759 | 2,28 |
| Leishmaniasis | 2.307 | 7.618 | 3.367 | 107 | 978 | 14.377 | 43,19 |
| Malaria | 6.526 | 337 | 367 | 93 | 207 | 7.530 | 22,62 |
| Trypanosomiasis | 621 | 935 | 85 | 333 | 2.229 | 621 | 6,70 |
| Total | 12.789 | 12.210 | 5.600 | 679 | 2.007 | 33.285 | 100 |
| DEATHS | | | | | | | |
| Amebiasis | 3 | 30 | 13 | 6 | 7 | 59 | 6,20 |
| Schistosomiasis | 1 | 29 | 10 | 0 | 0 | 40 | 4,21 |
| Leishmaniasis | 65 | 334 | 119 | 4 | 43 | 565 | 59,41 |
| Malaria | 24 | 10 | 11 | 0 | 1 | 46 | 4,84 |
| Trypanosomiasis | 9 | 77 | 109 | 4 | 42 | 241 | 25,34 |
| Total | 102 | 480 | 262 | 14 | 93 | 951 | 100 |
| MORTALITY | | | | | | | |
| Amebiasis | 0,08 | 0,91 | 2,26 | 1,56 | 1,51 | 0,7 | 0,7 |
| Schistosomiasis | 3,57 | 8,48 | 2,82 | - | - | 5,27 | 5,27 |
| Leishmaniasis | 2,82 | 4,38 | 3,53 | 3,74 | 4,4 | 3,93 | 3,93 |
| Malaria | 0,37 | 2,97 | 3 | - | 0,48 | 0,61 | 0,61 |
| Trypanosomiasis | 3,53 | 12,4 | 11,66 | 4,71 | 12,61 | 10,81 | 10,81 |
| Total | 0,8 | 3,93 | 4,68 | 2,06 | 4,63 | 2,86 | 2,86 |

Source: Ministry of Health - SUS Hospital Information System (SIH/SUS)
- - Numerical data equal to 0 not resulting from rounding

Table 3 – Mortality rate for some PD in Brazil according to sex. Jequié, BA, Brazil, 2018

| Year of care | Male | Female | Total (%) |
|--------------|------|--------|-----------|
| 2013 | 2,59 | 2,06 | 2,35 |
| 2014 | 2,77 | 2,11 | 2,48 |
| 2015 | 2,99 | 2,94 | 2,97 |
| 2016 | 3,03 | 2,84 | 2,95 |
| 2017 | 3,12 | 3,11 | 3,12 |
| Total | 2,97 | 2,71 | 2,86 |

Source: Ministry of Health - SUS Hospital Information System (SIH/SUS)

Regarding race/color, there was a higher prevalence and similarity in the results between the self-reported white and black population, which showed mortality of 3.85%, as shown in Table 4. Soon after, the variable without information shows the second highest mortality with 2.85%.

Table 4 – Mortality rate for some PD in Brazil according to race/color. Jequié, BA, Brazil, 2018

| Color/race | 2013 | 2014 | 2015 | 2016 | 2017 | Total (%) |
|----------------|------|------|------|------|------|-----------|
| White | - | 2,25 | 3,66 | 5,44 | 4,58 | 3,85 |
| Black | 6,25 | 4,37 | 1,62 | 4,41 | 4,73 | 3,85 |
| Brown | 3,72 | 2,85 | 2,73 | 2,33 | 2,74 | 2,68 |
| Yellow | - | 4,44 | 0,83 | 3,32 | 2 | 2,41 |
| Indigenous | - | - | - | 2,04 | 1,47 | 0,86 |
| No information | 1,49 | 2 | 3,42 | 3,06 | 3,34 | 2,85 |
| Total | 2,35 | 2,48 | 2,97 | 2,95 | 3,12 | 2,86 |

Source: Ministry of Health - SUS Hospital Information System (SIH/SUS)
- - Numerical data equal to 0 not resulting from rounding

Table 5 shows higher mortality in the age group ≥ 80 years old (9.64%). In addition, from the age of 60, mortality from all PD studied presents an increasing trend over the years.

