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What Adolescents Know About Intestinal Parasitic Infections: Contributions to the Promotion of Health in High School

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Abstract

Objective: The present study was carried out to identify perceptions and knowledge on the major intestinal parasites that affect adolescents (ascariasis, giardiasis and trichuriasis), and to assess their knowledge about the modes of transmission, prevention and the main vehicles of information used by these adolescents to obtain knowledge about these parasites.

Methods: For data collection, an investigative questionnaire was applied to high-school students, which sought to evaluate the level of their knowledge about the parasites mentioned, ways of transmission, preventive measures and the sources of information to obtain such knowledge.

Results: A population of 160 high-school students from technical courses of a federal education institute in Urutaí (Goiás State – Brazil) participated in the study. The analysis showed that, in general, adolescents are unaware or have little knowledge about the parasites investigated. Low levels of knowledge about modes of transmission and preventive measures were attested. Regarding sources of the information, the contents dealt with by teachers throughout life and cases experienced and socialized in the family, among relatives and/or friends were the most cited.

Conclusion: The study suggests the need to develop educational activities that promote, among students, the acquisition of knowledge to promote their own health.

Keywords: Public health; Health education; Students; Parasitic diseases

Introduction

The intestinal parasitic infections are the most frequently pathologies found in humans, and it is an important public health issue [1]. In Brazil, a multicenter study carried out with 7 to 14 years-old students and covering 10 Brazilian states showed that 55.3% of the students were diagnosed with some type of parasitosis. Ascariasis, trichuriasis and giardiasis were the most homogeneously distributed diseases, confirming that the intestinal parasitic infections are still very disseminated and with high prevalence in our country [2].

Regarding parasitic diseases in children and adolescents, some studies have been published [3-5]. These studies, in general, confirm the trend observed by Rocha et al. [2] and show that ascariasis, trichuriasis and giardiasis are still very prevalent among the adolescents.

In this sense, knowledge and basic notions on parasitic diseases have become essential when it comes to public health. These notions must be assimilated during the learning phase, in which the child and/or adolescent is learning how to treat his body and health, once these diseases, mainly the parasitic one, besides promoting greater vulnerability to other diseases can cause malnutrition, anemia and also influence school performance [6].

There are only a few studies that emphasize knowledge and notions about intestinal parasitic infections among adolescents, those from Lima et al. [7] and Moreira et al. [8] being the most recent studies on knowledge and prevention of zoonoses, and Malafaia et al. [9], in which the knowledge on intestinal diseases responsible for the high number of hospitalization in the Urutaí municipality (Goiás State, Brazil) was assessed among teachers. Thus, more studies on the knowledge and/or perceptions on these diseases are necessary, mainly considering that investigations of this nature can back up the implementation of actions/activities in favor of public health and promotion of health.

In this sense, the present study assessed perceptions and knowledge on the main intestinal parasitic infections (ascariasis, giardiasis and trichuriasis) among adolescents from the Instituto Federal Goiano (IF Goiano) –Urutaí Campus, as well as their knowledge about forms of transmission, prevention and the main means of information used by these adolescents to know more about these parasites.

Material and Methods

Target population and data collection instrument

The present study was carried out with high school students from technical courses of the IF Goiano – Urutaí Campus, located in the southeastern region of Goiás State, Brazil. The population included first-, second- and third-year students of the Agriculture, Information Technology and Management technical courses.

For data collecting, a questionnaire was elaborated based on Malafaia et al. [9], composed of discursive and multiple-choice questions. The aim of the questionnaire was to identify students' knowledge about the form of transmission and prevention of ascariasis, giardiasis and trichuriasis and which media are used to obtain such information. The questionnaire also included some questions about the participants' profiles.

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To determine the number of students participating in the research, the number of students of all classes of the IF Goiano technical courses (Agriculture: n=278, Information Technology: n=139 and Management: n=39) and the psychometric criteria were taken into consideration at the time of the study. The psychometric criteria are used for attitude scaling and are aimed to the identification of the number of respondents necessary to generate a saturation degree of the phenomenon or measured characteristic, that is, when the data captured by the research instrument start to repeat themselves or when their variability reduce significantly [10]. The saturation process starts when the amount of items of a questionnaire is multiplied by a scale that varies from 6 (minimum) to 10 (optimum). For the present research, the criterion 10 was used multiplied by the number of questions in the questionnaire (n=8), predicting the necessity of interviewing a total of 80 students.

