



## PREVALENCE OF INTESTINAL PARASITOSE IN FAMILIES OF LANDLESS WORKERS' MOVEMENT

### PREVALÊNCIA DE PARASITOSE INTESTINAIS EM FAMÍLIAS DO MOVIMENTO DOS TRABALHADORES RURAIS SEM TERRA

#### LA PREVALENCIA DE PARASITOSIS INTESTINAL EN FAMILIAS DEL MOVIMIENTO DE LOS TRABAJADORES RURALES SIN TIERRA

Genilde Gomes de Oliveira<sup>1</sup>, Cristina Maria Falcão Teti<sup>2</sup>, Izabel Cristina de Oliveira Lima<sup>3</sup>, Benito Oliveira Fernandez<sup>4</sup>, Ângela Maria da Silva<sup>5</sup>, Lincoln Vitor Santos<sup>6</sup>

#### ABSTRACT

**Objectives:** to investigate the prevalence of intestinal parasitosis in landless rural workers and correlate parasitism with clinical manifestations. **Method:** this is an exploratory descriptive, quantitative and cross-sectional field study conducted in thirteen settlements of Landless Workers' Movement in the southern region of the State of Sergipe, Brazil. The sample of 822 workers, selected by convenience, underwent clinical evaluation and 601 underwent fecal exams. Sample collection was performed from the first fecal bolus on alternated days using individual collectors TF-Test<sup>®</sup> (Three Fecal Test). Hypothesis tests were applied for data analysis. The Committee on Ethical Research with Humans of the Federal University of Sergipe approved the research project under certificate CAAE-0081.0.107.000-08. **Results:** among the pathogenic species, *Entamoeba histolytica* and *Giardia lamblia* were present in all settlements, *Ascaris lumbricoides* occurred most frequently, followed by *Schistosoma mansoni*. In relation to clinical conditions, we obtained a higher prevalence of headache, abdominal pain, anorexia and nausea. **Conclusion:** the results showed a high incidence of enteroparasitosis and polyparasitism in the target population of this research. **Descriptors:** parasitic diseases; rural population; health of rural population.

#### RESUMO

**Objetivos:** verificar a prevalência de parasitoses intestinais em trabalhadores rurais sem terra e correlacionar o parasitismo com as manifestações clínicas. **Método:** estudo de campo, exploratório descritivo, transversal e quantitativo, realizado em treze assentamentos do Movimento Sem Terra, da região Sul do Estado de Sergipe, Brasil. A amostra de 822 trabalhadores, selecionada por conveniência, submeteu-se a consulta clínica. Destes, 601 realizaram o exame parasitológico de fezes. Orientou-se a coleta da amostra a partir do primeiro bolo fecal, em dias alternados, em coletor individual do kit TF-Test<sup>®</sup> (Three Fecal Test). Testes de hipótese foram aplicados para análise dos dados. O Comitê de Ética em Pesquisa com Seres Humanos da Universidade Federal de Sergipe aprovou o projeto de pesquisa com o CAAE - 0081.0.107.000-08. **Resultados:** dentre as espécies patogênicas, *Entamoeba histolytica* e *Giardia lamblia* estavam presentes em todos os assentamentos, *Ascaris lumbricoides* ocorreu com maior prevalência, seguido por *Schistosoma mansoni*. Em relação às condições clínicas, obtiveram-se maiores prevalências em cefaléia, dor abdominal, anorexia e náusea. **Conclusão:** os resultados mostraram elevada incidência das enteroparasitoses e poliparasitismo na população alvo da pesquisa. **Descritores:** doenças parasitárias; população rural; saúde da população rural.

#### RESUMEN

**Objetivos:** determinar la prevalencia de parasitosis intestinal en los trabajadores rurales sin tierra y correlacionar el parasitismo con las manifestaciones clínicas. **Método:** se trata de un estudio de campo exploratorio descriptivo, transversal y cuantitativo llevado a cabo en trece asentamientos del Movimiento Sin Tierra, en el sur del estado de Sergipe, Brasil. La muestra de 822 trabajadores, seleccionados por conveniencia, fue sometida a evaluación clínica. De éstos, 601 se sometieron a pruebas parasitológicas de heces. La recogida de muestras se realizó a partir del primer bolo fecal en un colector individual del kit TF-Test<sup>®</sup> (Three Fecal Test). Las pruebas de hipótesis se aplicaron para el análisis de datos. El Comité de Ética en Investigación con Seres Humanos de la Universidad Federal de Sergipe aprobó el estudio por medio del certificado CAAE-0081.0.107.000-08. **Resultados:** entre las especies patógenas, *Entamoeba histolytica* y *Giardia lamblia* estuvieron presentes en todos los asentamientos, *Ascaris lumbricoides* se presentó con la mayor frecuencia, seguido por *Schistosoma mansoni*. En relación con las condiciones clínicas, se obtuvo una mayor prevalencia de dolor de cabeza, dolor abdominal, anorexia y náusea. **Conclusión:** los resultados mostraron una alta incidencia de enteroparasitosis y poliparasitismo en la población objetivo de esta investigación. **Descriptores:** enfermedades parasitarias; población rural; salud de la población rural.