Table 5 – Mortality rate for some PD in Brazil according to age group. Jequié, BA, Brazil, 2018

| Age group | 2013 | 2014 | 2015 | 2016 | 2017 | Total (%) |
|----------------|-------|------|-------|------|-------|-----------|
| > 1 year | 4,35 | 2,9 | 3,37 | 3,33 | 3,7 | 3,33 |
| 1 to 4 years | - | 1,06 | 1,44 | 1,02 | 1,51 | 1,22 |
| 5 to 9 years | - | 0,27 | 0,57 | 0,64 | 0,32 | 0,43 |
| 10 to 14 years | - | 0,59 | - | 0,47 | 0,5 | 0,39 |
| 15 to 19 years | 3,85 | 0,99 | 1,53 | 1,59 | 1,17 | 1,34 |
| 20 to 24 years | - | 1,17 | 1,94 | 1,49 | 1,72 | 1,54 |
| 25 to 29 years | 3,57 | 1,78 | 2,12 | 2,08 | 2,91 | 2,21 |
| 30 to 34 years | 3,03 | 1,35 | 2,4 | 3,57 | 1,76 | 2,28 |
| 35 to 39 years | - | 2,21 | 3,45 | 1,17 | 1,76 | 2,1 |
| 40 to 44 years | - | 4,34 | 3,07 | 4,04 | 2,44 | 3,4 |
| 45 to 49 years | 9,52 | 2,56 | 6,74 | 4,61 | 3,81 | 4,44 |
| 50 to 54 years | 5 | 4,4 | 3,58 | 5,09 | 4,08 | 4,28 |
| 55 to 59 years | - | 4,01 | 2,54 | 5,71 | 3,51 | 3,85 |
| 60 to 64 years | 4,35 | 4,23 | 6,13 | 5,99 | 6,62 | 5,68 |
| 65 to 69 years | 3,57 | 6,23 | 6,15 | 5,6 | 7,72 | 6,34 |
| 70 to 74 years | 8,33 | 6,82 | 5,73 | 7,69 | 9,85 | 7,46 |
| 75 to 79 years | 15,38 | 7,83 | 7,66 | 6,22 | 10,9 | 8,29 |
| ≥ 80 years | 8,33 | 7,66 | 11,27 | 8,26 | 11,72 | 9,64 |
| Total | 2,35 | 2,48 | 2,97 | 2,95 | 3,12 | 2,86 |

Source: Ministry of Health - SUS Hospital Information System (SIH/SUS)
- - Numerical data equal to 0 not resulting from rounding

DISCUSSION

The PD identified in this study are among the most frequent in the country and undoubtedly these diseases generate significant impacts on public health, especially in the population that is exposed to the risks of infection by different etiological agents.⁷

The present study was dedicated to analyzing a time frame corresponding to the interval between 2013 and 2017. It was observed in Table 1 that mortality from PD showed increasing behavior and, in 2017, higher mortality was recorded among hospital admissions with 3.12%. Thus, when analyzing the results, it can be inferred that there is a lack of effective educational policies in the country to combat the problem.³

In this perspective, a higher prevalence of hospitalizations, deaths and mortality rate is observed, respectively, in the North with 12,789 (38.42%), Northeast with 480 (50.47%), and Southeast with 4.68%. PD usually have a direct relationship with sociodemographic and environmental factors. Examples are socioeconomic, nutritional or infrastructural precariousness; poor basic sanitation and/or scarcity of drinking water.² The neglect of the government allied to these factors⁴ increase hospitalization rates and financial impacts to health services.