However, considering that there are 16 classes in the technical courses and a total of 388 students, we decided to randomly invite 10 students of each class, totalizing 160 participants in the research. This number corresponds to 41.2% of the total population of students from the high school-level technical courses in 2013.

The evaluation instrument was applied collectively in the classroom, having the collaboration of a leading teacher. It is worth mentioning that no previous intervening action was taken for the application of the questionnaire, so that the data obtained would reflect the actual knowledge of each student on the researched aspects.

Data analysis

For the analysis of the content of the discursive responses, spreadsheets were used to categorize them by similarity, according to correct forms of transmission and prophylactic measures against the diseases [11]. The analysis of the responses was carried out according to the counting method by incidence of certain responses, being presented the occurrence frequency in which the same response was observed.

Ethical Issues

Considering that this study involved humans directly, all the ethical recommendations found in Resolution n. 466, dated 12th December, 2012, and established by the National Health Council (Conselho Nacional de Saúde – CNS) of the Ministry of Health [12] were followed. The research project that led to this study was approved by the IF Goiano Committee for Ethics in Research (Comitê de Ética em Pesquisa – CEP) by means of the substantiated report n. 019/2013.

Results and Discussion

From the total of students participating in the study, 50% (n=80) belonged to the Agriculture technical course, 31.3% (n=50) to the Information Technology technical course, and 18.7% (n=30) belonged to the Management technical course. The majority (66.9%) were male adolescents (n=107). The ages ranged from 13 to 21 years, 53.1% (n=85) being from 15 to 16 years-old and the other 20.6% (n=33) 17 years-old; 8.8% (n=14) did not answer this question.

Initially, the identification of a general knowledge on the intestinal parasitic infections was assessed among the students. Regarding ascariasis, it was observed that the majority marked the option "no knowledge" (32.0%) or "very little knowledge" (38.1%) (Table 1). When knowledge was assessed by year, it was observed that the number of students who knew about the disease, despite representing a low percentage, was greater among the second-year classes. The second year of the Information Technology technical course stands out as the one presenting the highest percentage of "little knowledge" (70.0%) (Table 1). Such results can be related to the fact that these pathologies are normally dealt with in second-year of high school.

Regarding giardiasis, the majority of the students signaled having "no knowledge" (68.4%) of such parasitic infection. The third year of the Agriculture technical course presented the highest percentage for "no knowledge" (90.0%), whereas the third year of the Information Technology technical course presented the lowest percentage (50.0%) for the same classification among the third-year classes. These results

Classification	Agriculture technical course (%)			Information Technology technical course (%)			Management technical course (%)			Subtotal (%)			Total (%)
Ascariasis	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd	
Good knowledge	0.0	5.0	0.0	5.0	10.0	0.0	0.0	0.0	10.0	1.4	5.0	2.0	2.8
Very little knowledge	20.0	20.0	20.0	20.0	10.0	30.0	20.0	20.0	20.0	20.0	17.5	24.0	20.5
Little knowledge	10.0	65.0	15.0	35.0	70.0	60.0	50.0	30.0	20.0	22.9	57.5	34.0	38.1
No knowledge	60.0	10.0	55.0	30.0	10.0	5.0	30.0	30.0	50.0	47.1	15.0	34.0	32.0
Does not know the answer	7.5	0.0	5.0	0.0	0.0	5.0	0.0	20.0	0.0	4.3	5.0	4.0	4.4
Did not answer	2.5	0.0	5.0	10.0	0.0	0.0	0.0	0.0	0.0	4.3	0.0	2.0	2.1
Giardiasis													
Good knowledge	2.5	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	2.5	0.0	1.3
Very little knowledge	5.0	15.0	0.0	10.0	0.0	25.0	20.0	20.0	0.0	8.6	12.5	10.0	10.4
Little knowledge	0.0	5.0	5.0	5.0	10.0	5.0	10.0	0.0	20.0	2.9	5.0	8.0	5.3
No knowledge	82.5	65.0	90.0	65.0	50.0	50.0	70.0	50.0	80.0	75.7	57.5	72.0	68.4
Does not know the answer	5.0	5.0	5.0	15.0	30.0	15.0	0.0	30.0	0.0	7.1	17.5	8.0	10.9
Did not answer	5.0	5.0	0.0	5.0	10.0	5.0	0.0	0.0	0.0	4.3	5.0	2.0	3.8
Trichuriasis													
Good knowledge	2.5	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	2.5	0.0	1.3
Very little knowledge	7.5	10.0	0.0	10.0	0.0	20.0	0.0	0.0	20.0	7.1	5.0	12.0	8.0
Little knowledge	2.5	5.0	5.0	0.0	10.0	5.0	0.0	0.0	0.0	1.4	5.0	4.0	3.5
No knowledge	80.0	70.0	85.0	65.0	70.0	50.0	90.0	70.0	70.0	77.1	70.0	68.0	71.7
Does not know the answer	5.0	5.0	5.0	15.0	10.0	20.0	10.0	30.0	10.0	8.6	12.5	12.0	11.0
Did not answer	2.5	5.0	5.0	5.0	10.0	5.0	0.0	0.0	0.0	4.3	5.0	4.0	4.4