<sup>1</sup>Nurse. Doctoral candidate in Health Sciences at the Federal University of Sergipe (UFS). Teacher of the Nursing Course at the Estácio de Sergipe College/SE. Aracaju (SE), Brazil. Email: [d.genilde@ig.com.br](mailto:d.genilde@ig.com.br); <sup>2</sup>Nurse. Master in Educational Sciences from the International University of Lisbon, Portugal. Coordinator of the Nursing course at Aracaju College/UF. Aracaju (SE), Brazil. Email: [cristinateti@gmail.com](mailto:cristinateti@gmail.com); <sup>3</sup>Nursing student at Tiradentes University/SE. Aracaju (SE), Brazil. Email: [izabel\\_lima08@hotmail.com](mailto:izabel_lima08@hotmail.com); <sup>4</sup>Nurse. Specialist in Management and Auditing by UNITER-SC. Teacher of the Nursing Course at FASER-FACAR College. Aracaju (SE), Brazil. E-mail: [bonandez1@hotmail.com](mailto:bonandez1@hotmail.com); <sup>5</sup>Infectologist physician. Teacher of the Medical Department/UFS. Aracaju (SE), Brazil. Email: [angelmar@infonet.com.br](mailto:angelmar@infonet.com.br); <sup>6</sup>Nurse. Master candidate in Parasitological Biology/UFS, Specialist in Collective and Family Health, Family Health Nurse - São Cristóvão/SE. Aracaju (SE), Brazil. E-mail: [lincoln\\_vitor@hotmail.com](mailto:lincoln_vitor@hotmail.com)

## INTRODUCTION

The incidence of enteroparasitosis represents a serious public health problem of global nature. In Brazil, these diseases occur in urban or rural areas affecting different age groups. As landless rural workers fit into this social scenario, they are in situations of vulnerability.<sup>1</sup> Such disorders are related to low socioeconomic levels and precarious basic sanitation conditions, representing a scourge, especially for the poorest populations. The high frequency in human populations is indicator of local development level.<sup>2</sup>

Approximately one third of the population in developing countries lives in environmental conditions conducive to the spread of parasitic infections.<sup>3-5</sup> In rural settlements, it has been observed minimum conditions of sanitation and precarious personal and domestic hygiene, thus promoting opportunities for the spreading of the disease. In 1997, the World Health Organization (WHO) estimated that over 900 million people worldwide were infected with *Ascaris lumbricoides*, 900 million with *Ancilostoma spp.* and 500 million with *Trichuris trichiura*.<sup>6</sup>

Parasitic diseases are the result of three concurrent factors: conditions of the host, the presence of the parasite and a conducive environment. Age, nutritional status and factors such as genetic, cultural, behavioral and professional are important variables. Environmental conditions associated with the factors mentioned will facilitate and define the occurrence of infections and diseases.<sup>7</sup> In general, these diseases have no symptoms and they are neglected by the public health, contributing to the worsening of clinical pictures.<sup>8</sup> Although these diseases are not usually associated with deaths, sometimes they cause debilitating manifestations, with chronic diarrhea, malnutrition, and impaired physical and intellectual development, especially of younger age groups.<sup>5</sup>

In the 1970s, there was a shortage of epidemiological inquiries about enteroparasitosis, which were limited to day-care centers, military headquarters, schools, hospitals and health centers.<sup>9</sup> However, regarding communities, these inquiries are infrequently performed and works on the prevalence of parasitic infections including populations become relatively scarce.<sup>10-12</sup>

Current statistical systems need to be strengthened, particularly in developing countries. In view of the lack of epidemiological data on the subject in the State of Sergipe, we aimed to confirm the

presence of intestinal parasitosis in landless rural workers and their families and correlate the parasitism with clinical manifestations.

