FREQUENCY OF INTESTINAL PARASITES IN PATIENTS ATTENDED AT A UNIVERSITARY HOSPITAL IN MACEIÓ, STATE OF ALAGOAS, BRAZIL

FREQUÊNCIA DE PARASITOS INTESTINAIS EM PACIENTES ATENDIDOS EM UM HOSPITAL UNIVERSITÁRIO EM MACEIÓ, ESTADO DE ALAGOAS, BRASIL

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ABSTRACT: The aim of this study was to analyze the parasitological tests of a population at a public hospital in Maceió-AL. A descriptive study was made between January and July of 2015 analyzing the parasitological tests of a population at a public hospital in Maceió-AL. Variables such as gender, age, positive tests, protozoan species, helminths species and parasitic associations were analyzed. Out of 1.581 tests, 806 (51%) tested positive. Regarding gender, 535 (67%) were from women. Helminths were the most predominant infections (63.94%), compared to protozoans (36.06%). The Helminths with the highest number of infections were: *Ascaris lumbricoides* (93.23%), *Trichuris trichiura* (2.32%) and *Enterobius vermicularis* (1.26%). Among protozoans, *Endolimax nana* and *Entamoeba coli* corresponded to 78.09% and 15.91% respectively. Although non pathogenic, it suggests fecal contamination. According to the degree of parasitism, 84.0% were monoparasitism. It can be concluded that the number of positive tests for enteroparasites was high, mainly in men. The species *A. lumbricoides* was the main helminth detected, while *E. nana* was the main protozoan found in the tests. The age group between 24 and 59 years old was the one that had the highest amount of positive tests. The results observed strengthen the need for the implementation of prevention measures for intestinal parasitic infections.

KEYWORDS: Helminthiasis. Parasitic diseases. Protozoan infections.

INTRODUCTION

The intestinal parasitizes particularly in underdeveloped countries constitute itself as a major public health problem, these being caused by protozoa and helminths, and/or are quite widespread and with high prevalence, arising from the inadequate socio-sanitary conditions faced by poorer population layers (SOARES; OLIVEIRA; SOUZA, 2018).

Brazil has a great diversity of disease-causing enteroparasites. This fact is associated with the geographical, climatic, social and economic conditions in the country. In the last 30 years, it has been observed in the country, a decrease in the prevalence of these parasites, however, in some regions infection rates are still close to 30.0%, mainly the occurrence of monoparasitism (PRIETO-PÉREZ et al., 2016).

These parasites cause pathologies that lead to high rates of morbidity and mortality (PARIJA; CHIDAMBARAM; MANDAL, 2017). The significant morbidity related to these diseases are often caused by poliparasitism sometimes associated with severe malnutrition and deprivation stages, with resulting synergism of aggravations and disastrous consequences to the individual (BACELAR et al., 2018).

The diagnosis of these diseases in laboratory routine is performed by parasitological examination of feces, being the one that can search the main parasitic structures. Occasionally, in some infections are observed other parasites that do not cause diseases but this becomes relevant because it reflects the contact with food and water, possibly contaminated, and thus present a higher probability of infection (HUMPHRIES et al., 2017).

Early detection can be done by identifying enteroparasites more common in the population, leading to enlightenment campaigns about the transmission mechanisms, prevention and treatment, especially in children and the elderly, which are the most affected groups of parasitic infections (THAMIZHMANI et al., 2017).

In Alagoas, there are few published works on the subject, though, they show that the high rate

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of prevalence of these diseases is due to the same factors that affect the poor people of any region of the world or the country. A reflection of this is seen in a parasitological study conducted with 67 residents belonging to 21 families that reside in a needy community in the municipality of Barra de Santo Antônio, AL, where it was observed that most of the houses were made of taipa (ROCHA et al., 2011), which can favor the spread of different enteroparasites. The low quality of life justified by socio-sanitary conditions observed in the community causes an increase in the prevalence of infection by intestinal parasites, as well as the existence of poliparasitism (ROCHA; BRAZ; CALHEIROS, 2010).

Thus, the objective of this study was to perform a retrospective study from January to July 2015, about the frequency of intestinal parasites in the population in a teaching Hospital, located in the municipality of Maceió-AL.

MATERIALS AND METHODS

This study was approved by the Research Ethics Committee (COEPE) of the Cesmac University Center, registered under the number: 44467015.8.0000.0039. We conducted a retrospective descriptive study, where 1.581 parasitologic feces results were analyzed, in the Laboratory of Clinical Analyses of University Hospital Alberto Antunes (HUPAA), located in the State of Alagoas, during the period from 01 January to 31 July 2015. The study used a census research, being included all the tests taken during the period studied.

