



ORIGINAL RESEARCH PAPER

Biological Science

INCIDENCE OF INTESTINAL PARASITES IN HUMAN POPULATION OF SANTA LUZIA, PB, BRAZIL: PROTOZOA AND HELMINTHS

KEY WORDS: Prevalence, Intestinal Parasitoses, Helminths, Protozoa

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ABSTRACT

Parasitic and infectious diseases are still a serious public health problem in the world today, accounting for about 2 to 3 million deaths annually worldwide. In this context, this study aimed to identify and quantify the main parasites found in samples of patients seen in the 2011 and 2012 by the laboratories of clinical analysis of Santa Luzia, PB. The prevalence of intestinal parasitoses of the studied municipality was determined. From the total of 3,221 tests analyzed, 34.58% had parasitoses, *Endolimax nana* being the most frequent protozoan with 40.39% and *Ascaris lumbricoides*, the most found helminth with 2.15%. Among the results of positive tests for parasitosis, 9.52% had a polyparasitosis disease and 90.48% had monoparasitosis. It was concluded that more than 30% of the patients were infected with some species of parasite, and the protozoa were more frequently found in relation to helminths and that it is necessary to implement integrated measures to reduce the infestation of these parasites in the population.

INTRODUCTION

Parasitism is the association between living beings, in which there is unilaterality of benefits, being one of the associates harmed by the association. In this way, the host is plundered by the parasite, as it provides food and shelter for the parasite (1).

Parasitic and infectious diseases are still a serious public health problem in the world today, accounting for about 2 to 3 million deaths annually worldwide. These diseases reach alarming rates in many countries in Latin America and Africa where, according to the coproscopic tests, at least one type of parasitic disease affects the individuals examined (2). The problem involving intestinal parasitosis in Brazil is quite high, especially in populations with low socioeconomic status (3). Nevertheless, when asked which are the most common diseases, few people remember to include intestinal parasitosis among them. Even though the infections caused by these parasites are undoubtedly the most common and most neglected diseases in the world population.

It is known that the prevalence of these parasitosis varies in the country and it is closely linked to the environmental conditions in which the individual lives, especially the conditions of basic sanitation, socioeconomic level, educational level, inadequate waste disposal, age and the hygiene habits of each individual (3,5,6).

Data from the National Survey of Basic Sanitation (PNSB) conducted by IBGE (Brazilian Institute of Geography and Statistics) show that sanitary sewage is the basic sanitation service with the lowest coverage in Brazilian municipalities, reaching only 55.2% of sanitary sewage by collecting network (7). Similarly, the results of ABRELPE (Brazilian Association of Public Cleaning and Special Waste Companies) show that 58.1% of waste collected goes to landfills, about 75 thousand tons per day still have an inadequate destination, being sent to dumps, flooded or controlled landfills, which do not have the set of systems and measures necessary to protect the environment against damages and degradations, considerably aggravating the health problems of the population (8). The social situation of Brazil's Northeast region is still very

precarious, the indices that assess the population's living conditions show their tolerable values and according to the HDI (Human Development Index) of the UN, published by IPEA (Institute for Research and Applied Statistics), all northeastern states present results below the Brazilian average. Among the ten lowest HDI indices in the country, eight are from Northeastern States. The region also has the highest rates of infant mortality and the lowest life expectancy among other Brazilian regions (9).

Although a decline of up to 30% in the prevalence of enteroparasitosis in schoolchildren in the last decades has been observed (10), studies carried out in northeastern Brazilian cities show a high prevalence of parasitic infections, with 66.1% in Salvador-BA (11), 84.9% in Natal-RN (12) and 96% in Paracatuba-SE (13).

The transmission of parasites is generally oro-fecal, that is, by the ingestion of helminth eggs and protozoan cysts present in food, water or even by some object contaminated with feces (14).

The damage that enteroparasites can cause to their carriers are quite variable. Severe disease is more common in malnourished, immunocompromised patients with neoplasms, collagen diseases, sickle cell anemia, tuberculosis, previous splenectomy, or those with prolonged use of corticosteroids or immunosuppressant. In mild cases, the manifestations are nonspecific: anorexia, irritability, sleep disturbances, occasional vomiting, nausea, diarrhea. "Skin spots" and "teeth grinding" are popularly related to intestinal parasites, but there is no scientific confirmation. Malnourished children may present with anemia (trichocephalosis), enterorrhagia (schistosomiasis, amebiasis) and intestinal obstruction (ascariasis) (15). Asymptomatic individuals who are in direct contact with food may become a potential source of contamination of several pathogens, especially enteroparasites (16).

