EDUCAÇÃO CIÊNCIA E SAÚDE
http://dx.doi.org/10.20438/ecs.v11i2.624

EPIDEMIOLOGY OF SCHISTOSOMIASIS IN PARAÍBA, BRAZIL, BETWEEN 2018 AND 2022

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Resumo

A esquistossomose é uma doença parasitária causada pelo helminto *Schistosoma mansoni*, que afeta milhões de pessoas em todo o mundo, principalmente em áreas tropicais e subtropicais. Objetiva-se determinar o perfil epidemiológico dos indivíduos acometidos pela esquistossomose no estado da Paraíba entre os anos de 2018 e 2022. Estudo retrospectivo dos casos de esquistossomose diagnosticados no período de 2018 a 2022, coletados a partir do Departamento de Informática do Sistema Único de Saúde do Brasil. Identificou-se um total de 273 casos de esquistossomose durante o período estudado. O perfil epidemiológico predominante foi composto pelo sexo feminino, com idade entre 40 a 59 anos, etnia parda e baixa escolaridade. A evolução clínica dos casos teve principalmente desfecho de cura (74,7%). A implementação de medidas de saneamento básico, acesso à água potável, tratamento em massa e educação em saúde são essenciais para reduzir a incidência da doença e melhorar a qualidade de vida das populações em risco.

Palavras-chave: esquistossomose, medicina tropical, doenças negligenciadas.

Abstract

Schistosomiasis is a parasitic disease caused by the helminth Schistosoma mansoni, affecting millions of people worldwide, primarily in tropical and subtropical regions. This study aims to determine the epidemiological profile of individuals affected by schistosomiasis in the state of Paraíba between 2018 and 2022. It is a retrospective study of schistosomiasis cases diagnosed during the period from 2018 to 2022, collected from the Informatics Department of the Brazilian Unified Health System. A total of 273 cases of schistosomiasis were identified during the study period. The predominant epidemiological profile was composed of females aged 40 to 59 years, of mixed ethnicity, and with low educational levels. The clinical evolution of cases mainly resulted in a cure (74.7%). Implementing basic

sanitation measures, access to potable water, mass treatment, and health education is essential to reduce the incidence of the disease and improve the quality of life of at-risk populations.

Keywords: Schistosomiasis, tropical medicine, neglected tropical diseases.

1 Introduction

The World Health Organization (WHO) recognizes schistosomiasis as a Neglected Tropical Disease, which is characterized as the second most impactful parasitic infection globally (SILVA et al., 2021).

This parasitic disease is caused by the trematode *Schistosoma mansoni*. It is normally found in areas with high poverty rates and poor socioeconomic conditions, affecting approximately 200 million people worldwide in about 78 countries (CARVALHO, 2018).

According to data from the Brazilian Epidemiological Bulletin, in Latin America, schistosomiasis accounts for about 95% of the total number of cases in Brazil, which annually manifests a significant number of people infected by the parasite (SOUSA et al., 2021). Moreover, it is common found in nine states, with seven located in the northeastern region: Pernambuco, Sergipe, Alagoas, Bahia, Paraíba, Maranhão, and Rio Grande do Norte (SILVA et al., 2022).

The symptomatology of schistosomiasis is divided into two clinical phases: acute, characterized by cercarial dermatitis, fever, nausea, and headache, and chronic phase, where symptoms such as abdominal pain, diarrhea, presence of blood in stools, and ascites can be observed (COLLEY et al., 2014).

The primary approach for diagnosing this condition involves analyzing fecal samples, along with immunological methods to assess the host's immune response to the parasite antigen. However, the Kato-Katz technique is the most widely used by control programs and recommended by the WHO, proving effective in individuals with high or moderate parasite loads as it allows for the visualization of eggs and provides indicators of infection intensity (BRASIL, 2018 ; BRASIL, 2024).