Biological samples were received from patients made by medical requests. The tests were conducted by the qualitative method of sedimentation of Hoffman, Pons and Janer (HPJ). This method detects the presence of eggs and larvae of helminths and cysts of protozoa, being used in most clinical laboratories (GONÇALVES et al., 2016).

From the daily results, maps provided by the field of clinical analysis of the hospital data were obtained with the following variables: sex, age and the registration number of the patients who presented some type of parasitic infection and the correlation between the number of the total cases. *Entamoeba histolytica/Entamoeba dispar*, are not differentiated due to the fact the lab at the hospital not to make any distinction between these two species.

The samples were divided into seven age groups (for better understanding of the data and to check for possible correlations between the occurrence and age), as follows: 0 to 11 years; 12 to 23 years; 24 to 59 years and over 60 years. The data collected was inputed into the spreadsheet software Microsoft Office Excel ®, version 2013, and analyzed descriptively and expressed in percentage.

RESULTS AND DISCUSSION

In the study period, out of 1.581 parasitologic feces examined, 806 (51.0%) tested positive for one or more enteroparasites. In the present study, females presented 67.0% (540) cases of parasitic infections, followed by males with 33% (266) of the cases. These findings corroborate with those described by Lima et al. (2020) where 32.4% of the cases in a University Hospital in Santa Cruz-RN were from males, Melo et al. (2015) in the municipality of Bacabal-MA, where 63.8% of women were parasitized. Similarly, Ferreira et al. (2013) reported in a study the prevalence of infection of 65.4% among women, in the region of gravel pits in the municipality of Barreiras-BA and also by Sousa, Campos and Firmo (2020) finding a prevalence of 54% in females in the municipality of Alto Alegre do Pindaré-MA.

This higher frequency of infections in the female gender can be justified by the fact that women seek health services more often than men (MENEZES, 2013; OLIVEIRA FILHO et al., 2012). Inoue, Nigro and Castilho (2015) when evaluating the prevalence of intestinal parasitizes of patients in Irmandade da Santa Casa de Misericórdia de São Paulo, showing a prevalence of 63.7% among female patients.

In our study, out of the 806 positive tests, 473 tested positive for helminthiasis (63.94%) and 333 (36.06%) for protozoan infections. Table 1 shows the distribution of parasitism in relation to age group. Among children 0 to 11 years, 225 cases (28.2%) were observed. The track between 12 to 23 years 126 cases (15.6%) were observed. Between 24 and 35 years it was possible to identify 101 cases (12.5%), and among patients with 36 to 47 years, 140 cases (17.4%). Ranging in age from 48 to 59 years 112 cases (13.9%) tested positive and between 60 and 71 years, 79 cases (9.9%).

Drawing a parallel with the results obtained by other authors who performed this very same type of study in other states of the Northeast region, the prevalence of 51.0% positive intestinal parasites should be considered worrisome. In surveys conducted in João Pessoa-PB a prevalence of 69.0% could be found (OLIVEIRA; SILVA; MEDEIROS, 2014). In Buriti dos Lopes-PI the prevalence found

was 41% (SOUSA; COSTA; VIEIRA, 2018), in Estreito-MA (40.5%) (FIRMO et al., 2011), Campina Grande-PB (30.7%) and 12 in the municipality of Ibiassucê-BA (42.09%) (MATOS; CRUZ, 2012). These studies show that the helminthiasis are still very prevalent, especially in country's poorest regions.

In regard to the age group, the one that presented the highest number of individuals who tested positive were between 0-11 years. This same age group has been shown to be the most infected in other studies (ARAÚJO-FILHO et al., 2011; SOUZA et al., 2013). However, the above mentioned studies presented discordant results to Santos, Santos and Soares (2007) that observed that as the age increases, there is a progressive growth of frequency of parasitic infections.

Table 1. Absolute number and frequency (%) of intestinal parasites spread by parasitological examination age in a population attended between January to July/2015 in a university hospital in the city of Maceió, AL, Brazil.

Age group	**Nº of patients**	**Positivity rate by age group** (%)
0-11	225	28.2
12-23	126	15.6
24-59	353	43.8
> 60	102	12.8
Total	**806**	**100**

Our study showed parasitic infections by helminth to be (63.94%). Results of similar works also reported rates of prevalence of helminths, as described by Marinho (2008) and Basso et al. (2008), with a prevalence of 28% and 65%, respectively. On the other hand, the results of Menezes (2013) and Belo et al. (2012), displayed a pattern of high infection to Protozoan infections. The divergence of these results may be related to factors such as geographic area, socioeconomic status, nutritional status, age of the people who work and hygienic conditions (BELO et al., 2012). It was observed a predominance of parasitism occurred in people of the female gender with 535 cases (66.0%) compared to male with 272 occurrences (34.0%). Based on the results obtained, it should be noted that 63.94% of infections were caused by helminths, and 36.06% by protozoan.