In urban centers, there has been a slight decrease in the incidence of PD in recent years.³ In the present study, the southern region showed a lower prevalence of hospitalizations with 679 (2.04%) and deaths with 14 (1.47%). On the other hand, the northern region presented a lower mortality rate due to PD, even though it is considered an endemic region. The veracity of the SIH data is questioned, given that in northern Brazil, there is the highest index of riverside populations recognized for the precariousness of basic sanitation and access to drinking water. Therefore, this population is subject to the use of river water for consumption, body hygiene and various other activities, which ensures the maintenance of the life cycle of etiological agents.⁸

The highest prevalence of hospitalizations and deaths in Brazil were recorded due to Leishmaniasis with 14,377 (43.19%) and 565 (59.41%), respectively, according to Table 2. In addition, it is noteworthy that this disease stood out in the northeast region in the two variables mentioned. This disease is considered an important public health problem,¹¹ not only in Brazil, but in several American, Asian, European and African countries. The magnitude of this problem sensitized the World Health Organization (WHO) to include it in the ranking of the six priority pathologies in its control program.¹²

Regarding the control of Leishmaniasis in the Northeast region, it is noted that there are variations in the characteristics of the disease in the northeastern states. Maranhão, for example, expresses the same patterns observed in the north of the country, while Ceará and Bahia show variations in these characteristics. As a result, there is the establishment of challenges, especially due to the difficulty of studying vectors and their reservoirs.¹²

The disease with the highest mortality in Brazil was Trypanosomiasis with a rate of 10.81%, also showing higher mortality in the Midwest Region of the country with 12.61%, corroborating with other studies¹³⁻¹⁴ that demonstrated higher mortality in the region. At broader levels, Trypanosomiasis affects approximately 16 to 18 million people in several American countries.¹⁵

Regarding sex, the results showed that the male population obtained higher mortality from PD in Brazil throughout the study period, making up a rate of 2.97% and an increasing behavior in the values presented, as Table 3 shows. Thus, PD can be considered as another cause of increase in male morbidity and mortality, since, among the main reasons for deaths, Brazilian men have a lower survival rate compared to women.¹⁶

This statement is justified because in addition to being more affected by infectious and parasitic diseases, they are more exposed to work and traffic accidents, adhere too much to alcohol intake and other licit and illicit drugs, engage more frequently in situations of violence, do not practice physical activities regularly and adopt the thought of immortality, which in turn, excludes the perspective of diagnostic and therapeutic precocity.¹⁶

In addition, it is observed that the participation of men in primary health care services is significantly lower than that of women. Therefore, the low demand for health services is also a contributing factor to the increase in PD mortality, given that primary care services are one of the main strategies for prevention, control and treatment of PD.¹⁷

Regarding race/color, although, historically, the morbidity and mortality profile of Brazilian indigenous peoples is known for the predominance of infectious and parasitic diseases¹⁸, the indigenous presented the lowest mortality rate in the present study with 0.86%. The highest rates were recorded among the self-reported white and black population, which showed similarity in mortality values with 3.85%, as shown in Table 4.

Regarding the mortality rate by age group, the results of this study showed higher values among the elderly, in the age group ≥ 80 years (9.64%), according to Table 5. In addition, it is pointed out that, from the age of 60, mortality from PD showed increasing behavior during the period studied. Among the elderly, there are several risk factors that predispose them to these diseases and increase morbidity and mortality. Among them, the decrease in the normal functions of the immune system stands out, because T lymphocytes are altered due to the process of senescence and/or senility. As a result, the efficiency of monocytes/macrophages in the destruction of invasive microorganisms becomes impaired.¹⁹

Although in the last 20 years there has been a decrease in PD in Brazil, in general, such diseases have played an important role among the causes of death in the country. It was evident that this group of diseases is of importance due to its expressive social impact, since it is directly associated with poverty and quality of life, being framed as diseases related to precariousness in the conditions of hygiene, housing and food.¹⁹ Nevertheless, there is a lack of public care and educational policies, in order to disseminate information for the training of professionals, and for the population, focusing mainly on prevention.^{1,3}

CONCLUSION

This study showed an increasing behavior in deaths and mortality rate from PD in Brazil, in addition, trypanosomiasis was the cause of higher mortality in the country. Therefore, it is necessary to strengthen sanitary measures especially in the southeast region, because they present higher mortality from PD.

It is noteworthy that this study has limitations due to the source of data collection, which may contain underreporting and, therefore, interfere with the veracity of the records. However, the SIH is an important tool for epidemiological dissemination of various health problems, in order to direct strategies for their prevention, control and rehabilitation.

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