Prevalence of enteroparasitoses in students of a municipal school in Southwestern bahiano

Prevalência de enteroparasitoses em alunos de uma escola municipal no Sudoeste do bahiano

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ABSTRACT
Introduction: Infections caused by intestinal parasites are a silent disease and their high morbidity and mortality rates, especially in children, have been reported in different studies. The high prevalence of parasites in this public is directly associated with the socioeconomic profile of the population, as well as structural development and climatic conditions of the studied regions. Objective: To describe the prevalence of enteroparasitosis in students of a municipal school in southwestern Bahia in 2019. Materials and Methods: This is a cross-sectional, descriptive and quantitative study conducted by applying a questionnaire and collecting parasitological material from 76 Elementary students from a city in southwest Bahia. Results: Among the studied population, 46 (60.5%) were female. Regarding age, they had an average of 8.7 years (± 1.9 years), and 36 (48%) considered themselves brown. The prevalence of enteroparasitosis was 21.1%, with Endolimax Nana (4.1%), Ascaris Lumbricoides (2.0%), Iodamoeba Butshilli (2.0%), Entamoeba Coli (14.3%), Enterobius Vermiculares (4.1%), Giardia Lamblia (6.1%). Conclusion: It was observed that the prevalence of enteroparasitosis in the children analyzed was low, with a predominance in females. This low rate may be related to factors such as the consumption of treated water and the presence of a sewage system, allied to the helminth control, prevention and monitoring work promoted by the Municipal Health Department.

Keywords: Enteroparasitosis, Schoolchilden, Prevalence, Sanitation.

RESUMO
Introdução: As infecções causadas por parasitas intestinais são uma doença silenciosa e suas altas taxas de morbidade e mortalidade, especialmente em crianças, têm sido relatadas em diferentes estudos. A alta prevalência de parasitas neste público está diretamente associada ao perfil socioeconômico da população, assim como ao desenvolvimento estrutural e às condições climáticas das regiões estudadas. Objetivo: Descrever a prevalência de enteroparasitose em estudantes de uma escola municipal no sudoeste da Bahia em 2019. Materiais e Métodos: Este é um estudo transversal, descritivo e quantitativo realizado através da aplicação de um questionário e coleta de material parasitológico de 76 alunos do ensino fundamental de uma cidade do sudoeste da Bahia. Resultados: Entre a população estudada, 46 (60,5%) eram do sexo feminino. Quanto à idade, eles tinham uma média de 8,7 anos (± 1,9 anos), e 36 (48%) se consideravam pardos. A prevalência de enteroparasitose foi de 21,1%, com Endolimax Nana (4,1%), Ascaris Lumbricoides (2,0%), Iodamoeba Butshilli (2,0%), Entamoeba Coli (14,3%), Enterobius Vermiculares (4,1%), Giardia Lamblia (6,1%). Conclusão: Observou-se que a prevalência de enteroparasitose nas crianças analisadas era baixa, com predomínio nas fêmeas. Esta baixa taxa pode estar relacionada a fatores como o consumo de água tratada

e a presença de um sistema de esgoto, aliados ao trabalho de controle, prevenção e monitoramento do helminto promovido pela Secretaria Municipal de Saúde.

Palavras-chave: Enteroparasitose, Escolares, Prevalência, Saneamento.

1 INTRODUCTION

Infections caused by intestinal parasites are a silent disease, and the high rate of morbidity and mortality caused by them, especially in children, has been reported in different studies. The high prevalence of parasitosis in this population is directly associated with the socioeconomic profile of the population, as well as the structural development and climatic conditions of the studied regions (PEREIRA, 2011; CARVALHO et al, 2002).

Intestinal parasites are excellent indicators of the socioeconomic situation of a population and can be correlated with different determining factors. Such as inappropriate sanitary facilities, presence of feces in the water and food that are consumed, precariousness or even lack of basic sanitation, sociocultural elements, conviviality with animals, in addition to aspects such as the age of the host and the type of infecting parasite (BELO et al, 2012).

Brazil faces a serious infrastructure problem where 9.8 million people still do not have a water distribution network and sewage system in their homes, according to the Brazilian Institute of Geography and Statistics (IBGE), thus facilitating the spread of parasites (BELO et al, 2012).

The prevalence of intestinal parasites in school-age children and adolescents is mainly related to cultural and socioeconomic issues. Infections by helminths and protozoa have an important influence on the nutritional and intellectual status, which can evolve into serious health problems and generate great damage in terms of physical well-being and educational development (PRADO et al, 2001).

Given the lack of studies in the region and the complications that can be presented by parasitosis, this study aimed to describe the prevalence of intestinal parasitosis in students from a municipal school in southwestern Bahia.