## METHOD

This is an exploratory descriptive, cross-sectional and quantitative field study conducted in 13 settlements of the Landless Workers' Movement in the southern region of the State of Sergipe, Brazil. The sample selected for convenience underwent clinical consultation. They were 2 to 65 years old and settled by the government, totalizing 822 people.

Clinical-epidemiological investigation was initially conducted in three settlements during home visits. Subsequently, the subjects were gathered in public establishments of the community, where families were addressed. After the clarifications of the study and the acceptance in participating, participants were asked to sign an Informed Consent Form and we filled out a questionnaire containing clinical data such as co-morbidities and clinical manifestations resulting from parasitism. These procedures were based on a standardized datasheet containing the main data for assessment of morbidity and adapted to the conditions of the field.

From all individuals consulted, 601 parasitological examinations of feces were held. Sample collection was performed from the first fecal bolus, on alternated days using individual collectors TF-Test® (Three Fecal Test). The high sensitivity and economic and practical aspects demonstrate that the technique of TF-Test® is suitable for individual diagnosis and population surveys, as well as for evaluation of chemotherapy in control programs of intestinal parasitosis.<sup>13</sup> The samples were forwarded to the laboratory of clinical analyses of the University Hospital at UFS, where coprological examination was carried out. For statistical analysis, we used Bootstrap techniques in order to calculate prevalence, and the Chi-square test and Fisher's exact test to relate co-morbidities.

This study met all the recommendations of the National Health Council Resolution CNS No. 196/96. The research project was approved by the Committee on Ethical Research with Humans of UFS under certificate CAAE 0081.0.107.000-08. All individuals infected with *S. mansoni* were treated with praziquantel. The other cases of parasitosis were sent to the local Basic Health Unit to perform treatment.

RESULTS

Settlement I was the most representative (73 individuals) and Settlement XIII had the

smallest numbers of cases (26 individuals). The average was 46.23 participants by settlement (Table 1).

Table 1. Frequency of enteroparasitosis in Landless settlements in the south region of Sergipe. Aracaju - SE, 2012.

Set.*	n	En	Eh	Gl	Al	An	Lb	Sm	Tt	Ss	Ox	Tso	Tsa	Hn
%														
I	73	35.6	20.5	9.6	13.7	19.2	1.4	2.7	2.7	0	0	0	0	0
II	55	45.5	20	12.7	27.3	23.6	3.6	3.6	1.8	0	0	0	0	0
III	55	69.1	30.9	5.5	18.2	10.9	5.5	0	3.6	10.9	1.8	0	0	0
IV	54	55.9	22.2	16.7	7.4	14.8	3.7	0	1.9	3.7	0	0	0	0
V	49	58.0	26.0	26.0	16.0	14.0	10.0	0	4.0	2.0	0	0	0	0
VI	47	59.2	12.2	18.4	8.2	6.3	4.1	4.1	0	0	0	0	0	0
VII	46	58.7	23.9	6.5	6.5	2.2	0	17.4	2.2	0	0	0	0	0
VIII	45	42.2	6.7	11.1	11.1	6.7	8.9	0	8.9	2.3	0	0	0	0
IX	44	63.6	31.8	11.4	18.2	2.3	2.3	2.3	4.5	2.3	0	0	0	0
X	36	69.4	27.8	30.6	52.8	22.2	11.1	22.2	5.6	8.3	2.8	2.8	2.8	2.8
XI	36	51.5	9.1	18.2	6.1	12.1	6.1	2.9	0	0	0	0	0	0
XII	35	55.9	32.4	32.4	0	5.9	11.8	0	2.9	2.9	0	0	0	0
XIII	26	60.0	28.0	16.0	16.0	36.0	20.0	7.7	8.0	0	0	0	0	0

Legends: Set.: Settlement; En: *Endolimax nana*; Eh: *Entamoeba histolytica*; Gl: *Giardia lamblia*; Al: *Ascaris lumbricoides*; An: *Ancilostomideos*; Lb: *Iodamoeba beustschilli*; Sm: *Schistosoma mansoni*; Tt: *Trichocephalus trichiurus*; Ss: *Strongyloides stercoralis*; Ox: *Oxiurus*; Tso: *Taenia solium*; Tsa: *Taenia saginata*; Hn: *Hymenolepis nana*. \* The names of settlements were replaced by fictitious ones.

