



RESEARCH ARTICLE

IDENTIFICATION OF THE MAIN PARASITES IN SCHOOL-AGE CHILDREN:
A CROSS SECTIONAL STUDY

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ARTICLE INFO

Article History:

Received 04th February, 2018
Received in revised form
19th March, 2018
Accepted 28th April, 2018
Published online 23rd May, 2018

Key words:

Host-parasite interactions;
Ascaris lumbricoides;
Giardia lamblia;
Schistosoma mansoni.

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Citation: Marcelo Paim Sodr , Wagno Alc ntara de Santana and Eduardo Mart nez. 2018. "Identification of the main parasites in school-age children: A cross sectional study", *International Journal of Current Research*, 10, (05), 69020-69023.

ABSTRACT

Parasitic infestations are the most common causes of diseases that affect humans, especially children, because at this stage of life the immune system is still developing and is not competent to prevent infection. The clinical manifestations generated by enteral parasitosis vary from simple to severe signs and symptoms and may even lead to death of the host. The objective of this study was to identify the main parasites affecting children and adolescents of school age and design intervention measures to avoid new parasitic infestations. A cross-sectional study carried out during the period from March to December 2017 collected fecal samples from 39 students and submitted to a diagnostic technique for spontaneous sedimentation. After the analyzed samples, in 57%, parasites were identified, and in 32% of them, more than one parasite were identified. The parasites were: *Ascaris lumbricoides* (64%), *Giardia lamblia* and *Schistosoma mansoni* (4.55%) each, *Endolimax nana* (41%) and *Entamoeba coli* (31,82%). The high occurrence of enteral parasitosis shows the need for basic sanitation and adequate treatment of water used by the community. It was understood the need to articulate health and education policies in order to contemplate the real needs of individuals in this age group of peculiar development.

INTRODUCTION

Parasites are living organisms that extract from other organisms the elements necessary for their survival. This relationship is classified as parasitism and defined as an association between two living beings (host and parasite), in which there is unilaterality benefits, consequently, damage to the other individual (NEVES, 2011). The water is considered one of the main vectors of parasitic contamination and dissemination (BELO, 2012 and BRASIL, 2016). The prevalence of poverty and underdevelopment translated into poor sanitary conditions corroborate with high numbers of enteroparasitoses (NEVES, 2011). Intestinal infections caused by helminths and protozoa affect about 3.5 billion people, causing disease in approximately 450 million around the world, mostly in children (BELO, 2012). Pacheco et al. 2014, state that studies indicate prevalence of parasites between 16% and 94% of the population of Brazil and that the highest rates are found in endemic areas and in the child population of the North and Northeast regions. Regarding infantile intestinal parasitosis, 12.3% and 11.4% of all diseases affecting boys and girls, respectively, in the underdeveloped countries are the main cause of helminth infections (PRADO, 2001; GROSS, 2016 HORACIO, 2005).

Parasitic infections can trigger changes in the physical, psychosomatic and social state, directly interfering in the quality of life of its patients, especially in children of lower social classes, with poor sanitary conditions, poor hygiene habits, malnutrition and in places such as nurseries, schools, asylums and orphanages, for ease of contamination and dissemination (LIMA, 2013; JUNIOR, 2014; BRASIL, 2015). Given the importance of the verification and prevention of parasitic infections in schoolchildren from 2 to 18 years of age, this study aims to identify the main parasites and indicate preventive methods to health institutions.

MATERIALS AND METHODS

The district of Santo Amaro (Bahia – Brazil), with a population estimated at 61,702 inhabitants (IBGE, 2015) was the place chosen for project intervention. There were few epidemiological data on the occurrence of parasitic diseases in children, absence of basic sanitation, presence of open pit cesspits and water consumption without adequate treatment. Based on IBGE (2015), the following data on hospital morbidities were verified, specifically regarding deaths due to infectious and parasitic diseases in the last 6 years in the city of Santo Amaro - Bahia (Table 1).