In this context, the Ministry of Health recommends Praziquantel as the treatment for schistosomiasis, provided through the Brazilian Unified Health System (SUS) (SOARES et al., 2022). Additionally, preventive measures are

essential, including implementing health education programs, improving basic sanitation conditions, and controlling intermediate hosts. These actions are crucial to ensuring effective control of this parasitic disease.

Thus, this neglected disease is associated with economically disadvantaged social groups residing in unhealthy regions. These conditions facilitate the spread of infectious forms of this parasite and the occurrence of reinfections. Moreover, the lack of adequate healthcare infrastructure or its non-existence worsens the situation, hindering access to medical care and effective treatments (SOUZA, 2020). Therefore, this helminthiasis is of great importance due to the high number of cases. Between 2009 and 2019, 423,117 people in Brazil were affected by this condition (BRASIL, 2024).

Therefore, this study aimed to determine the epidemiological profile of individuals affected by schistosomiasis in the state of Paraíba between the years 2018 and 2022.

2 Methodology

2.1 Study design

It is an epidemiological study, quantitative and descriptive, which used secondary data from the National System of Diseases and Notification (SINAN), from the database of the Department of Informatics of the Unified Health System (DATASUS) (ANDRADE JÚNIOR et al., 2021).

2.2 Study location

The state of Paraíba is located in the Northeast region of Brazil, with an estimated area of 56,467,242 square kilometers, an estimated population of 4,059,905 inhabitants in the year 2021, and a population density of 66.70 inhabitants per square kilometer. From a social perspective, it has a Human Development Index (HDI) of 0.658 and a per capita household income of 1,096 (IBGE, 2023).

2.3 Variables Analyzed

The population of this study consisted of schistosomiasis cases reported in the state of Paraíba, Brazil, between the years 2018 and 2022. The following sociodemographic variables were analyzed among these cases: sex, age

group, education level, race, and clinical outcome. The data obtained were compiled into a spreadsheet using Microsoft Office Excel software and evaluated through simple descriptive statistics.

2.4 Ethical Considerations

As this study involved secondary data analysis, submission to the Research Ethics Committee was not required, in accordance with Resolution CNS 466/2012, which regulates research and trials involving human subjects.

3 RESULTS AND DISCUSSION

Paraíba has environmental, socioeconomic, and cultural characteristics that facilitate the spread of the schistosomiasis parasite and its intermediate host (BARRETO ; LOBO, 2021), contributing significantly to the emergence of cases (Table 1).

Table 1: Confirmed Schistosomiasis Cases by Year from 2018 to 2022 in the State of Paraíba

Year	Number of Cases	%
2018	47	17,2%
2019	30	11%
2020	38	13,9%
2021	68	24,9%
2022	90	33%
Total	273	100%

Source: Research data (2024).

In this context, in 2022, there was a higher prevalence of cases, reaching 33% of the total of 273 confirmed cases between the years 2018 to 2022. The progressive increase in schistosomiasis cases observed in the state of Paraíba is similar to that found in a study conducted in the state of Bahia (CARVALHO et al., 2023). However, it is important to highlight that, thanks to the implementation of basic sanitation measures and the pharmacological treatment provided free of charge by the Brazilian Unified Health System (SUS), a reduction in this disease has been observed in northeastern Brazil, which shows that the disease has become more concentrated in increasingly specific regions of the country (SANTOS et al., 2024). This emphasizes the need to

maintain active case finding, develop more targeted public policies, and provide appropriate treatment for those affected.

In Figure 1, it is possible to observe the percentage of affected individuals, taking into account their gender.

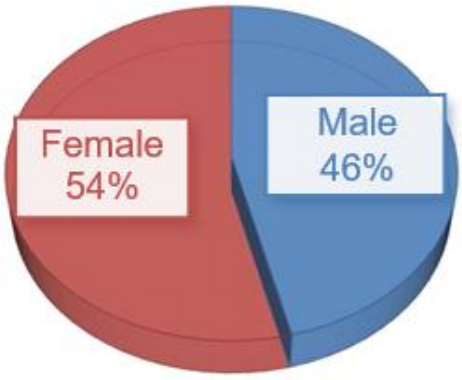

Figure 1 - Percentage of individuals affected by schistosomiasis, by gender, between the years 2018 to 2022 in the State of Paraíba.