The order of overall prevalence of enteroparasitosis was as follows: *Endolimax nana* found in 328 samples (54.6% of individuals); *Entamoeba histolytica*, 133 (22.2%); *Giardia lamblia*, 93 (15.6%); *Ascaris lumbricoides*, 92 (15.3%); *Ancilostomideos*, 80 (13.2%); *Iodamoeba beustschilli*, 35 (5.9%); *Schistosoma mansoni*, 26 (4.3%); *Trichocephalus trichiurus*, 20 (3.3%); *Strongyloides stercoralis*, 15 (2.5%); *Oxiurus*, 2 (0.4%); *Taenia saginata*, *Taenia solium* and *Hymenolepis nana*, 1 (0.2%) each. Positive verminosis ranged from 0 to 69.4%. In absolute terms, there were from 1 to 328 infected/causal agents or 0 to 30 individuals/settlement/type of parasite (Table 1).

*E. nana*, *E. histolytica*, *G. lamblia* and *Ancilostomideos* were found in all settlements. Despite *A. lumbricoides* was the fourth most prevalent, it was not found in Settlement XII. The same goes for *I. beustschilli* in Settlement VII and *T. trichiurus* in Settlements VI and XI (Table 1).

Settlement X had the highest proportion of *E. nana* (69.4%), while Settlement IV stood out in absolute terms for the same parasite,

with 30 individuals. In the case of *E. histolytica*, the highlights were for Settlement XII (32.4%) and Settlement I (15 individuals). Settlements III and X were the only ones to show positive *Oxiurus*. Exams of Settlement X were the only ones to confirm *T. solium*, *T. saginata* and *H. nana* (Table 1).

Polyparasitism rates were high. In General, 37.8% of individuals examined had more than one verminosis. In Settlement X, from which 36 individuals participated in the study, there were 94 positive occurrences, which represents that each subject had on average 2.6 causal agents. The rate was 1.9 parasites for each individual in Settlement XIII. Other sites also showed considerable rates of multi infestation: Settlement III (56.4%), V (56.0%), XII (44.2%) and II (38.1%). For the rest sites, rates varied from 5.4 to 26.3%. In the opposite situation, detection rate for Settlement VIII was 2.1% smaller than the sample.

Table 2. Clinical conditions associated with enteroparasitism in Landless Settlements in the south region of Sergipe. Aracaju - SE, 2012.

Clinical manifestations	Categories	n	%
Good general state of health	Yes	595	99%
	No	6	1%
	p value	< 0.0001	
Headache	Yes	315	52%
	No	285	47%
	p value	0.22067	
Abdominal pain	Yes	298	50%
	No	302	50%
	p value	0.87028	
Anorexia	Yes	219	36%
	No	381	63%
	p value	< 0.0001	
Nausea	Yes	208	35%
	No	392	65%
	p value	< 0.0001	
Dry cough	Yes	144	24%
	No	456	76%
	p value	< 0.0001	
Constipation	Yes	123	20%
	No	476	79%
	p value	< 0.0001	
Vomiting	Yes	101	17%
	No	497	83%
	p value	< 0.0001	
Diarrhea	Yes	79	13%
	No	520	87%
	p value	< 0.0001	

The most common clinical manifestations in the individuals were headache (52.0%), abdominal pain (50.0%), anorexia (36.0%) and nausea (35.0%); although only anorexia showed statistical significance. Despite this, 99.0% of individuals examined were classified as in "good general state of health", with significant statistical correlation (Table 2).

DISCUSSION

Protozoa were more prevalent in the coproparasitological examination, with over 500 positive tests. Among the helminths, we observed that *Ascaris lumbricoides* infected 16.7% of individuals analyzed, reaching half of the participants in one of the settlements.

The following intestinal parasitoses are the most prevalent worldwide: ascariasis, trichiniasis, ancylostomiasis, amoebic dysentery and giardiasis. This research corroborates this assertion; however, in Brazil there are statistical data that show the actual prevalence of theses microorganisms, being most of the information arising from occasional studies.<sup>14</sup>

There were not positive cases of *A. lumbricoides* detected just in one settlement. This is surprising, since hygiene, housing, culture and health conditions of this settlement were very similar to those of the rest of the settlements.

