



ISSN: 2230-9926

Available online at <http://www.journalijdr.com>

IJDR

International Journal of Development Research

Vol. 11, Issue, 10, pp. 51155-51159, October, 2021

<https://doi.org/10.37118/ijdr.23106.10.2021>



RESEARCH ARTICLE

OPEN ACCESS

ENTEROPARASITOSIS A PUBLIC HEALTH PROBLEM: A CROSS-CUTTING STUDY WITH EDUCATIONAL INTERVENTION

*¹Rafaela Costa de Aranda Lima, ²Cleidivan Alves dos Santos, ³Mara de Souza Paixão, ³Kelly Cristina Vaz de Carvalho Marques, ³Jose Ricardo Sousa Ayres de Moura, ³José Mariedson da Silva Junior, ³Gabriel de Brito Cerqueira, ⁴Fabício dos Reis Santos Dutra, ⁵Júlio César Claudino dos Santos, ¹Artur Mota Ferreira, ¹Ayalla Vilela Souza, ¹Lucas Dileno Rodrigues, ¹Fernando Antônio Alves Prudente Filho, ¹Vanessa Ribeiro de Souza, ⁶Horst Naconecy de Souza, ¹Claudio Silva Teixeira, ⁷José Gilson Rego Gonçalves

¹University of Rio Verde, Brazil, ²State University of Piauí, Brazil, ³Federal University of Ceará, Brazil, ⁴Pontifical Catholic University of Minas Gerais, Brazil, ⁵Unicrhirtus Faculty of Medicine, Brazil, ⁶Family Medicine and Ophthalmology Resident, Brazil, ⁷Nurse in Brazil, RN

ARTICLE INFO

Article History:

Received 10th August, 2021
Received in revised form
19th September, 2021
Accepted 08th October, 2021
Published online 30th October, 2021

Key Words:

Education; Parasitosis;
Coproparasitological diagnosis.
Public Health. Parasitic Diseases. Medicine.

*Corresponding author:

Rafaela Costa de Aranda Lima

ABSTRACT

Parasitic diseases are serious public health problems mainly due to the lack of basic sanitation and educational prevention campaigns. Intestinal parasites are among the most frequently found pathogens in humans and cause diseases that can manifest in different ways and even lead to sepsis in immunosuppressed patients. This study assesses the prevalence of intestinal parasites in the population of a city in the interior of Brazil. A total of 428 results of coproparasitological examinations were analyzed during four months and an educational intervention was carried out. The overall prevalence coefficient was 43.8% positivity, most frequently for *Endolimax nana* (16.72%), followed by *Entamoeba Histolytica* (9.59%), *Giardia lamblia* (5.42%), *Ascaris lumbricoides* (2.01%), *Strongiloides stercoralis* (1.70%), *Ancylostomidae* and *Taenia sp* (0.16%) respectively. This prevalence is similar to that found in other Brazilian regions, showing that there is a need to implement public health policies to improve health conditions. We verified that the educational intervention was well accepted by the local population affected by intestinal parasites.

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Citation: Rafaela Costa de Aranda Lima, Cleidivan Alves dos Santos, Mara de Souza Paixão, Kelly Cristina Vaz de Carvalho Marques et al. 2021. "2021: President Bolsonaro and his ministry of truth", *International Journal of Development Research*, 11, (10), 51155-51159.

INTRODUCTION

Intestinal parasites or enteroparasitosis, resulting from protozoa and/or helminths, occur mainly in underdeveloped or developing countries where they are quite widespread (FREI *et al.*, 2008; SANTOS *et al.*, 2018). The incidence is high in places where living conditions and basic sanitation and education are inadequate. Parasitic forms are observed in soils of several countries around the world, remembering that the parasites are not randomly distributed in different regions of the globe, requiring indispensable conditions required by the species for the survival of these parasites (CORDOBA *et al.*, 2002, NEVES, 2016; SILVA *et al.*, 2019). Intestinal parasitosis is a public health problem in rural areas of underdeveloped countries and improving populations' access to drinking water could reduce the magnitude of these diseases (TEKPA *et al.*, 2019).