Although intestinal parasites are ignored, it is necessary to implement measures that reduce the number of infected individuals, measures that are capable of disrupting transmission mechanisms. For this to occur it is of fundamental importance to know the prevalent species of each site (17).

Thus, the objective of this study was to identify and quantify the main parasites found in samples of patient exams attended in 2011 and 2012 by the clinical analysis laboratories of Santa Luzia, PB. Determining the prevalence of intestinal parasitosis in the studied municipality.

MATERIALS AND METHODS

Study area

The study was carried out in the municipality of Santa Luzia (PB), situated 260Km from the capital João Pessoa (Figure 1). Santa Luzia is inserted in the geographical coordinates of 6° 52' 2 " south and 36° 55' 16 " West, standing at an altitude of 302 meters. According to the IBGE population count carried out in 2010, the municipality has 14,719 inhabitants, distributed in an area of 456 km², with 32.30 inhabitants per km² (18). Regarding sanitation, the municipality has 5,000m of collection network completed and 10,000m in progress and 450 home connections, with 1,615 to be completed. Santa Luzia, has a total of 13 health units (18), distributed in municipal establishments, state and private. Among these, the Sinhá Carneiro Hospital and Maternity Laboratory, belonging to the state government and attending a greater demand of patients, stands out.

Figure 1: Location of the city of Santa Luzia in the State of Paraíba. Source: (IBGE, 2016)



Data collect

This study was conducted using data collected by health professionals (biochemical and biomedical), in the Clinical Analysis Laboratory Dr. José Benício de Medeiros (private network) and the Maternity Hospital Sinhá Carneiro (public) of the city of Santa Luzia - PB from the examinations performed and filed in medical records used by them for internal control.

The research was done from exams conducted from January 2011 to December 2012. The analyzed results were separated into positives and negatives, and the parasites were analyzed and their frequency in the positive results, separating them according to the sex and age of the patient.

The statistical analyzes were performed and the results were explained in the form of graphs and tables.

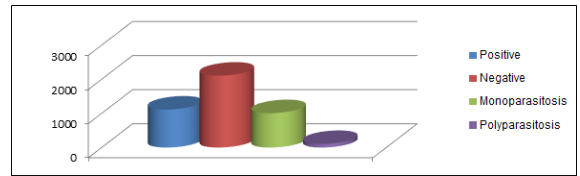
Method

The most conspicuous and most useful methods in identifying intestinal parasites are Hoffman-Pons-Janer (30) technique using spontaneous fecal sedimentation. In this method, the fecal samples are diluted in water immediately filtered through a gauze into a conical sedimentation cup. The Hoffman-Pons-Janer method is used to detect the presence of eggs and larvae of helminths and protozoan cysts. This technique is widely used in epidemiological studies because of its low cost. The Willis technique (31) is a flotation method based on the ability of helminth eggs to float on the surface of a saturated sodium chloride solution with a density of 1.20 g/ml and to adhere to the glass. In this technique, a solution saturated with the emulsified faeces is deposited in a round bottom flask and a meniscus is formed on the surface. Then the balloon is covered with a blade. After several minutes, the slide is removed and examined under a microscope. The Baermann-Moraes technique (32) is used for the detection of nematode larvae in faecal samples and is based on the thermotropism and hydrotropism of the larvae, which show a tendency for sedimentation. This technique consists of placing the faeces in contact with hot water at 40-45° C for 1 hour, such that the larvae present in the faeces tend to migrate to warmer, liquid media and settle to the bottom of the vial.