Ascariasis is considered one of the most important epidemiological intestinal parasitoses in the world. It has high prevalence and is related to inadequate

hygiene habits.<sup>4</sup> At the same time, it is estimated that about one billion individuals carry *Ascaris* worldwide, being the contingent infested with trichina and ancylostoma only slightly smaller.<sup>12</sup> in this study, ascariasis, ancylostomiasis and schistosomiasis were more prevalent; however, ascariasis, ancylostomiasis and trichiriasis infections are considered the most common intestinal parasitoses in Brazil.<sup>4</sup>

*Ancylostoma E. histolytica* and *G. lamblia*, in addition to the non-pathogenic *E. nana*, were present in all settlements. The frequency of giardiasis varies regarding world distribution. In developed countries, the rate is relatively low and the increase in these rates is due to outbreaks that do not configure a chronic problem with constant high frequencies. In developing countries, it is known that the frequency is much higher.<sup>10</sup> It is estimated that 200 and 400 million individuals host *Giardia duodenalis* and *Entamoeba histolytica*, respectively.<sup>12</sup>

Non-pathogenic protozoa *E. nana* and *I. beutschilii* were frequent in 13 and 12 settlements, respectively. These agents do not determine morbidity by intestinal parasites in a given population; however, they are indicative of local basic sanitation conditions.<sup>15</sup> *N. stercorales* was present in seven settlements and helminthiasis trichuriasis was frequent in 11 settlements, thus confirming the precarious condition of housing in this population.



*T. solium*, *T. saginata* and *H. Nana* were found in a single settlement. In this same location, the rates of scariasis and schistosomiasis prevalence were the largest. In the case of *S. mansoni*, the values exceeded those of the municipality, which was 15.57%. Lack of knowledge about health education and environmental sanitation arise from poverty; hence, the high percentage of parasitism.<sup>16</sup>

The origin of settlers follows the same criteria to all settlements, i.e., they come from several municipalities and not specifically from an area with registration of endemic diseases. When the prevalence of schistosomiasis by settlement was determined, we observed variations, even when located in the same municipality. The epidemiological parameters such as prevalence, incidence, intensity of infection and morbidity vary widely, even within a region.<sup>17</sup> This diversity can be primarily explained by human ecology and the environment. In Brazil, the problems involving enteroparasitoses take a large proportion, especially due to socioeconomic conditions, lack of basic sanitation, health education and cultural habits.<sup>5</sup>

We observed a high frequency of complaints, such as headache (52.0%), abdominal pain (50.0%), anorexia (36.0%) and nausea (35.0%). The damages that enteroparasites can cause to their carriers include bowel obstruction (*Ascaris lumbricoides*), malnutrition (*Ascaris lumbricoides* and *Trichuris trichiura*), iron deficiency anemia (ancylostoma), diarrhea and malabsorption (*Entamoeba histolytica* and *Giardia duodenalis*). Clinical manifestations are usually proportional to the parasitic load carried by the individual.<sup>12</sup> All less prevalent symptoms also showed significance in this study, which suggests that their absence should not be taken into consideration when discarding a suspicion of parasitosis.

Intestinal parasitosis constitutes a serious public health problem, particularly in developing countries. This disease is one of the main factors debilitating populations, often associated with chronic diarrhea and malnutrition, undermining physical and intellectual development, particularly in younger age groups.<sup>5,18</sup> This fact makes our findings in the settlements worrying, especially because it is a needy population, without financial resources, health care and access to appropriate treatments.

Some concepts and reflections on health promotion policy underlines the importance of interaction between public health and geography, increasingly present in implementing strategies and controls of the diseases, in addition to urban planning, epidemiology and reorganization of services and health practices in the local sphere.<sup>19</sup>

## CONCLUSION

The results of this work have shown the precarious conditions of sanitation in the settlements investigated, resulting not only in high levels of intestinal parasitism, but in the frequent occurrence of polyparasitism.

Despite the high frequency of enteroparasitosis observed in the general population, we must highlight the shortage of studies addressing the problem and aiming at a better scaling and drawing up of measures to combat these diseases on the part of health authorities.

The quality of health, prevention of disease and the maintenance of hygiene are the main problems faced in developing countries and, in general, the information about the prevalence of intestinal helminths is limited to certain regions in Brazil.

Parasitoses feature variations, which depend on health, educational, economic and social conditions, population agglomeration index, use and contamination of soil, water and food.

Such findings confirm that landless rural workers constitute a disadvantaged group in Brazil, which, on a large scale, is excluded from the main public measures that can improve health and living conditions, such as: sanitation or water supply suitable for human consumption.

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### Corresponding Address

Lincoln Vitor Santos

Cond. Lagoa Doce

Rua Luiz Carlos de Aguiar Machado, 120, Bl 01, Ap. 204

Santa Lúcia, Jabotiana

CEP: 49095-480 – Aracaju (SE), Brazil