2 MATERIALS AND METHODS

This is a cross-sectional, descriptive, and quantitative study, where the objective was to assess the prevalence of intestinal parasites among students. The study was carried out in the municipality of Macarani, which is located 630 km from the capital Salvador, in the Southwest region of Bahia, having about 18,592 inhabitants until 2018 and is bathed by the Rio Pateirão and Rio Pardo. The place chosen as the study setting was a municipal school in the region.

Initially, there was a meeting with representatives of the school to present the project. Subsequently, parents were invited to provide guidance on the steps and documents required for their children's participation in the research. After selecting the interested parties who met the inclusion criteria (students duly enrolled from the 1st to the 5th year of elementary school of both sexes), a questionnaire on socioeconomic and child and family habits was applied to the legal representatives. Later, universal collectors for biological material were delivered, properly labeled with the respective names of the children authorized to participate in the study, in addition to the guidelines for collection.

The study sample consisted of 76 students of both sexes. The delivery of biological materials (stool) was carried out on the first day of November at the school and they were sent to the Parasitology sector of the Municipal Central Laboratory of Vitória da Conquista, where they were properly labeled and prepared for analysis according to the laboratory standards. To analyze the stool samples, the Hoffman-Pons-Janer method was used, also known as the spontaneous sedimentation technique (VALADA, 1998). The reading was carried out by technicians from the laboratory.

The data obtained were collected, tabulated, and analyzed using the IBM SPSS statistics 22.0 program. The descriptive analysis presented in the form of absolute and relative frequency was performed for categorical variables, and position and dispersion measurements for continuous variables. In addition, this project was approved by the Ethics Committee of Faculdade Independente do Nordeste - FAINOR, meeting the ethical aspects set out in resolutions nº 466/2012 and nº 510/2010 of the National Health Council, being registered under number 3.653.387.

3 RESULTS AND DISCUSSION

Among the 76 students participating in the study, 46 (60.5%) were female. Regarding age, they had an average of 8.7 years (± 1.9 years), and 36 (48%) considered themselves brown.

Table 1: Distribution of participants according to socioeconomic and demographic characteristics - November 2019.

Characteristics	n	%
Gender		
Female	46	60,5
Male	30	39,5
Skin color		
Brown	36	48,0
White	16	21,3
Black	16	21,3
Indigenous	03	4,0
I prefer not to declare	04	5,3
Income		
Up to half minimum wage	16	21,1
1 minimum wage	32	42,1
Between 1 and 2 minimum wages	18	23,7
Greater than 2 minimum wages	10	13,2
Occupation of parents or guardians		
Retired	09	11,9
Do not work	14	18,4
Works	53	69,7

n: number of pacients
%: percentage of pacients
Source: survey data

In relation to income, there was a higher prevalence of families with up to 1 monthly minimum wage, 32 (42.1%). Family income reflects a very sensitive socioeconomic status index for detecting the effects of the distribution of intestinal parasites, being an important characteristic for directing prevention and treatment actions (ORLANDINI, et al, 2010).

In the present study, it was also evidenced that 84.2% of the participants live in the urban area of the studied municipality. The fact that these children live in this area is a factor that differentiates them from others (residents of the rural area), as they have housing in terms of basic sanitation and access to treated water in better conditions.

Table 2. Distribution of participants according to housing and sanitation conditions - November 2019.

Characteristic	n	%
Place of residence		
Rural zone	12	15,8
Urban zone	64	84,2
Sewage destination		
In the sewer network	57	76,0
In the pit	11	14,7
In the river	06	8,0
Other	01	1,3
Water supply		
General supply network (Ex. SAAE).	60	78,9
Tank Truck	02	2,6
Pit	07	9,2
River	07	9,2
Waste Destination		
Collected directly by the cleaning service	60	78,9
Burned	11	14,5
Buried	03	3,9
Played in vacant lot	02	2,6

n: number of pacients
%: percentage of pacients
Source: survey data

Some studies show that the urban area has a higher rate of contamination by protozoa. Whereas in the rural area there is a higher frequency of helminths, showing that children in rural areas do not have access to properly treated water and the sewage does not receive any type of treatment. Being released into a tributary of the river itself, where they collect water for consumption, favoring the maintenance and transmission of the infective forms of helminths (OLIVEIRA, 2013).

Regarding the destination of sewage, 76.0% have an adequate sewage treatment network offered by the company SAAE, reducing the risk of contamination. About 14.7% use the dry pit as a method of disposing of sewage from their homes, a useful method, however, most likely in a rudimentary way that can cause pollution and contamination of the environment. However, the use of septic tanks, when well constructed, constitutes an adequate sanitary solution for the destination of sanitary waste (GIANTTI et al, 2004; OLIVEIRA et al, 2010).