Table 1: Knowledge on ascariasis, giardiasis and trichuriasis among high school students of the technical courses of the IF Goiano – Urutaí Campus. Urutaí, 2013.

were equivalent to those corresponding to the second-year of the Information Technology and Management technical courses (Table 1).

Regarding trichuriasis, the results were similar to those found for giardiasis, once the majority of the students marked the option "no knowledge" as response (71.7%). The highest percentage for this classification corresponded to the first-year of the Management technical course, with 90.0% (Table 1). Only the first- and second-year classes of the Agriculture technical course marked the option "good knowledge", representing 2.5% and 5.0% respectively.

Due to the large quantity of syllabuses to be dealt with in schools, many of these parasitic diseases are superficially approached or even unnoticed. Such intestinal diseases are as important as any other disease that is not diagnosed or treated early. Therefore the knowledge about forms of transmission and prevention becomes essential when it comes to public health. In IF Goiano, regarding the diseases investigated, only ascariasis was dealt with in the classroom, in second-year classes of the Agriculture and Information Technology technical courses. It is understood that none of the three diseases were dealt with in the second-year of the Management technical course.

This fact can be the explanation for the percentages presented by the students of that class. The values found for ascariasis point to a lower percentage for the answer option "little knowledge" and a higher percentage for "no knowledge" (Table 1). Regarding giardiasis, the same happens for "little knowledge" and equals or gets closer to the data found for the other second years for "no knowledge" (Table 1). When it comes to trichuriasis, despite all second years keeping the same percentage for "no knowledge", the second-year of the Agriculture and Information Technology technical courses chose other classifications, whereas the second-year of the Management technical course only indicated the classifications "no knowledge" and "does not know the answer" (Table 1). This demonstrates a deficit in knowledge on parasites in relation to other second-year classes, which can cause problems to these students for not knowing the disease.

Therefore, it is relevant to perform educational activities such as lectures and/or playful activities in order to provide information on intestinal diseases, once such measures can strongly contribute to the control/prevention on a local and/or regional level [9].

Another important point is the knowledge about the way of parasitic disease transmission. Malafaia et al. [9] stress out that the understanding of the contagion cycle of a certain disease helps to establish the prophylactic attitudes favorable to the combat of the parasitic infection, such as basic care for personal and domestic hygiene, and also for food, water and the environment.

Having these aspects in mind, the knowledge on the mode of ascariasis, giardiasis and trichuriasis transmission was evaluated. As observed in (Table 2), almost half of the participants (49.0%) did not know how to answer this question. Regarding ascariasis, the most frequent answer by the students was "ingestion of food contaminated with eggs" (38.7%), which was considered a correct, according to Neves et al. (2011). As example of category mentioned by the adolescents taken as incorrect was "walk barefoot", pointed by some first-year students from the Management technical course (10.0%) and second-year students from the Agriculture technical course (15.0%). Regarding the other classifications, only second-year students did not mention "ingestion of eggs present under nails or in the hands". However, second-year students presented, in general, better results regarding their knowledge about ascariasis transmission dynamics, besides presenting the lowest number of students who did not know how to answer such question (30.0%) (Table 2).

