

PARASITOLOGY IN THE ENVIRONMENT OF A PUBLIC SCHOOL IN UBERLÂNDIA CITY – MINAS GERIAS

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ABSTRACT

Based on the high prevalence of enteroparasitosis and the possibility of contamination of the school environment, this study was to investigate the possibility of contamination of the school environment by intestinal parasites in different places inside one municipal school of Uberlândia, MG, using a transparent tape. The knowledge on basic parasitology was also assessed using a questionnaire responded by 143 students attending the 7th grade of a middle school. The samples were collected in the months of June and September of 2008 and totaled 60 elements. Out of 30 analyzed samples, one (3.3%) and three (10.0%) from the first and second collection months respectively, were positive for intestinal parasites. The analysis of the questionnaires allowed the verification of contextualization flaws on the part of the students about the parasitological theme, emphasizing the importance of further research involving the school environment.

KEYWORDS

School environment; Parasites; Parasitology; Students.

Introduction

The high prevalence of intestinal parasitic infections reflects a deficiency of basic sanitation, hygienic culture and the existence of favorable natural ecological factors. Education on health issues is one of the key points to combat infectious or contagious diseases (GIATTI et al., 2004). In the region of Uberlândia studies on intestinal parasitosis were carried out (CARVALHO et al., 2002). Several potential sources of endoparasitosis infection have been identified, among which are the food handlers, water, consumed vegetables and the toilets. In this context, the school environment can be an important potential focus for the dispersion of intestinal parasites, especially when hygiene habits are not well developed (AIDAR-SOBRINHO et al., 1995; REZENDE, COSTA-CRUZ e GENNARI-CARDOSO, 1997; COELHO et al., 1999; COELHO et al., 2001; NOLLA e CANTOS, 2005; BORGES, COSTA-CRUZ e PAULA, 2009).

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The objective of the present study was to investigate the possible contamination of the school environment with intestinal parasites and to evaluate the specific knowledge about endoparasites by public school students in the municipality of Uberlândia, MG.

Material and Methods

This study was conducted in a public school in the central region of the municipality of Uberlândia, Minas Gerais, in the period between June and September of 2008.

In order to evaluate the levels of contamination in the school environment, two sample collections were executed, one in June (first collection) and another in September (second collection) of 2008 in the following sites within the school building: lunch room, toilets, playground and water fountain. In each sample collection 30 slides were obtained, totaling 60 analyzed slides. The school environment was divided into elements. The lunchroom was divided into 10 elements (freezer door, basket of vegetables, stove, sink, cups, bench, microwave, door knob, water filter and refrigerator door). The male and female toilets were divided into four elements (bowl, flushing knob, door knob and tap), where the toilet bowl was subdivided into four quadrants (right and left sides, front and back parts) totaling 7 elements in each restroom (male and female). One element was analyzed in the water fountain, the tap. The school playground was divided into three elements (tables, benches and public telephone) where the telephone was subdivided into three parts (internal, keyboard and handset) totaling 5 elements. The samples were collected using a transparent adhesive tape (Durex type) (GRAHAM, 1941). The slides were properly identified, stored and transported to the Laboratory of Parasitology of the Institute of Biomedical Sciences of the Federal University of Uberlândia. The slides were analyzed by two examiners in an optical microscope (Olympus, CH-2, Japan) under 100 and 400 X magnification.

A questionnaire containing 5 questions covering aspects of the etiology, biology, methods of transmission and control of parasitic infections was developed and used to evaluate the knowledge on parasitology. The questionnaire was applied to the students of the 7th grade in this middle school since issues related to parasitic infections are taught during the science classes in this grade. The criteria for the evaluation of the answers were based on the concepts (COURA, 2005).

The statistical analysis of the data was carried out by the binomial proportions test. The results were considered significant when the value of $p < 0.05$. The final obtained data were released to the teachers, students and the school's cleaning staff through an interactive lecture with the whole school community.

Results and Discussion

Out of the 30 analyzed samples, one (3.3%) and three (10.0%) were positive for intestinal parasites in first and second sample collection, respectively (Table 1). However there was no significant statistical difference in the positivity between the two collections ($p < 0.05$). Similarly as observed by Dias et al., (2010) there was a difference in the positivity for enteroparasites in fecal samples during different collection times.

In the first collection, an egg of *Ascaris lumbricoides* was found in the flushing knob element of the women's toilet, however this egg did not present a conserved external

morphology. In the second collection, helminth eggs were found with well-preserved morphology; two eggs of *Enterobius vermicularis*, one in the toilet bowl element (right side) of the women's toilet and the other in vegetable basket element of the lunchroom; one egg of *A. lumbricoides* in the freezer element in the lunchroom. The finding of helminth eggs in the school environment can indicate the possibility of transmission of enteroparasites mainly in environments with public restrooms, such as schools and day-care centers (AIDAR-SOBRINHO et al., 1995; COELHO et al., 1999; BORGES, COSTA-CRUZ e PAULA, 2009; GIROTTO et al., 2013). The fact that helminth eggs were found in the lunchroom strengthens the possibility of the food handlers being the sources of transmission of intestinal parasitic infections especially in schools (REZENDE et al., 1997).

Table 1: Positivity of samples from two sample collections in different places within a public school in the municipality of Uberlândia, MG, 2008.