Table 1. Hospital morbidities due to infectious and parasitic diseases in Santo Amaro – Bahia

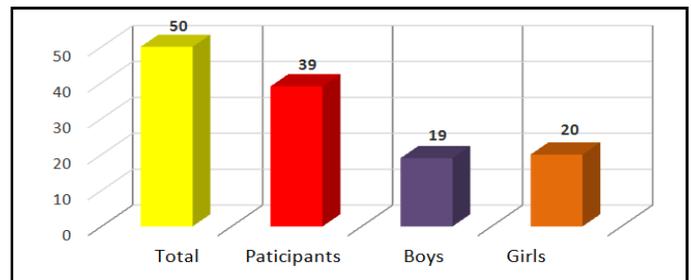
Period	Population	Female	Male	Population	Total Deaths
2014		4	8		12
2013		10	9		19
2012		1	1		2
2011		Uninformed	2		2
2010		1	0		1

Source: Brazilian Institute of Statistical Geography

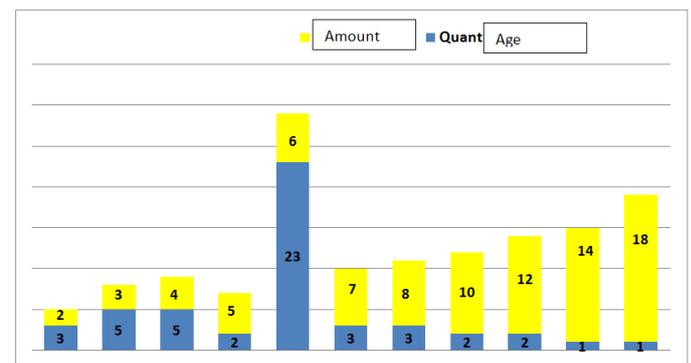
The study was conducted between March and September 2017, with the target audience being the children and adolescents of Oliveira dos Campinhos Municipal School, aged between 02 and 18 years. Children between the ages of 2 and 6 stay in school full time and only one shift. This locality does not have piped water, most uses river water and does not have regular trash collection. Some houses do not have a bathroom. The presence of an individual with *Shistosoma mansoni* is noteworthy. The family reports other cases identified more than six months in other family members. This study contemplated the universe of 50 participants. All subjects completed the Individual Student Questionnaire (ISQ), which aims to verify the factors associated with the occurrence of parasitosis through closed questions about the hygiene habits, the origin of the water consumed, the feces' destination, the periodicity of the tests, the identification of the worms and the treatment done. 150 sterile collectors were distributed to collect three stool samples from each student. The forms, techniques and care required for collection were explained, in addition to the deadline for delivery of the material. The fecal samples were delivered to the Santa Casa de Misericórdia de Oliveira dos Campinhos laboratory, where they were processed and analyzed. The parasitological technique used was the method of Spontaneous Sedimentation, known as the method of Lutz or Hoffman, Pons & Janer, which consists of detecting the presence of eggs and larvae of helminths and cysts of protozoa, using microscopic visualization. This technique is the one used by the laboratory because it shows itself to be more in financial account.

RESULTS

From the ISQ it was identified that only 56% of the individuals have piped water. 76% state that the water supplying their home comes from a cistern and 24% use water directly from the river. The main river that supplies the city is a tributary of the River Subaé. The water is untreated, has a strong odor and sometimes a muddy color. Regarding faeces disposal, 92% use septic tanks built in the external area of the house, 6% claim that they do not have a domestic well and that they despise their fecal waste in areas close to the residence and 2% claimed to be unaware of the destination of their sanitary system. It was evidenced that hand washing habit, mainly after the use of the toilet, is not a habitual practice, since 16% of the participants stated they do not do it. Regarding agriculture, 18% cultivate for commercialization and 24% for subsistence. The irrigation system is made with water from the cistern or directly from the river. All children have direct contact as soil and attend, at least once a month, places near rivers or bathe in the waters of it. Performing exams such as stool parasitology is neglected by the study population. 52% of the children and adolescents studied and 64% of those responsible had been parasitological for more than 1 year, and 80.77% and 40.62%, respectively, had some parasitosis.