Source: Research data (2024).

Schistosomiasis infection can affect individuals of both sexes due to human contact with freshwater bodies contaminated with the parasite, making people vulnerable to this disease. Therefore, the increase or decrease in cases, considering gender, is directly associated with the individual's relationship with water, which can be influenced by cultural, recreational, occupational, and personal hygiene factors (PEREIRA et al., 2018).

However, data show that females predominated with 54% of the cases. The relationship between gender and schistosomiasis is a relevant issue that deserves analysis because there are significant differences in prevalence, symptom severity, and disease consequences between men and women. In many endemic areas, men tend to have a higher infection rate due to their professional activities such as fishing, agriculture, or manual labor that frequently expose them to contaminated water. Additionally, cultural and behavioral factors may contribute to differential exposure between genders. Although prevalence is often higher among men, women are also affected by schistosomiasis in distinct ways, as observed in the present research (AYABINA et al., 2021; ZHONG; JIN, 2023).

Schistosomiasis is a parasitic disease that can affect people of all ages (Table 2).

Table 2 - Confirmed Cases of Schistosomiasis by Age Group from 2018 to 2022 in the State of Paraíba

Age Group	Number of Cases	%
>1 to 14 years	23	8,5%
15 to 19 years	14	5,1%
20 to 39 years	61	22,3%
40 to 59 years	113	41,4%
≥60 years	62	22,7%
Total	273	100%

Source: Research data (2024).

Thus, the age group most affected was 40 to 59 years old, comprising 41,4% of the cases. This finding corroborates the study by Sobrinho et al. (2020), which assessed the predominance of cases among individuals aged 20 to 59 years, suggesting a possible association between infection risk and occupation, thus affecting the most productive age group of human life. In the age group of 20 to 59 years, many individuals are involved in occupational activities that frequently expose them to water contaminated with *S. mansoni* cercariae, particularly farmers and fishermen (FAUST et al., 2020).

Furthermore, during this life period, individuals may reside in endemic areas for prolonged periods, resulting in cumulative exposure to the parasite over the years. This can lead to a higher likelihood of infection and disease development (GRIMES et al., 2015).

In Table 3, the number of schistosomiasis cases in Paraíba according to race can be observed.

Table 3 - Confirmed Schistosomiasis Cases by Race from 2018 to 2022 in the State of Paraíba.

Ethnicity	Number of Cases	%
Ignored	13	4,8%
White	52	19%
Black	05	1,8%
Mulatto	200	73,3%
Indigenous	03	1,1%
Total	273	100%

Source: Research data (2024).

It is evident from this research that individuals of mulatto present the highest number of schistosomiasis cases in Paraíba. This highlights the historical instability faced by Black and mixed-race populations, who often experience precarious socioeconomic conditions such as inadequate housing, limited access to sanitation and clean water, and involvement in labor activities that expose them to contaminated water. Additionally, institutional racism in the country creates barriers to accessing healthcare services (CONCEIÇÃO et al., 2022).

In Table 4, the data regarding the education level of those infected with *S. mansoni* can be analyzed.

Table 4 - Confirmed Schistosomiasis Cases by Education Level from 2018 to 2022 in the State of Paraíba

Education level	Number of Cases	%
Ignored	105	38,5%
No schooling	12	4,4%
Low education level	70	25,7%
Average schooling	52	19,0%
High schooling	22	8,0%
Not applicable	12	4,4%
Total	273	100%

Source: Research data (2024).