The prevalence of intestinal parasite infections is one of the best indicators of the socioeconomic status of a population and may be associated with several determinants, such as inadequate sanitation facilities, faecal pollution of water and food consumed, sociocultural factors, contact with animals, lack of sanitation basic, in addition to the age of the host and the type of infecting parasite (BELO *et al.*, 2012; GAMBOA *et al.*, 2003). The concern with intestinal parasites became a discussion again with the COVID19 pandemic, since patients with severe infections needed to use high doses of corticosteroids that lead to immunosuppression due to the increase in Th2 cell apoptosis and reduction, increasing the risk of superinfection by *Stroglyoidiasis*. The immunosuppressed population is considered a risk group for the development of severe stroglyoidiasis, in which hyperinfection/dissemination is related to an accelerated autoinfection syndrome, which, in many cases, is associated with some impairment of the immune system (SANTANA; LOUREIRO, 2016). People using immunosuppressive drugs for the treatment of lymphoma,

rheumatoid arthritis, ankylosing spondylitis, leprosy and systemic lupus erythematosus and to prevent the rejection of transplanted organs are more susceptible due to the risk of increased concentration of glucocorticoid derivatives, which, due to their similarity with ecdysone, a hormone that regulates the fecundity of parthenogenetic females and the transformation of rhabditoid larvae into infective filarioids, leads to frames of superinfection by *Strongyloidiasis* (SANTANA; LOUREIRO, 2016). Children are often affected by intestinal parasites that cause digestive disorders, whose intensity can vary from latency to intestinal obstruction, diarrhea being more frequent in protozoan than helminth infestations (BOURÉE, 2016). Some parasites are cosmopolitan (*Ascaris*, *pinworms*, *Whipworms*, *Giardia intestinalis* etc.), but are more frequent in warm, humid environments, while others are specific to tropical regions (*Strongyloids*, *Hookworms*, *Schistosomes*) (BOURÉE, 2016). However, in the tropical environment, these treatments are not effective in the general population if they are not accompanied by continuing health education. Several studies have been carried out on the prevalence of intestinal parasites throughout Brazil (GONDIM *et al.*, 2003; VITURI *et al.*, 1991; SMITH *et al.*, 2001). Although there are many studies observing parasite outbreaks, confirming the prevalence and intensity of these infections, little has examined the socio-cultural factors that affect the transmission of enteroparasites. Some studies have shown that the lack of education, lack of toilets, low economic conditions, deficient garbage collection system and sewage system are directly related to parasitic infections (SMITH *et al.*, 2001). Because of this, the prevalence of intestinal parasites in a city in the interior of Brazil was investigated. Based on that, the objective of this work was to trace the epidemiological profile of intestinal parasites in a city in the interior of Brazil. The absence of educational intervention in the city are essential for the prevention of parasitic diseases, this was also a motivation for carrying out this work.

MATERIALS AND METHOD

Study design and population. A cross-sectional study with a quantitative approach was carried out in a city in the interior of Brazil and occupies an area of 259,909 km², has 30,802 inhabitants, of which about 15,500 live in urban areas. The municipality has 12 family health posts. To assess the frequency of parasitosis, 468 residents were selected. Data collection, storage and analysis. The coproparasitological survey was carried out from June to September, in which semi-structured questionnaires (with questions relating to socio-economic and cultural aspects) were applied to 468 randomly chosen residents of different age groups. Coproparasitological analysis was performed at the Central Regional Reference Laboratory. The method of spontaneous sedimentation (HOFFMAN *et al.*, 1934) was performed, and the results were delivered to each patient who were referred to the municipal health post responsible for the Family Health Program (PSF). Data were entered into a database using Excel for Windows version 2003 and checked for typing errors. Data analysis was descriptive, in order to determine the socio-demographic profile of the patients. The chi-square test (χ^2) was applied to verify the association between the studied variables, at a significance level of 5%. The Graph Pad Prisma version 5.0 application was used as a tool for statistical analysis. Ethical considerations. This study does not have any conflict of interest following the precepts of Resolution 412/12 of the national health council, which regulates research involving human beings (BRAZIL, 2012). Educational intervention: It is a strategy used so that the educational intervention takes place after the interview, with the presentation of an information leaflet and guidance on the importance of preventing infections caused by intestinal parasites. The method by Freitas *et al.* 2018 works very well for the prevention of diseases and health problems. In this method, the researcher made interventions and guides on how to prevent infections by intestinal parasites so that they can reflect on what was said and add information to clarify knowledge and doubts (FREITAS *et al.*, 2018; TABOSA *et al.*, 2019).

RESULTS AND DISCUSSION

An overall positivity of 205 (43.80%) of the analyzed samples was found, a similar incidence was observed in a parasitological survey carried out in preschool children (TSUYUOKAR *et al.*, 1999). Although it was not possible to relate the etiology of enteroparasitosis with a condition of basic sanitation and water supply, these data reinforce the most urgent possible administrative measures for basic sanitation and adequate treatment of water for consumption by the population affected by the high rate of parasitic infection. Little is known about the current prevalence of intestinal parasites in the city of Pau dos Ferros. However, the general prevalence found reinforces the incidence of several studies (GONDIM *et al.*, 2003; SIQUEIRA *et al.*, 2005; COSTA-MACEDO *et al.*, 1998). Of the positive results, there was a predominance of female individuals (67.74%), when compared with male individuals (33.26%), as shown in work, but this difference was not statistically significant by the test of Chi-square ($p > 0.05$, $X^2=1.45$). These results corroborate a study carried out in Vila Velha, Espírito Santo, Brazil, where women were more parasitized than men (15). However, these results are contrary to those obtained by a study carried out with the population of Martinésia, Minas Gerais, Brazil (rural area of Uberlândia, Minas Gerais), where men were almost twice as parasitized as women. However, the authors of the study in question warned of the need for further investigation to obtain conclusive results (RIBEIRO *et al.*, 2005).

