

Original Article

Prevalence of enteroparasitosis in users of the clinical analysis laboratory of a municipality of the agreste region of Alagoas

Prevalência de enteroparasitoses em usuários do laboratório de análises clínicas de um município do agreste alagoano

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Abstract

Parasitic diseases represent a significant challenge in the field of global public health, being closely linked to precarious sociodemographic and environmental conditions, which are more common in tropical and subtropical countries. This study aimed to describe the epidemiological profile of enteroparasitosis in the population attended by a private clinical analysis laboratory in the Agreste region of Alagoas. A retrospective cross-sectional descriptive study was conducted in a clinical analysis laboratory located in the city of Arapiraca-AL, using the results of fecal examinations from 01/01/2023 to 12/31/2023, among individuals aged 1 to 99 years, totaling 5,871 analyzed tests. The Hoffman, Pons, and Janer or Lutz Method, also known as the spontaneous sedimentation method, was used for the examination. As a result, 7% (431) of cases were positive for at least one intestinal parasite, with the most prevalent being the protozoa *Entamoeba coli* 33.26% (152), *Giardia lamblia* 16.47% (71), *Entamoeba histolytica/Entamoeba dispar* 11.60% (50), and *Endolimax nana* 0.93% (4). Regarding helminth infections, the most prevalent was *Ascaris lumbricoides* at 24.12% (104), followed by *Enterobius vermicularis* 3.71% (16), *Hymenolepis nana* 1.85% (8), *Schistosoma mansoni* 1.85% (8), *Trichuris trichiura* 0.92% (4), and Ancylostomatidae 0.92% (4). Thus, due to the significant portion of the population infected, the importance of implementing public policies aimed at improving sanitary education is evident

Keywords: parasitic diseases, helminthiasis, epidemiology.

Resumo

As doenças parasitárias representam um desafio significativo no campo da saúde pública mundial, estando relacionadas com a precariedade das condições sociodemográficas e ambientais, que são mais comuns em países tropicais e subtropicais. O estudo teve como objetivo de descrever o perfil epidemiológico das enteroparasitoses pela população atendida no laboratório privado de análises clínicas do agreste alagoano. Foi realizado um estudo descritivo e retrospectivo de corte transversal em um laboratório de análises clínicas situado na cidade de Arapiraca-AL, utilizando os resultados de exames de fezes no período de 01/01/2023 a 31/12/2023 entre indivíduos com idades 01 e 99 anos, totalizando 5,871 exames analisados. Para a realização do exame, foi usado o Método de Hoffman, Pons e Janer ou Lutz ou método de sedimentação espontânea. Como resultado, evidenciaram-se 7% (431) de casos positivos para pelo menos um parasito intestinal, sendo prevalente os protozoários *Entamoeba coli* 33.26% (152), *Giardia lamblia* 16.47% (71), *Entamoeba histolytica/Entamoeba dispar* 11.60% (50) e *Endolimax nana* 0.93% (04). Com relação às infecções por helmintos, o de maior prevalência foi *Ascaris lumbricoides* com 24.12% (104), seguido por *Enterobius vermicularis* 3.71% (16), *Hymenolepis nana* 1.85% (08) *Schistosoma mansoni* 1.85% (08), *Trichuris trichiura* 0.92% (04) e ancilostomídeos 0.92% (04). Dessa forma, devido à significativa parcela da população infectada, fica evidente a importância da implantação de políticas públicas visando uma melhor educação sanitária.

Palavras-chave: doenças parasitárias, helmintíases, epidemiologia.