Individuals with low levels of education were predominantly affected by *Schistosomiasis mansoni* in Paraíba. These data reaffirm the study by Melo et al. (2018), which considers education as a determinant factor of health. Lack of

education restricts understanding of prevention guidelines and undermines the effectiveness of medication treatment, contributing to the continued spread of the disease. Furthermore, it is important to highlight that individuals with lower levels of education often engage in occupations with greater exposure to risk factors, such as fishing. Another relevant perspective is that these individuals, for the most part, have low incomes, which contributes to living in areas with poor sanitation infrastructure, fostering the emergence and spread of the disease (CARNEIRO; CARNEIRO; CARNEIRO, 2022).

The clinical outcomes data are presented in Table 5.

Table 5 - Confirmed Schistosomiasis Cases by Clinical Outcome from 2018 to 2022 in the State of Paraíba.

Clinical Outcome	Number of Cases	%
Ignored	56	20,5%
Cure	204	74,7%
Non-cure	6	2,2%
Deaths	7	2,6%
Total	273	100%

Source: Research data (2024).

It is evident that the highest rate is that of recovery, at 74,7%. Thus, health restoration is the most common outcome in cases of schistosomiasis. This is attributed to the effectiveness of Oxamniquine and Praziquantel, which are the selected medications to treat this health condition (HOLANDA et al., 2020).

A limitation of the research was the absence of data recorded in SINAN classified as "unknown/white," which hinders the conduct of epidemiological studies. Proper feeding of data notification systems is crucial for understanding the health situation and disease incidence in specific areas, enabling the formulation of essential strategies that public health authorities can adopt (MACEDO et al., 2020; ARAÚJO; ANDRADE JUNIOR; SOUTO MAIOR, 2021). This may be related to the lack of training among healthcare professionals in properly filling out notification forms (ARAÚJO et al., 2023), which hinders the identification of the true epidemiological reality of schistosomiasis in Paraíba.

4 Conclusão

Between 2018 and 2022, 273 cases of schistosomiasis were reported. The epidemiological profile was predominantly composed of females aged 40 to 59 years, of mixed ethnicity, and with low educational attainment. Clinical outcomes primarily resulted in recovery. Thus, these epidemiological characteristics are crucial for formulating strategies and public policies aimed at reducing cases and improving the health quality of the population at risk of illness.

5 Referências

ANDRADE JÚNIOR, F. P. et al. Epidemiological profile of people affected by tuberculosis in Campina Grande - PB, between 2014 and 2018. **Revista de Ciências Médicas e Biológica**, v.20, n.2, p.296-300, 2021.

ARAÚJO, J. M. D.; ANDRADE JUNIOR, F. P. ; SOUTO MAIOR, F. N. Tendência de mortalidade por câncer gástrico no nordeste brasileiro. **Saúde (santa maria)**, v. 47, p. 47, 2021.

ARAÚJO, J. M. D. et al. Perfil clínico-epidemiológico de acometidos por meningite em Natal-RN. **Almanaque Multidisciplinar de Pesquisa**, v.10, n,10, p.123-139, 2023.

AYABINA, D. V. et al. Gender-related differences in prevalence, intensity and associated risk factors of Schistosoma infections in Africa: A systematic review and meta-analysis. **PLoS neglected tropical diseases**, v. 15, n. 11, p. e0009083, 2021.

BARRETO, B.L.; LOBO, C.G. Aspectos epidemiológicos e distribuição de casos de esquistossomose no Nordeste brasileiro no período de 2010 a 2017. **Revista Enfermagem Contemporânea**, v.10, n.1, p.111–118, 2021.

BRASIL. Ministério da Saúde. **Esquistossomose**. 2024. Disponível em:< https://www.gov.br/saude/pt-br/assuntos/saude-de-a-a-z/e/esquistossomose>. Acesso em: 13 dez. 2024.

BRASIL. Ministério da Saúde. Inquérito Nacional de Prevalência da Esquistossomose mansoni e Geo-helmintoses. Belo Horizonte: **CPqRR**, 2018.

CARNEIRO, K. J. S. G.; CARNEIRO, K. S. G.; CARNEIRO, C. S. Esquistossomose mansônica como doença profissional: a importância de estabelecer o nexo. **Saúde e Sociedade**, v. 31, n. 4, p. e200987pt, 2022.