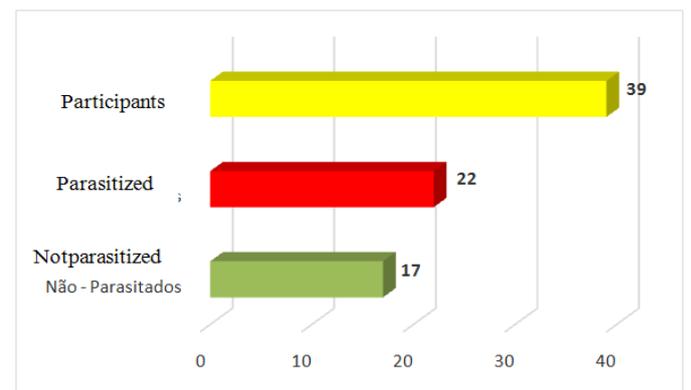


Graph 1. Total number of participants
Period: March to September / 2017



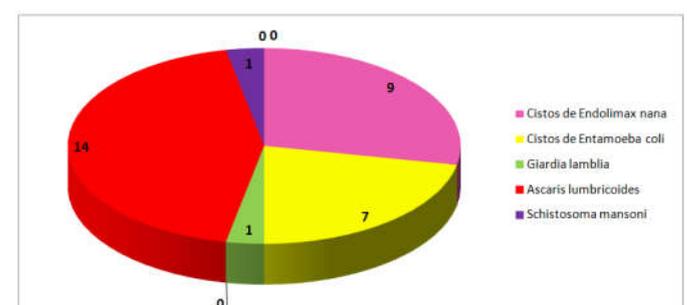
Source: Own elaboration

Graph 2. Age of participants
Period: March to September / 2017



Source: Own elaboration

Graph 3. Total participants
Period: March to September / 2017



Source: Own elaboration

Graph 4. Prevalence of parasites
Period: March to September / 2017

Many cases have not received adequate clinical treatment. It was also found that the adult family members, after performing tests with positive samples, did not carry out adequate treatment. Total of 39 individuals delivered the material to the laboratory as scheduled.

**Table 2. Total participants and parasites identified by geographical area
Period: March to September 2017**

Locality	Total resident	<i>Giardia</i>	<i>Ascaris</i>	<i>Schistosoma</i>	<i>E. coli</i>	<i>E. nana</i>	Negative sample
Farm Aurora	01	01					
Santa Monica Farm	05		03		01	01	01
Retiro Farm	01		01		01	01	
Allotment Home Sweet Home	01				01	01	
Allotment Maria Martins	02		01				01
Marape Set	06		04				02
Center	09		01			01	03
Tanque Senzala	01					01	
São Francisco Village	15		03	01	04	04	09

Source: Own elaboration

Of these participants, 19 were male and 20 were female (Graph 1) and aged between 02 and 18 years (Graph 2). The total prevalence of intestinal parasitoses found in this study was 57% (22 individuals) as shown in Graph 3. Of these, 18% were identified as biparasites and 14% were individuals with polyps. Two species of helminths were diagnosed: *Ascaris lumbricoides* (64%) and *Schistosoma mansoni* (4.55%), a pathogenic protozoan species: *Giardia lamblia* (4.55%) and two commensal species: *Endolimax nana* (41%) and *Entamoeba coli* (31.82%) (Graph 4). Regarding the area of residence of the participants, Table 2 shows the incidence of parasitosis in each locality and the number of residents, participants of this research. The town with the highest incidence and prevalence of parasitosis was Vila São Francisco. Analyzing the information of the inhabitants of this locality from the ISQ children and adults who underwent stool parasitology previously and claim to have been treated with Mebendazole, in this study they show with verminousness.