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Received: October 8, 2024 – Accepted: March 24, 2025

Editor: Takako Matsumura Tundisi



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1. Introduction

Parasitic diseases represent a significant challenge in international public health (Beavogui et al., 2021; Rosa et al., 2020; Iannacone et al., 2021). Various environmental, social, and geographical factors contribute to the ongoing prevalence of intestinal parasites, which are more common in tropical and subtropical countries (Ramos et al., 2023; Nunes and Rocha, 2019; Oliveira et al., 2020; Silva et al., 2021a; Rahman et al., 2022). According to Silva et al. (2021b), developing countries are characterized by poor sanitation conditions, such as a lack of sewage systems, waste collection, public cleaning services, and water services, along with low levels of education and hygiene among the population, leading to the occurrence of intestinal parasitoses.

Parasites are predominantly endemic and widely spread in certain regions of the world, causing the disease pattern to vary according to geographic location (Ulhaq et al., 2021). Soil-transmitted helminth (STH) infections are common worldwide, affecting approximately 1.5 billion people, or 24% of the global population. These infections are primarily found in socially disadvantaged communities. In such regions, millions of preschool-aged children, school-aged children, adolescents, and pregnant women require treatment and preventive measures (WHO, 2022).

The transmission of intestinal parasites primarily occurs via the fecal-oral route, by the ingestion of contaminated water and the consumption of food contaminated with infectious forms of protozoa and intestinal helminths, mainly raw foods such as vegetables and certain meats, as well as due to a lack of hand hygiene (Cardoso et al., 2020; Rocha et al., 2021). Laboratory diagnosis is mainly conducted through parasitological stool examination or enzyme immunoassays, and treatment involves the use of antiparasitic medications, which are highly effective and have few side effects. Despite continuous advancements in pharmacology, there is still no satisfactory single-dose oral medication that is low-cost, multifunctional, free of side effects, suitable for pregnant women and children, and highly effective against all enteroparasites (Vilar et al., 2021).

Estimates that the prevalence of intestinal parasitic infections in Brazil is high; however, in clinical practice, this rate is likely to be underestimated because not enough individuals are tested, and the tests themselves have low sensitivity and specificity (Incarni et al., 2017; Potes-Morales and Crespo-Ortiz, 2023). Although there are some studies of specific populations, such as children in daycare centers (Aschale et al., 2021), incarcerated individuals (Lima et al., 2024), Indigenous peoples (De Paula et al., 2024), residents of quilombos (former slave settlements) (Santos et al., 2024), and communities living near landfills (Alencar et al., 2021), the representativeness of their data may be limited to these groups.

The issue of intestinal parasitoses in Brazil is more severe than perceived, as there is unfortunately a deficiency in a comprehensive and effective sanitation education policy, in addition to the low socioeconomic level, geographic isolation, and precarious living conditions of the population (Correia et al., 2022). The elimination of these

enteroparasites requires improvements in socioeconomic conditions, basic sanitation, and sanitation education, as well as attention to aspects related to food, including its preparation, handling, and hygiene (Gomes et al., 2020; Nunes and Rocha, 2019).

In the Northeast region, the rates of enteroparasitosis are quite high, generally prevailing at elevated levels where the socioeconomic conditions of the population are more precarious. These infections can occur across different age groups, from preschoolers to adults, but primarily among children (Rocha et al., 2022; Araujo et al., 2020; Silva et al., 2018).

In this instance, the objective of this study was to describe the epidemiological profile of enteroparasitosis among the population served by the private clinical analysis laboratory in the Alagoas Agreste region, aiming to positively impact the epidemiological knowledge of intestinal parasitosis.

2. Methods

This research was approved by the research ethics committee of the Cesmac University Center under protocol number 17292613.8.0000.0039. A descriptive, retrospective, cross-sectional, and quantitative study was conducted for analysis. The analyzed data were collected from patient records that underwent coproparasitological examinations at a clinical analysis laboratory located in the municipality of Arapiraca-AL.

All individuals who underwent coproparasitological exams from 01/01/2023 to 12/31/2023, aged between 01 and 99, were included in the study, totaling 5,871 exams performed. To avoid data duplication, duplicate exams from the same users conducted after the first test were excluded.