Regarding the knowledge about modes of giardiasis transmission caused by *Giardia lamblia*, the great majority, as already stressed out, did not know how to answer the question (88.5%), similarly to the results obtained by Malafaia et al. [9], who verified that the majority of the participants also attested that they knew nothing about the disease. The highest percentage of students who marked "ingestion of food contaminated by cysts" (30.0%) was from the Management technical

Classification	Agriculture technical course (%)			Information Technology technical course (%)			Management technical course (%)			Subtotal (%)			Total (%)
Ascariasis	**1st**	**2nd**	**3rd**	**1st**	**2nd**	**3rd**	**1st**	**2nd**	**3rd**	**1st**	**2nd**	**3rd**	
Ingestion of food contaminated with eggs	15.0	65.0	10.0	45.0	70.0	70.0	40.0	20.0	10.0	27.1	55.0	34.0	38.7
Ingestion of water contaminated with eggs	2.5	10.0	0.0	5.0	0.0	10.0	30.0	30.0	0.0	7.1	12.5	4.0	7.9
Ingestion of eggs present under nails or in the hands	0.0	0.0	0.0	15.0	0.0	0.0	10.0	0.0	10.0	5.7	0.0	2.0	2.6
Walk barefoot	0.0	15.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	1.4	7.5	0.0	3.0
Incoherent/incorrect response	5.0	5.0	20.0	45.0	20.0	10.0	10.0	40.0	10.0	17.1	17.5	14.0	16.2
Did not know how to answer	85.0	15.0	70.0	30.0	30.0	25.0	40.0	60.0	80.0	62.9	30.0	54.0	49.0
Giardiasis													
Ingestion of food contaminated with cysts	2.5	0.0	0.0	5.0	0.0	5.0	30.0	10.0	0.0	5.7	2.5	2.0	3.4
Ingestion of water contaminated with cysts	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	2.0	0.7
Ingestion of cysts present under nails or in the hands	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Contact with contaminated animals	0.0	5.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	5.0	0.0	1.7
Incoherent/incorrect response	5.0	25.0	0.0	15.0	0.0	0.0	0.0	0.0	0.0	7.1	12.5	0.0	6.5
Did not know how to answer	95.0	70.0	100.0	80.0	100.0	90.0	70.0	90.0	100.0	87.1	82.5	96.0	88.5
Trichuriasis													
Ingestion of food contaminated with eggs	0.0	0.0	0.0	5.0	0.0	10.0	10.0	0.0	0.0	2.9	0.0	4.0	2.3
Ingestion of water contaminated with eggs	0.0	0.0	0.0	5.0	0.0	5.0	0.0	0.0	0.0	1.4	0.0	2.0	1.1
Contaminated environments without basic sanitation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Contact with contaminated animals	0.0	0.0	0.0	5.0	0.0	0.0	10.0	0.0	0.0	2.9	0.0	0.0	1.0
Incoherent/incorrect response	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	1.7
Did not know how to answer	100.0	90.0	100.0	85.0	100.0	85.0	90.0	100.0	100.0	94.3	95.0	94.0	94.4

*The sum of the percentages for each class, subtotal or total, exceeds 100%, once the same student could have mentioned more than one response classification.

Table 2: Knowledge on forms of ascariasis, giardiasis and trichuriasis transmission among high school students of the technical courses of the IF Goiano – Urutaí Campus. Urutaí, 2013.

course first-year class. Only the Information Technology technical course third-year classes marked "ingestion of water contaminated with cysts", also considered a correct answer, representing only 0.7% of the total of students (Table 2).

Regarding the knowledge on trichuriasis transmission, the values found exceed those found for ascariasis and giardiasis. For trichuriasis, the percentage of students who admitted not knowing how to answer the question reached 94.4% (Table 2). The analysis by classes showed that only the first-year and third-year students of the Information Technology technical course and the first-year students of the Management technical course presented, however few, correct knowledge about trichuriasis transmission, mentioning "ingestion of food contaminated by eggs" and "ingestion of water contaminated with eggs", representing 2.3% and 1.1% respectively (Table 2).

Still on transmission forms, the students signaled incorrect answers for the three intestinal parasitic infections. Chart 1 presents some examples of erroneous citations on the intestinal diseases. In general, the highest percentage of incorrect/incoherent responses corresponded to ascariasis with 16.2% (Table 2).

Studies show that the high prevalence of intestinal parasites in the population can be related to ignorance regarding the forms of parasite transmission, prophylaxis and the basic hygiene principles, involving children and adolescents, as well as their families [4,13,14].

When analyzing the knowledge level regarding preventive and prophylactic forms, the results were similar for giardiasis and trichuriasis. For these diseases, the majority of the students did not know how to answer this question, the percentages being 89.0% for giardiasis and 95.9% for trichuriasis (Table 3). However, ascariasis presented the lowest percentage for this classification (39.9%) and the highest percentage of incorrect and/or incoherent responses (60.0%). Examples of incorrect citations can be observed in Chart 1. Among the classes, the highest number of incorrect responses was observed in the third year of the Information Technology technical course with 105.0%, as more than one student presented more than one prophylactic measure (Table 3).