CARVALHO, O. S. Distribuição geográfica dos hospedeiros intermediários do Schistosoma mansoni nos estados do Paraná, Minas Gerais, Bahia, Pernambuco e Rio Grande do Norte, 2012-2014. **Revista de Epidemiologia e Serviços de Saúde**, v. 27, n. 3, 2018.

CARVALHO, B. L. et al. Análise epidemiológica da evolução do quadro de esquistossomose na Bahia, durante o período de 2015 a 2022. **The Brazilian Journal of Infectious Diseases**, v. 27, p. 103507, 2023.

COLLEY, D. G. et al. Human schistosomiasis. **The Lancet**, v. 383, n. 9936, p. 2253-2264, 2014.

CONCEIÇÃO, J. R. et al. Doenças tropicais negligenciadas e racismo sistêmico especialmente no Brasil: dos aspectos de novos medicamentos. **Acta Trópica**, v. 235, p. 106654, 2022.

FAUST, C. L. et al. Schistosomiasis control: leave no age group behind. **Trends in parasitology**, v. 36, n. 7, p. 582-591, 2020.

GRIMES, J. et al. The roles of water, sanitation and hygiene in reducing schistosomiasis: a review. **Parasites & vectors**, v. 8, p. 1-16, 2015.

HOLANDA, E. C. et al. Caracterização epidemiológica e prevalência de esquistossomose no Estado do Maranhão, Brasil. **Research, Society and Development**, v. 9, n. 8, 2020.

MACEDO, J. B. et al. Análise espacial e determinantes sociais na vigilância das doenças negligenciadas. **Research, Society and Development**, v. 9, n. 8, p. e808986261- e808986261, 2020.

MELO, A. G. S. et al. Esquistossomose mansônica em famílias de trabalhadores da pesca de área endêmica de Alagoas. **Escola Anna Nery**, v. 23, 2018.

PEREIRA, G. S.; OLIVEIRA, H. M. B. F.; OLIVEIRA FILHO, A. A.; Educação Ambiental em Saúde: Analise dos Casos de Esquistossomose Notificados no Período de 2015a 2017. **Revista Educação Ambiental em Ação**. v.17, n.64, 2018.

SANTOS, M. S. et al. Estudo epidemiológico de esquistossomose no Nordeste do brasil no período de 2019 a 2023. **Brazilian Journal of Implantology and Health Sciences**, v. 6, n. 8, p. 1408-1423, 2024.

SILVA, B. M. D.; et al. High schistosomiasis-related mortality in Northeast Brazil: trends and spatial patterns. **Revista da Sociedade Brasileira de Medicina Tropical**, v. 55, 2022.

SILVA, P. W. et al. Basic and associated causes of schistosomiasis-related mortality in Brazil: A population-based study and a 20-year time series of a disease still neglected. **Journal of Global Health**, v.11, 2021.

SOARES, A. C,; et al. Aspectos gerais sobre a esquistossomose mansoni - uma breve revisão de literatura. **Doenças infecciosas e parasitárias no contexto brasileiro**, v. 4, p.161-170, 2022.

SOBRINHO, F. S. L. et al. Esquistossomose Mansônica no Nordeste brasileiro, no período de 2013 a 2017. **Diversitas Journal**, v. 5, n. 4, p. 2881-2889, 2020

SOUSA, D. G. S. et al. Challenges and prospects of mansonic schistosomosis diagnosis in Brazil: literature review. **Revista Eletrônica Acervo Saúde**. v.13, n. 3, p.1-9, 2021.

SOUZA, C. C. Perfil epidemiológico de doenças tropicais negligenciadas no nordeste brasileiro. **Revista Baiana de Saúde Pública**, v.44, n.3, p.143-160, 2020.

ZHONG, H.; JIN, Y. Single-sex schistosomiasis: a mini review. **Frontiers in Immunology**, v.14, p.1158805, 2023.