As for the analytical methodology, the examination was carried out using the Hoffman, Pons and Janer or Lutz Method, also known as the spontaneous sedimentation method, which essentially involves the sedimentation of fecal material after dilution in water and filtration through gauze, followed by a resting period for complete sedimentation at the bottom of the container. From this sediment, an aliquot was taken and placed on a microscope slide along with a drop of 2% Lugol, covered with a coverslip, and then subjected to microscopic examination, initially using a 10x objective to visualize eggs and larvae, followed by a 40x objective to observe protozoan cysts and trophozoites. The data collected were subjected to analysis using a spreadsheet in Office Excel®, Professional Plus 2019 version, for descriptive analysis and expressed as percentages.

3. Results

The results of coproparasitological examinations from 5,871 users were analyzed, of which 7% (431) were positive for the presence of at least one intestinal parasite, while 93% (5,440) had negative results for enteroparasites.

These results are similar to those of the study by Clímaco (2011). However, the positivity rate of 7% of infected individuals found in Arapiraca was lower than that of the study by Paiva Sousa (2018), which studied the population of the municipality of Buriti dos Lopes-PI and showed a prevalence of enteroparasitosis in 41% of individuals. The socioeconomic differences between the populations may justify this discrepancy in the results studied.

Upon reviewing the results between protozoa and helminths, a predominance of infections caused by protozoa is noted, accounting for 66.58% (287), compared to infections by helminths, which account for 33.42% (144). However, the study by Marques et al. (2005), in Concórdia, in western Santa Catarina, showed that helminths were responsible for 57.8% (663) of infections, while protozoa accounted for 42.2% (483). This difference in rates may be justified due to the different regions of the country and the use of anthelmintic drugs by the population.

Regarding the genders of the individuals, a higher prevalence of positive cases in females can be observed, representing 59% (253 individuals), compared to 41% (178 individuals) in males. This finding was also observed in the study conducted at the Clinical Analysis Laboratory of Araruna - PB, between November 2016 and January 2017, where females were predominant in the total sample (74% of cases) (Oliveira, 2017). In line with this scenario, the positive results from the Clinical Analysis Laboratory of HUAB indicated a presence of 63.2% of females (Lima, 2018).

Table 1 indicates the distribution of enteroparasitosis according to the age range of the users. The prevalence in the age group between 25 and 59 years was higher when compared to other studied age groups, with 37% (158 cases), while the lowest prevalence rate was in the 10 to 19-year-old age group, representing 7% (32) of the cases.

In the study conducted by Santos and Merlini (2010), it was observed that the highest number of tests was carried out in the age group of zero to nine years, which also presented the highest number of positive cases compared to other age groups. It is known that preschool children, aged 0 to 3 years, and school-aged children, aged 4 to 12 years, are the most affected since they tend to place their unclean hands in their mouths, do not regularly wash them, and their immune systems are still developing

(Oliveira et al., 2020; Militão et al., 2022). However, the results of this study showed a higher prevalence of enteroparasitosis in adults aged between 20 and 59 years, a fact that may be justified by the large number of individuals from these age groups who underwent the test during the study period.

Table 2 describes the prevalence of the specimens found, with 431 positive cases recorded among protozoa and helminths. Among the protozoa identified, the following percentages were documented: *Entamoeba coli* (33.26%), *Giardia lamblia* (16.47%), *Entamoeba histolytica/Entamoeba dispar* (11.60%), and *Endolimax nana* (0.93%). Among the helminths, the following were evident: *Ascaris lumbricoides* (24.12%), *Enterobius vermicularis* (3.71%), *Schistosoma mansoni* (1.85%), *Hymenolepis nana* (1.85%), *Trichuris trichiura* (0.92%), and ancylostomids (0.92%).