DISCUSSION

This investigative process made it possible to structure the understanding of the main parasites affecting children of school age in the district of Santo Amaro (Bahia - Brazil). The final report of the Program of the Federal University of Bahia: Sub-Project Environment in the Local Context - Oliveira dos Campinhos (UFBA, 2015), after analyzing the applied questionnaires, reported that the piped water is more used by residents to clean the house and wash clothes, due to the quality of it. The water comes from a spring of the Subaé River (BAHIA, 2015) and presents bad smell and muddy appearance. Households to run the sanitary facilities use rudimentary pits and seek to obey the safe distance of the cisterns (ABNT, 2016). The most common types of diseases in children are: asthma, diarrhea, influenza, malnutrition and verminousness, due to the precariousness of basic sanitation, which directly interfere with the quality of life of the population (VIANA, 2008). It was noticed that in the evaluated period the most frequent diseases were the verminoses, intestinal infection due to the use of the untreated waters and absence in many houses of sewage. The present study, 16 years after the above mentioned, being the second study of this nature in that region, shows an alarming situation: of the 22 parasitized individuals of the universe of 32, taking into account the limitations of the technique used in the identification of the parasites and the possible, it is considered a very high rate of enteroparasitosis. From this study it was possible to perceive the importance of projects that identify early parasitic diseases that interfere directly with the health of individuals, especially children, in order to give due treatment. The most common parasite in the studied population was *Ascaris Lumbricoide* with 14 cases

(64%) followed by *Endolimax xnaina* with 09 cases (41%), *Entamoeba coli* with 07 cases (31.82%) and finally *Giardia lamblia* and *Schistosoma mamansoni* (4.55%) 01 case each. These indexes are in agreement with similar works of other authors in the Northeast region of the country, described by LIMA *et al.* (LIMA, 2013) and MAIA *et al.* (MAIA, 2016). This prevalence in the region is associated, among other factors, with precarious health system conditions, lack of access to drinking water and low levels of education, culminating in poor access to information on hygiene care. It was noticed that one of the main difficulties experienced by the population of Santo Amaro is the lack of basic sanitation and the need to consume untreated water to provide their survival, which makes water one of the main vectors of contamination. It was evidenced that there is a great lack of information in the sense of prevention and basic health care in relation to parasitic infestations and damage. Thus, the whole effort to understand the proposed theme through the bibliographic review and project execution in the school community must be undertaken and there is still little to understand the complexity of the problems that affect the subjects in this peculiar phase of development.

Conclusions

In this way, it can be concluded that children suffer more than adults with poor hygiene and basic sanitation. The lack of medical care and the poverty of the population increased the cases of parasitosis without treatment. Public health measures should be taken to improve the education, health and housing of the population of Santo Amaro.

Acknowledgment: We thank the municipality of Santo Amaro for hosting the Maurício de Nassau Faculty and the Federal University of Bahia for the scientific support and the others involved.

REFERENCES

- Associação Brasileira de Normas Técnicas (ABNT). Projeto NBR 7229/1992 CB-02 - Comitê Brasileiro de Construção Civil CE-02:009.07 - Comissão de Estudo de Instalação Predial de Fossas Sépticas. Rio de Janeiro, 1992. Disponível em: http://www.acquasana.com.br/legislacao/nbr_7229.pdf Acesso em 13/06/2016.
- Belo, Vinicius Silva, OLIVEIRA, Robson Bruniera, Fernandes, Priscila Correia, Nascimento, Bruno Warllley L., Fernandes, Fabio Vitorino, Castro, Cassia Luana F., Santos, Wanderson Bassoli dos, Silva, Eduardo Sérgio. Fatores associados à ocorrência de parasitoses intestinais