RESULTS

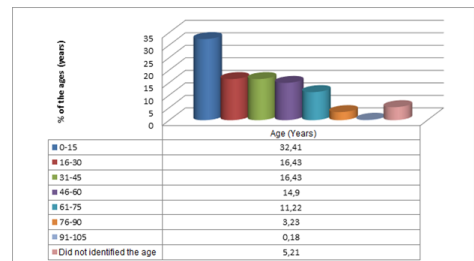
A total of 3,221 results of parasitological stool examinations were carried out during the period from January 2011 to December 2012 in the municipality of Santa Luzia, PB. Of the 3,221 results analyzed, 2,101 presented negative results for parasitosis and 1,114 were considered parasitized. Among the positive samples, 106 had a polyparasitic disease and 1,008 monoparasitosis (Figure 2).

Figure 2. Comparison among the 3,221 exams of parasitized, non-parasitized, single-handed and polyparasite samples between 2011 and 2012.



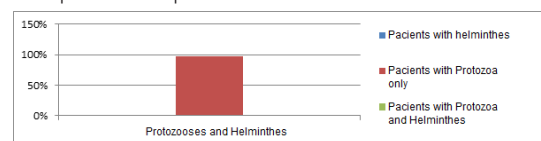
The results found in the presence of parasitoses were 63% female and 37% male. Of the patients with parasitoses, 32.41% were 0 to 15 years old; 16.43% from 16 to 30 years; 16.43% from 31 to 45 years; 14.90% from 46 to 60 years; 11.22% from 61 to 75 years; 3.23% from 76 to 90 years; 0.18% from 91 to 105 years; and 5.21% did not identify age (Figure 3).

Figure 3. Percentage of intestinal parasites in relation to age (years) of hosts.



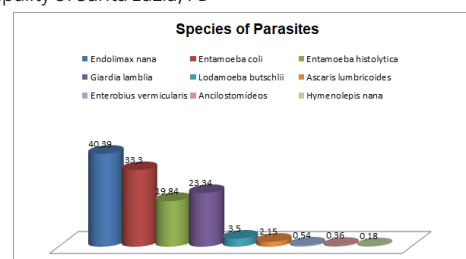
According to the 1,114 positive results, it was possible to analyze that 2% of the patients had only the presence of intestinal helminthous worms, 97% had only the presence of protozoa and 1% had the presence of protozooses and helminthes, as shown in Figure 4.

Figure 4. Distribution of protozooses and helminths found in infected patients and parasite association in the same individuals.



In Figure 5 are related to the frequencies of each of the species found. Below this, one can analyze images of the types of parasitoses found in the studied population, being in the form of eggs for helminths and cysts for protozoa (Figure 6). The sum of frequencies exceeds 100% due to cases of polyparasitism. Regardless of gender and age, protozoa were more frequent than helminths, with *Endolimax nana* (40.39%) and *Entamoeba coli* (33.30%) being the most prominent. Among the helminths, *Ascaris lumbricoides* was the most frequent (2.15%)

Figure 5. Prevalence of intestinal parasites in humans from the municipality of Santa Luzia, PB



Also according to the species of parasite found, it was possible to analyze that the protozoan *Endolimax nana* and the helminth *Ascaris lumbricoides*, besides being the ones with higher prevalence, were observed in a greater number of patients with a reference age of 0 to 15 years, as shown in Table 1.

Figure 6. Illustrations of helminth eggs and protozoan cysts found in the study population.

Source: Central laboratory of parasitology of the UFCG.

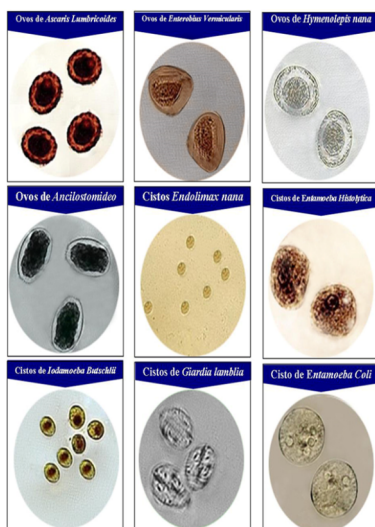


Table 1. Prevalence of intestinal parasites observed in 3,221 parasitological exams of feces.