There were no statistically significant differences ($p > 0.05$) in the prevalence coefficients of intestinal parasites, according to place of residence and age group. These results corroborate studies carried out in the southeast region of Brazil (FERREIRA *et al.*, 1997). The results found in this study showed that *Endolimax nana* was the most prevalent in 16.72%, followed by *Entamoeba histolytica/dispar* 9.59%, rates diverging from those found by other authors 1,5,6,8,18. The highest prevalence rates occurred for protozoa 40.17% while helminths showed a prevalence of 3.63%, although *Endolimax nana* is a commensal protozoan with the highest prevalence in this research, *Entamoeba histolytica* was the most prevalent 9.59% among the pathogenic s, while among the most prevalent pathogenic helminths was *Ascaris lumbricoides* 2.01%. Infections by *Giardia lamblia*, *Strongyloides stercoralis*, *Hymenolepis nana* had a prevalence coefficient of 5.42%, 1.7%, 0.77%, while in *Taenia* sp and *Hymenolepis nana* this index was 0.16%, which represents a low contamination index. Comparing to epidemiological studies carried out in Brazil, where the incidence of *Trichostrongylus* sp. was 0.0079% (GONDIM *et al.*, 2003) and 0.23% (FLEURY *et al.* 1970), the same was found in this study with a relatively high incidence (4.6%), and because it is an occasional parasite for men, probably the focus of contamination comes from animals (horses) commonly used for transport in this community. In studies conducted with children in the Central African Republic of the three isolated species of protozoa *Entamoeba histolytica* was found in 15 cases of 14.70%. The most common helminthiasis was *Ascaris lumbricoides* 40.19% (TEKPA *et al.*, 2019).

Table 1. Enteroparasites identified in the coproparasitological examination

Enteroparasites	%
<i>Endolimax nana</i>	16,72
<i>Entamoebahistolytica/dispar</i>	9,59
<i>Giardialamblia</i>	5,42
<i>Ascaris lumbricoides</i>	2,01
<i>Strongyloidesstercoralis</i>	1,70
<i>Hymenolepis nana</i>	0,77

Source: the authors. It was used for descriptive statistical analysis

Prevalence study of enteroparasitosis in the city of São Bernardo do Campo - SP, Brazil the researchers conclude that *Giardia* spp. it was the most frequent and frequent frequency in children (0 to 11 years old) and the areas of the city with the highest prevalence were those on the outskirts, such as the Vila São Pedro neighborhood. The researchers alert to the need to implement prevention and control in

public health of these and other types of diseases. In a cross-sectional study carried out in the Central African Republic, the prevalence of intestinal parasitosis in children was 88.23%, and abdominal pain was observed in 55 children 53.92% (TEKPA *et al.*, 2019). In studies carried out in southern Italy, researchers found that intestinal parasites are still a cause of intestinal infection in a region where there is immigration. Although immigrants have a significantly higher prevalence of parasitosis than natives, this does not increase the risk of infection for this population. This is probably due to the lack of adequate biological conditions in the study area (BELLI *et al.*, 2014). Epidemiological study evaluating Enteroparasites in Areia Branca Aracaju, Brazil, the authors found a higher incidence of Helminth infections when compared to protozoan infections (GONDIM *et al.*, 2003). The educational intervention through leaflets and conversations serves as a moment to make people reflect on the dangers of the problems and health problems. After these conversations, many patients can become aware of improving their hygiene and health habits and reduce parasite infections, improving hygiene conditions and improving their quality of life for a given population (FREITAS *et al.*, 2018).

Final Considerations

We found that the epidemiological study of enteroparasitosis is an important indicator to assess the socioeconomic conditions of a community, adequately reflecting the degree of sanitation in a region. It is necessary to evaluate strategies and health measures and educational programs to be implemented so that the prevalence of parasites is reduced or even the elimination of parasites so that there is an improvement in the quality of life in this city. Educational interventions are an important tool to prevent the spread of intestinal parasites. Thus, educational campaigns are extremely effective in reducing the spread of intestinal parasites in communities. We encourage the family's health teams to carry out this health education, as well as the schools and universities to carry out interventions with the purpose of improving the health conditions of poor populations around the world.

Disclosure statement: The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Acknowledgment

The authors would like to thank the entire health team responsible for the Family Health Program in Brazil and everyone who helped directly or indirectly in carrying out the research.

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