The other 8% reported that their sanitary waste certainly goes to the river near the property where they live, which could end up being a form of contamination of many helminths. Places without a sewage system or with unfinished toilets for the deposition

of human waste allow the transmission of ascariasis (Ascaris lumbricoides) acquired due to the ingestion of parasite eggs, helminthiasis, or other verminosis, whose parasites can be carried to water or food as vegetables through irrigation (HORNICK, 2013).

As for garbage disposal, 78.9% reported that solid waste resulting from daily activities is collected by a company responsible for public cleaning, a service offered by the city hall. It has been proven that when waste is properly conditioned, incorporating modern treatment technologies, the impacts on public health and the environment are lower (RIBEIRO; ROOKE, 2010).

Tabela 3. Children's habits and domestic customs - November 2019.

Characteristic	n	%
Are fruits and vegetables sanitized before the child consumes them?		
Yes	54	71,1
No	11	14,5
Sometimes	11	14,5
Does the child wash their hands with soap and water after using the bathroom?		
Yes	45	60,0
No	12	16,0
Sometimes	18	24,0
Does the child have the habit of washing their hands before meals?		
Yes	46	60,5
No	12	15,8
Sometimes	18	23,7
Is the water the child drinks filtered or boiled?		
Yes	63	82,9
No	13	17,1
Does the child have the habit of going barefoot?		
Yes	38	50,0
No	18	23,7
Sometimes	2	26,3

One of the determining factors for the development of a disease caused by parasites is the domestic habits and customs, described in Table 3 (LEME; BARRETO, 2014).

One of the best ways to avoid contamination by enteroparasitosis is through personal hygiene measures or prophylactic measures. The act of sanitizing fruits and vegetables before consumption together with the act of washing hands after using the bathroom and before meals can minimize the risk of contamination since most of the eggs or cysts of these parasites are in places where we play mainly where more than one person uses it (bathrooms, doorknobs, faucets). Children, unintentionally put their hands to their mouths after using the bathroom or after outdoor recreational activities. All of this, without due care in sanitizing, can serve as a vector of contamination (NEVES, 2005; REY, 2011).

In the study, 71.1% of the participants stated that fruits and vegetables are previously sanitized before consuming them, as well as 11.5% stated that fruits are often not washed or are sometimes washed. It is noteworthy that, due to the microscopic size of the eggs and cysts of enteroparasitosis, flies and other arthropods (ants, cockroaches) can serve as a vehicle for contamination of exposed fruits (NEVES; 2005).

Table 4 – Helminths and protozoa found in stool examinations of 16 positive samples.

Characteristic	n	%
Number of parasites per analyzed sample		
0	60	78,9%
1	12	16,0%
2	01	1,2%
3	03	3,9%
Found enteroparasitosis		
Entamoeba coli	7	14,3%
Giardia lamblia	3	6,1%
Endolimax nana	2	4,1%
Enterobius vermiculares	2	4,1%
Ascaris lumbricoides	1	2,0%
Iodamoeba butshilli	1	2,0%

n: number of pacients
%: percentage of pacients
Source: survey data

It was observed that 60 (78.9%) samples analyzed had negative results. It is noted that the prevalence of children infected with protozoa is greater than that of helminth infections, with five species of protozoa and only two of helminths being identified. In the sixteen positive samples, the three most prevalent parasites were Entamoeba coli (14.3%), Giardia lamblia (6.1%), and Endolimax nana (4.1%) (TABLE 4).

The protozoa E. coli, E. nana, and Iodamoeba butshilli, although not pathogenic, they were included in the study as they have the same pathogen transmission mechanism and can serve as a good indicator of socio-sanitary conditions (PEREIRA, 2011).

Cases of polyparasitism (03 cases) were also found, being them by Ascaris lumbricoides and Entamoeba coli, Enterobius vermiculares and Endolimax nana, and finally Entamoeba coli and Iodamoeba butshilli.

The appearance of protozoa in school-age children is directly related to contact with the soil, ingestion of contaminated water or food, and lack of hygienic habits. About 50% of parents who answered the socioeconomic questionnaire reported that children have the habit of walking barefoot, a habit that can facilitate the contamination by these parasites. There are other authors who carried out studies on the prevalence of intestinal parasites in some age groups and determined that the rates are high from 5 to 12 years old, a situation experienced in the present study, where the highest frequency of intestinal parasites was observed between 7 and 11 years old. (FALEIROS, 2004; BUSCHINI et al., 2007).

4 FINAL CONSIDERATIONS

Based on the results obtained in this study, it can be concluded that the prevalence of intestinal parasites in the children analyzed was low, with a predominance of females. This low rate may be related to factors such as the consumption of treated water and the presence of a sewage system, combined with the work of control, prevention, and monitoring of helminths promoted by the Municipal Health Department. The incidence of intestinal parasites may be related to family income, with a higher prevalence in families with a monthly income of one minimum wage. In this regard, it is important to emphasize the need for actions to improve urban infrastructure and access to information for the population as measures to reduce the prevalence of these infections.

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