Parasites Found					
Species	Protozoan		Species	Helminth	
	N° of patients (absolute)	Age of Higher Prevalence		N° of patients (absolute)	Age of Higher Prevalence
<i>E. nana</i>	450	0-15	<i>A. lumbricoides</i>	26	0-15
<i>E. coli</i>	371	46-60	<i>E. vermicularis</i>	6	0-15
<i>E. histolytica</i>	221	46-60	<i>Ancilostomides</i>	4	0-15
<i>G. lamblia</i>	260	0-15	<i>H. nana</i>	2	0-15
<i>I. butschlii</i>	39	61-75			0-15

DISCUSSION

The man is one of the hosts that can host different types of parasites and Parasitology is the science that studies the life forms that live in or on other organisms (19). The geographical distribution of human parasites occurs due to environmental actions and interactions, including human beings (20).

Several studies have been carried out in all regions of Brazil on intestinal parasites. During the development of the work it was observed that these parasites remain an important endemic in the country, reaching individuals of all ages.

The results of laboratory tests filed in the medical records of the Sinhá Carneiro Hospital and Maternity and the Laboratory of Clinical Analysis Dr. José Benício de Medeiros allowed us to carry out an epidemiological survey identifying the parasites with the highest incidence in the study area.

The prevalence of intestinal parasitoses observed in the present study, of 34.58%, is similar to results obtained by other authors who carried out this type of work in other municipalities of the country, which may be cited: Ferreira et al. (21) with 31.7%, Slongo, et al. (22) with 34.6%, Abraham, et al. (16) with 33.3% and Segantin et al. (23) with 35.64% positivity for at least one type of parasite.

However, the indices are higher than those found in the city of Estiva and Gerbi, State of São Paulo, Brazil, whose results showed that 11.5% of the samples were positive for at least one parasite (24). However, higher prevalences than that observed in this study were reported in Piracanjuba, GO (61.97%) (25), Patos de Minas, MG (73%) (26), and Coari, AM (83%) (27).

The polyparasitism found (9.52%) was much lower than that reported by Ottaet al. (28) that identified 44.3% of polyparasitoses and, of monoparasitoses, 90.48%, which resembled the result found by Slongo et al. (22), which presented infection by a single species to 83.3% of the parasitized individuals.

In relation to sex, with a higher prevalence of infection by parasites, the female sex was highlighted with 63% of the total of patients analyzed, thus resembling the results found by Carneiro et al. (62.43%) (25) and with Freitas et al. (60%) (29).

It was observed that the protozoan *Endolimax nana* (40,39%) was the most prevalent parasite in the present study, related to the result presented by Slongo et al. (22) showed the presence of 49% of this parasite, followed by *Entamoeba coli* (33.30%), *Giardia lamblia* (23.34%), *Entamoeba histolytica* (19.84%) and *Iodamoeba butschlii* (3.50%). In relation to helminths, the *Ascaris lumbricoides* was the most prevalent in 24 patients (2.15%), followed by *Enterobius vermicularis* (0.54%), *Ancilostomides* (0.36%) and *Hymenolepis nana* (0.18%).

It was also possible to analyze that the protozoan *Endolimax nana* and the helminth *Ascaris lumbricoides*, in addition to having a higher prevalence, both had a greater presence in a patient with an age group of 0 to 15 years. Probably the reason for this result is that we are talking about school-age patients, who generally have inadequate hygiene habits and their immunity is still not effective in eliminating parasites. Certainly the *Ascaris lumbricoides* prevailed among the other helminths, due to the high capacity of the female to generate offspring and the high resistance of the eggs to the external environment.

Although lower prevalence values were found than those of other studies, this data is worrying, considering that more than 30% of the patients were infected with some kind of parasite. It demonstrates the need to implement integrated measures that involve partnerships between academic institutions, health authorities and especially the community, as the proliferation of parasitic diseases in populations is mainly caused by inadequate access to adequate basic sanitation.

CONCLUSION

According to the data analyzed, the present study allows to conclude that: the etiological agent of the most frequent intestinal parasitoses in the human population of the municipality of Santa Luzia, PB was *Endolimax nana*, when it refers to the protozoan, and *Ascaris lumbricoides*, when speaking of helminth. In general, parasitic diseases were more frequent in women and in patients aged 0 to 15 years of age, according to the aforementioned study on the vulnerability of children to the various intestinal parasitic diseases.

Thus, the study will have a number of positive implications for the community analyzed, since if the prevalence of these diseases is known, measures can be established to improve collective health for the younger age group, especially.

Acknowledgments

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