Table 2 presents the distribution of species of enteroparasites detected in the samples analysed. Among helminths, *Ascaris lumbricoides* eggs were found (93.23%), *Trichuris trichiura* (2.32%), *Enterobius vermicularis* (1.26%) followed by parasites of the family Ancylostomatidae (1.26%). Among the protozoa, *Endolimax nana* cysts were found (78.09%), *Entamoeba coli* (15.91%) and lastly *Giardia lamblia* (4.80%).

Table 2. Distribution of species of enteroparasites found in a population between January to July/2015 in a university hospital in the city of Maceió (AL), Brazil.

Parasite	Occurrence	% (in relation to the total amount of positive results)*
Helminths	**473**	**63.94**
Ascaris lumbricoides	441	93.23
Trichuris trichiura	11	2.32
Enterobius vermicularis	6	1.26
Família Ancylostomatidae	6	1.26
Schistosoma mansoni	5	1.05
Strongyloides stercoralis	3	0.63
Hymenolepis nana	1	0.25
Protozoan	**333**	**36.06**
Endolimax nana	260	78.09
Entamoeba coli	53	15.91
Giardia lamblia	16	4.80
E. histolytica/E.dispar	4	1.20
Total	**806**	**100**

* Percentage calculated according to the total number of samples that tested positive to one or more parasites

A. *lumbricoides* was the most prevalent helminth in this study with a rate of 93.23%. Santos, Santos and Soares (2007) analyzing the occurrence of intestinal parasitizes in patients treated at the University Hospital Prof. Edgar Santos, Salvador-BA, found a rate of 35.2% for helminths; being the most frequent: *A. lumbricoides* (5.8%), *T. trichiura* (4.2%) and Ancylostomatidae (2.3%), as in the present study. The high rate of *A. lumbricoides* is considered indicative of inadequate sanitation, commonly observed in urban and rural communities according to Menezes (2013). It is observed that A. *lumbricoides* is found in all age groups when viewed according to age distribution (Table 3). The *A. lumbricoides* infection is worrisome because the parasites in its larval stage can cause liver and pulmonary damage due to its migrations. And the adult stage can lead to intestinal damage due to mechanical destruction, malnourishment due to spoliation, toxic parasite antigen destruction and can even cause ectopic lesions in some infections (LAMBERTON; JOURDAN, 2015).

B. The *S. stercoralis*, presented a 0.63% frequency in the samples. This number may be underestimated, considering the low sensitivity and specificity of HPJ test for larvae, when compared to the Baermann-Mathew (1948), specific to this helminth. The same occurs with the low frequency of *E. vermicularis*, once the technique of Harada and Mori (1995) becomes less specific due to the parasitic cycle, since the female lays the eggs in the perianal region (FIRMO et al., 2011).

C. In relation to the protozoa, the species *E. nana* and *E. coli* showed more prevalent, however, they do not constitute serious harm to public health; but it serve as indicators of contamination by fecal-oral route, (MARZAGÃO et al., 2010). These results were similar to those demonstrated by Freitas et al. (2014), in a work done in Barra dos Garças-MT. Damaceno and Costa (2017) when evaluating the prevalence of enteroparasites in patients at a university hospital in Goiânia-GO, Brasil, detected that the occurrence of *E. coli* (19%) and *E. nana* (3.1%). And also by Inoue, Nigro and Castilho (2015), when it was identified *Endolimax nana* (46.6%) and *E. coli* (43.3%), in patients at a tertiary hospital with public appointments.

Table 3. Percentage of positivity rates on the parasitological tests according to each age group done in patients between January and July/2015 at a university hospital in Maceió (AL).

	Percentage of positivity rates by age group			
Parasite	**0-11**	**12-23**	**24-59**	**> 60**
Helminths				
Ascaris lumbricoides	241 (54.64%)	150 (34.01%)	60 (13.60%)	30 (6.80%)
Trichuris trichiura	4 (36.36%)	4 (36.36%)	2 (18.18%)	1 (9.09%)
Enterobius vermicularis	3 (50%)	2 (33.33%)	1 (16.66%)	-
Família Ancylostomatidae	2 (33.33%)	3 (50%)	-	1 (16.67%)
Schistosoma mansoni	1 (20%)	2 (40%)	2 (40%)	-
Strongyloides stercoralis	-	3 (100%)	-	-
Hymenolepis nana	-	1 (100%)	-	-
Protozoan				
Endolimax nana	109 (41.92%)	72 (27.69%)	65 (25%)	14 (5.39%)
Entamoeba coli	25 (47.16%)	15 (28.30%)	7 (13.20%)	6 (11.32%)
Giardia lamblia	6 (37.5%)	3 (18.75%)	4 (25%)	3 (18.75%)
E. histolytica/E.dispar	-	3 (75%)	1 (25%)	-