In a study conducted at the Clinical Analysis Laboratory in Araruna - PB, from November 2016 to January 2017, the percentage of *Entamoeba coli* was similar, at 31.4%. In contrast, the presence of *Endolimax nana* was recorded at 20%, which is significantly higher than the less than 1% observed in this present study in Arapiraca. This discrepancy may also be explained by the socioeconomic differences between the studied populations.

Regarding the positive cases of helminths, the study conducted in Araruna reported only 8.6% of *Ascaris lumbricoides*, which is lower compared to the data collected in this work, which recorded a prevalence of 24.12% for the same enteroparasite (Oliveira, 2017).

However, the parasites found in users of the Clinical Analysis Laboratory at HUAB, Santa Cruz, from July 2016 to July 2017, show a different prevalence context compared to this study and the one conducted in Araruna - PB. Due to *Endolimax nana* presence of 76.2%, while *Entamoeba coli* accounted for only 7.4%. Furthermore, there were 0.5% of positive cases for *Ascaris lumbricoides* (Lima, 2018).

Table 1. Prevalence of enteroparasitosis according to the age group of individuals with positive test results, from January to December 2023, in a clinical analysis laboratory located in the municipality of Arapiraca, Alagoas, Brazil.

Age range	Individuals	%
0 to 9 years	63	14.62
10 to 19 years	32	7.42
20 to 24 years	104	24.13
25 to 59 years	158	36.66
60 years or above	74	17.17
Total	431	100

Source: Research data.

Table 2. Percentage of enteroparasites in positive cases from parasitological examinations conducted at a clinical analysis laboratory located in the city of Arapiraca, Alagoas, using stool test results from January 1, 2023, to December 31, 2023.

Protozoa	Cases	%
<i>Entamoeba coli</i>	143	33.26
<i>Giardia lamblia</i>	71	16.47
<i>Entamoeba histolytica / Entamoeba dispar</i>	50	11.60
<i>Endolimax nana</i>	4	0.93
Helminths	Cases	%
<i>Ascaris lumbricoides</i>	104	24.12
<i>Enterobius vermicularis</i>	16	3.71
<i>Schistosoma mansoni</i>	8	1.85
<i>Hymenolepis nana</i>	4	0.92
Ancilostomids	4	0.92

Source: Research data.

This study presents some limitations inherent to the use of secondary data obtained from a clinical analysis laboratory. As these records are primarily laboratory-based, they do not include information on socioeconomic determinants such as income, education level, or access to basic sanitation, which are well-recognized factors in the epidemiology of enteroparasitic infections. The absence of these variables made it impossible to conduct more complex inferential statistical analyses, such as logistic regression, which require multiple predictive factors to identify significant associations. Additionally, since this is a retrospective study based on anonymous records, it was not feasible to supplement the data with new collections or direct interviews with the tested individuals. However, these limitations do not compromise the relevance of the findings, as the analyzed data provide a valuable epidemiological overview of the distribution of intestinal parasitic infections in the studied population, offering important insights for surveillance and control efforts in the region.

4. Conclusion

The results demonstrated that the prevalence of intestinal parasitic infections in the population was relatively low compared to other studies. Protozoa were more prevalent, with *E. coli* and *G. lamblia* being the most predominant in this group, while among the helminths, the most frequent were *A. lumbricoides* and *E. vermicularis*. The highest incidence of cases occurred in individuals aged between 25 and 59 years, with females being the most affected group.

In the municipality of Arapiraca, there is a need for more comprehensive studies on both helminths and intestinal protozoa, so that these can be used to assist in the application and development of therapeutic and preventive actions by governmental institutions.

Regarding the modes of transmission, prevention, and treatment, it is evident that the population lacks awareness regarding these parasitic infections, along with insufficient access to basic sanitation in some areas of the municipality. Therefore, the implementation of public policies that promote health education is necessary to address this public health issue.

Data Availability Statement

- The research data analyzed in this study are not publicly available in any form.
- The entire dataset that supports the results of this study was published in the article itself.
- The data are available upon request.

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