- em uma população de crianças e adolescentes. Ver Paul Pediatr 2012; 30(2): 195-201.
- BRASIL. Decreto Nº 6.286, de 5 de dezembro de 2007, o Programa Saúde na Escola – PSE. Disponível em http://portal.mec.gov.br/index.php?option=com_docman&view=download&alias=1726-saudenaescola-decreto6286-pdf&category_slug=documentos-pdf&Itemid=30192 Acesso em 14/06/2016.
- Brasil. Lei Federal Nº 9.394, de 20 de dezembro de 1996. Lei de Diretrizes e Bases (LDB). Disponível em http://www.planalto.gov.br/ccivil_03/Leis/L9394.htm. Acesso em 14/06/2016.
- Brasil. Lei nº 11.445 de 5 de janeiro de 2007 que estabelece as diretrizes nacionais para o saneamento básico. Disponível em: http://www.planalto.gov.br/ccivil_03/_ato2007-2010/2007/lei/11445.htm Acesso em 05/11/2015.
- Cimerman, Benjamin. Cimerman, Sérgio. Parasitologia humana e seus fundamentos gerais. São Paulo: Editora Atheneu, 2ª edição, 2010.
- Estudo de uso e ocupação da terra da Bacia Hidrográfica do Rio Subaé – Estado da Bahia Disponível em http://www.cartografia.org.br/cbc/trabalhos/3/463/CT03-25_1403891286.pdf Acesso em 06/11/2015.
- Gross, Alisson André; Silva, Gabriela Kniphoff. Incidência de enteroparasitos intestinais em uma escola infantil pública e uma escola infantil comunitária, em um município no interior do Rio Grande do Sul. Revista Destaques Acadêmicos, Lajeado, v. 8, n.3, p.50-57, 2016.
- Instituto Brasileiro de Geografia e Estatística (IBGE). Disponível em: <http://cidades.ibge.gov.br/painel/historico.php?lang=&codmun=292860&search=bahia|santo-amaro|infograficos:-historico> Acesso em 05/11/2015.
- JUNIOR, Israel de Oliveira; COSTA, Diego Rebouças. Análise de indicadores socioeconômico no território de identidade Recôncavo, Estado da Bahia: o geoprocessamento aplicado ao planejamento territorial. Anais do Simpósio Regional de Geoprocessamento e Sensoriamento Remoto - GEONORDESTE 2014 Aracaju, Brasil, 18-21 novembro 2014
- LIMA, Dayse da Silva, Mendonça, Roberta Alves, Dantas, Fernanda Carmem Mendonça, Brandão José Odnilson de Calas, Medeiros, Caroline Sanuzi Quirino. Parasitoses intestinais infantis no nordeste brasileiro: uma revisão integrativa da literatura. Cadernos de Graduação – Ciências Biológicas e da Saúde Facípe, Recife, v. 1, n.2, p. 71-80, novembro 2013.
- Maia, Carlos Vangerre de Almeida, HassumIzabella Cabral. Parasitoses intestinais e aspectos socio-sanitários no Nordeste brasileiro no século XXI: uma revisão de literatura. Revista Brasileira de Geografia Médica e da Saúde, Hygeia 12 (23): 20 – 30, dezembro de 2016.
- Neves, David P. Parasitologia humana. São Paulo: Editora Atheneu, 12ª edição, 2011.
- Pacheco, Flávia Thamiris Figueiredo; SILVA, Renata Kelly Novais Rodrigues; MENDES, Ana Verena Almeida; RIBEIRO, Tereza Cristina Medrado; SOARES, Neci Matos; TEIXEIRA, Marcia Cristina Aquino. Infecção por *Giardiaduodenalis* e outros enteroparasitoses em crianças com câncer e crianças de creche em Salvador, Bahia. Revista de Ciências Médicas e Biológicas, Salvador, v. 13, n. 3 – especial, p. 280 – 286, set. – dez., 2014
- Prado, Matildes et. al. Prevalência e intensidade da infecção por parasitas intestinais em crianças na idade escolar na Cidade de Salvador, 2001. Disponível em: http://www.scielo.br/scielo.php?script=sci_pdf&pid=S0037-86822001000100016&lng=en&nrm=iso&tlng=pt Acesso em 05/11/2015.
- Relatório final do Programa UFBA em Campo III – Sub-Projeto Meio Ambiente no Contexto Local – Oliveira dos Campinhos (2001), Realizado pelo Projeto Estudo Ambiental da Bacia do Rio Subaé, do Departamento de Geografia do Instituto de Geociências, desenvolvido no Laboratório de Cartografia – LACAR. Disponível em http://www.subaegeo.ufba.br/pdf/Ambiente_contexto%20local.pdf Acesso em 05/11/2015.
- Revista da Sociedade Brasileira de Medicina Tropical 38(5). TELES. Horacio M. S. Distribuição geográfica das espécies dos caramujos transmissores de *Schistosoma mansoni* no Estado de São Paulo. Set-out, 2005. Disponível em: <http://www.scielo.br/pdf/rsbmt/v38n5/a13v38n5> Acesso em 02/08/2016.
- Viana, S. G. F. Giardíase. IN: Amato Neto, Vicente (et al). Parasitologia Clínica. Rio de Janeiro: Elsevier, 2008.