Intestinal species such as *E. nana* and *E. coli,* although considered non pathogenic, the rates should be worth noting, since it can be used as a parameter of fecal contamination that these patients are exposed to. (SANTOS; MERLINI, 2010).

In regards to the possible pathogenic action protozoan, *E. histolytica/ E. dispar* was found (1.20%). According to Franco (2007) these protozoa emerged as one of the major public health problems in the last 25 years, being disseminated mainly by waterborne. Regarding the intensity of the parasitism, it was observed that the monoparasitism was more prevalent, with 84% (680) of the cases and the biparastism was equivalent to 14.0% (113), figure1.

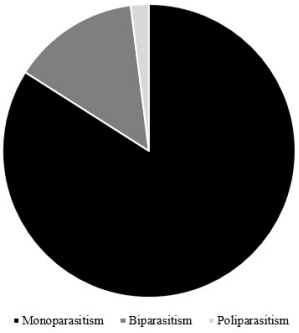

Figure 1. The distribution pattern of enteroparasites infection in a population attended between January to July/2015 in a university hospital in the city of Maceió, AL, Brazil.

The last analysis undertaken was regarding the degree of poliparasitism, where the present study detected a high degree of monoparasitism (84.0%). This result corroborates with a work done by Avelar (2012), in Paracatu-MG, where 79.96% of the samples analyzed pointed out to monoparasitism, while in 29.04% was found poliparasitism. On the other hand, our findings were different from those described by Andrade et al. (2011), in the Zona da Mata-MG, where 16 patients were diagnosed with multiple infections. The occurrence of poliparasitism can be explained by the fact that the basic sanitation conditions are poor, exposing the population to the acquisition of different enteroparasites (BUSCHINI et al., 2007).

CONCLUSION

It can be said that the positive rate of enteroparasites was very high, mainly in women. The most frequent helminth was the *A. lumbricoides,* found in all age groups analyzed. The rate of patients infected with protozoans was higher amongst *E. nana* and *E. coli*, species that indicate a fecal-oral contamination. The age group between 24 and 59 years old was the one that had the most amount of positive tests. The frequency of parasitized individuals is still great, demonstrating the need for improvements in planning actions aimed at the awareness of the population about the subject.

RESUMO: Os estudos da ocorrência de parasitoses em laboratório são de grande relevância, pois os mesmos podem proporcionar informações necessárias no diagnóstico da infecção e avaliar o índice de infecção parasitária, principalmente dos países em desenvolvimento, constituindo um problema de saúde pública. Foram coletados dados de exames de fezes realizados no período de janeiro a julho de 2015 nos registros de exames coproparasitológicos de fezes, de um hospital universitário de Maceió-AL. Foram analisados 1.581 exames, realizados pelo método de Hoffmann, Pons e Janer. Foi possível verificar que 51% apresentaram positividade para um ou mais enteroparasitos, sendo 66% para o sexo feminino e 34% no sexo masculino. Predominaram-se as infecções causadas por helmintos, com 55%, seguido das infecções causadas por protozoários 45%. Os helmintos com maior frequência de detecção foram: *Ascaris lumbricoides* (50,14%), *Trichuris trichiura* (1,61%), *Enterobius vermicularis* (0,87%) e ancilostomídeos (0,87%). Dentre os protozoários, *Endolimax nana* e *Entamoeba coli* com 34,42% e 7,8% respectivamente, que embora comensais indiquem contaminação fecal. A faixa etária entre 6 e 11 anos apresentou maior número de indivíduos parasitados (2,1%). Quanto ao grau de parasitismo, houve uma predominância de 84% para monoparasitismo. Assim, conclui-se, que foi elevado o número positividade para enteroparasitos, com predominância de casos no gênero masculino. A espécie *A. lumbricoides* foi e helminto detectado, enquanto que, *E. nana* foi o principal protozoário. A faixa etária entre 6 a 11 anos foi a que apresentou maior número de casos positivos. Os resultados observados reforçam a necessidade da implantação de medidas de prevenção para as parasitoses intestinais.

PALAVRAS-CHAVE: Helmintíases. Infecções por protozoários. Parasitoses intestinais.

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