Places	1 st collection *		2 nd collection *	
	N	+ / %	N	+ / %
Lunchroom	10	0 / 0	10	2 / 6.7
Water fountain	1	0 / 0	1	0 / 0
Toilet	14	1 / 3.3	14	1 / 3.3
Playground	5	0 / 0	5	0 / 0
Total	30	1 / 3.3	30	3 / 10.0

N: Number of elements analyzed at each place; +: Positivity, %: Percentage of positive, *: Binomial Test (p = 0.2932)

Source: The authors

Of the 150 students enrolled in the 7th grade of the middle school, 143 students within the age range from 11 to 13 years old responded to the questionnaire (Table 2). Although 88.6% stated already having heard about parasites, there was great confusion in the conceptualization. Such distortions were common among students of public middle schools in the city of Rio Claro, São Paulo (UEMURA e CARVALHO, 1989). This probably occurs because the students embody a popular concept of the word parasite, aspects of the scientific conceptualization received in school, when usually the correlation with injury to another organism is not made (UEMURA e CARVALHO, 1989).

Knowing that the epidemiology of parasites is the result of the interdependency of socio-economical, cultural, environmental and parasite biological factors, the parasites can be found in various locations. The students mentioned a diversity of environments (Table 2) indicating that they have a reasonably correct knowledge on aspects of the

biology of parasites, corroborating with data the others studies (MELLO et al., 1988). Human feces are the main source for the dissemination of intestinal parasites and in 12.3% of the students answers (Table 2) man was identified as a source of enteroparasite infection (PEDRAZZANI et al., 1990; SIQUEIRA e FIORINI, 1999). In addition, 20.2% of the students cited animals or insects as a source of parasitic infection (Table 2), stressing that areas of constant stream of children, such as parks, squares and school playgrounds may constitute transmission routes for various parasitic zoonoses (NUNES et al., 2000).

The parasites as responsible for allergies, tick-borne diseases, amebiasis, Chagas disease and worms, were mentioned by 13.1% of the students. Nonetheless, considering the parasitic diseases such as those that are caused by any etiological agent, it was possible to verify that 40.9% of the student answers are in accordance with this understanding. Similar results were obtained in a study with students from the 6th grade of a middle school (UEMURA e CARVALHO, 1989).

The preventive measures for intestinal parasitosis cited by the students revealed a concern about hygiene habits and the care about food and water quality, animals and trash, which are all important factors in the epidemiology of parasitic diseases. Attention to the personal hygienic measures as important prophylactic behavior against intestinal parasitic infections (UEMURA e CARVALHO, 1989; FERREIRA e MARÇAL JR, 1997; SIQUEIRA e FIORINI, 1999).

Table 2: Answers to the questionnaire applied to 143 students in a public school in the municipality of Uberlândia, MG, 2008

Questions	Answers	N / %
"Have you ever heard about parasites?"	Arthropods/animals	186/ 63.9
Which? "	Microorganisms/parasites	72/ 24.7
	Other	17/ 5.8
	Plants	1/ 0.3
	Do not know or did not answer	15 /5.1
	"Where can these parasites be found?"	Nature/air/soil
	Animals/insects	56/ 20.2
	Water and food	36/ 13.0
	Places/objects	35/ 12.6
	Man	34/ 12.3
	Other	25 / 9.0
	School/Home	17 /6.1
	Do not know or did not respond	6 /2.2
	Inside the school	69/ 30.8
	Plants/air	45/ 20.1

	Garbage	24/ 10.7
	Man	23/ 10.3
	Other	21/ 9.4
"Do you think that some parasites can be found in the school environment? Where? "	Objects	18/ 8.0
	Animals and insects	8/ 3.6
	Water and food	7/ 3.1
	Home	1/ 0.4
	Do not know or did not respond	8/3.6
"Can these parasites cause any disease? Which?"	Dengue/viral related	31/ 19.5
	Symptoms/allergy	29/ 18.2
	Mycoses	13/ 8.2
	Other	13/ 8.2
	Tick-borne diseases	7/ 4.4
	Amebiasis	4/ 2.5
	Chagas disease	3/ 1.9
	Worms	2/ 1.2
	Do not know or did not respond	57 /35.8
"What can be done to eliminate these parasites?"	Treatment/Medical treatment	61/ 33.0

Hygiene	51/ 27.6
Care with water/animals/ garbage	29/ 15.7
Other	11/ 6.0
Food	1/ 0.5
Do not know or did not respond	32 /17.3

N: Number of answers given by 143 students; %: Percentage of answers in relation to the total number of affirmative answers given by the students by applied question.

Source: The authors

Conclusion

This study strengthens the possibility of contamination of the school environment by intestinal parasites in addition to demonstrate flaws in the contextualization of the subject of parasitology in the school. This study underscores the importance of further research involving the school, mainly within the public health theme and particularly aiming at changing the behavior throughout the context of the school environment and thus reducing the transmission of parasitic diseases.

RESUMO

Baseando-se na alta prevalência das enteroparasitoses e na possibilidade da contaminação do ambiente escolar, este trabalho teve como objetivo investigar a possibilidade de contaminação do ambiente escolar por parasitas intestinais em diferentes locais dentro da escola, utilizando uma fita adesiva transparente. Além de sondar os conhecimentos na área de parasitologia de 143 alunos do 7º ano do ensino fundamental, de uma escola municipal de Uberlândia, MG, utilizando um questionário. Foram obtidos 60 elementos, em duas coletas efetuadas nos meses de junho e de setembro, 2008. Das 30 amostras analisadas, uma (3,3%) e três (10,0%) foram positivas para parasitas intestinais, na primeira e na segunda coleta, respectivamente. A análise dos questionários permitiu verificar a confusão na contextualização que os alunos fazem dentro do tema parasitologia.

PALAVRAS-CHAVE

Ambiente escolar; Parasitas; Parasitologia; Alunos.

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