Among the correct measures of ascariasis prevention and prophylaxis, only the classification "wash hands before touching food" was mentioned by the students. The first-year classes yielded the highest percentage (5.7%). Despite incorrect, classifications such as "cook food well" and "avoid walking barefoot" were in general mostly pointed out by second-year students, being the values equivalent for both classifications (12.5%) (Table 3). Only third-year students of the Management technical course pointed out "patient treatment" (10.0%) as a prophylactic measure.

Regarding giardiasis, a few correct measures were pointed out, such as "basic sanitation" (2.3%) and "personal hygiene" (1.8%) (Table 4). It is worth mentioning that no class from the Agriculture technical course and none of the second-year classes of the other courses indicated some correct form. Moreover, 100.0% of the second-year students from the Information Technology technical course did not know how to answer this question, similarly to the result found for the third year of the Agriculture technical course (Table 3).

Regarding the knowledge about trichuriasis prophylactic measures, the results, as expected in face of the lack of knowledge on transmission forms, were not different for this question when it comes to this parasitic infection. The majority of the participants did not know how to answer the question (95.9%); from those who answered it, 16.2% indicated incorrect measures (Table 3).

There is a prophylactic measure common to all intestinal parasitic infections of our study, the "sanitary education", and it was not mentioned at all by the students. Sanitary education is understood as an educational practice whose objective is the promotion of habits among the population that favor health and avoid diseases. In turn, health education is based on the conception that the individual learns to take care of his own health, which results from multiple factors intervening in the health-disease process, starting from the collective referential of knowledge of his reality [15]. However presenting different conceptions, both terms are used to develop educational actions in Health, being developed by professionals with varied trainings.

Oliveira et al. [16] consider that in Brazil the lack of sanitary education is striking. Political decisions are necessary to reverse this scenario, and the population's awareness regarding the ways in which

Diseases	Examples of incorrect/incoherent responses	
	Mode of transmission	**Prophylactic measures**
Ascariasis	"Contact with excreta from contaminated animals" Information Technology – first year "Walk barefoot" Management – first year "Contact with litter and open sewage" Management – second year "By means of worms and vermin" Agriculture – third year	"Take vaccines and medication" Agriculture – first year "Avoid walking barefoot" Information Technology – first year "Avoid places that promote the disease" Agriculture – second year "Avoid contact with fleas" Agriculture – second year
Giardiasis	"By bacteria" Agriculture – first year "Walk barefoot" Information Technology – first year "Contact with vector insect" Agriculture – second year "Take baths in infected rivers" Agriculture – second year	"Avoid walking barefoot" Information Technology – first year "Fumigation with the elimination of the transmitter" Agriculture – second year "Do not defecate in the open" Management – second year "Work of the health agents" Information Technology – third year
Trichuriasis	"Contact with excreta from contaminated animals" Information Technology – first year "By infection" Agriculture – second year "Bite from the parasite" Agriculture – second year	"avoid excreta from contaminated animals" Information Technology – first year "Be medicated" Management – first year "Eliminate the transmitter" Agriculture – second year

Chart 1: Examples of incorrect responses marked by high school students of the IF Goiano technical courses – Urutaí Campus on modes of transmission and prophylactic measures. Urutaí, 2013.

Classification	Agriculture technical course (%)			Information Technology technical course (%)			Management technical course (%)			Subtotal (%)			Total (%)
Ascariasis	**1st**	**2nd**	**3rd**	**1st**	**2nd**	**3rd**	**1st**	**2nd**	**3rd**	**1st**	**2nd**	**3rd**	
Sanitary education	0.0	0.0	0.0	0.0	0.0	0.0	70.0	0.0	0.0	10.0	0.0	0.0	3.3
Wash hands before touching food	0.0	0.0	5.0	15.0	0.0	5.0	10.0	10.0	0.0	5.7	2.5	4.0	4.1
Food protection against insects	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Treatment of the infected	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	2.0	0.7
Cook food well	5.0	10.0	0.0	20.0	30.0	10.0	0.0	0.0	0.0	8.6	12.5	4.0	8.4
Avoid walking barefoot	0.0	15.0	0.0	5.0	10.0	5.0	10.0	10.0	0.0	2.9	12.5	2.0	5.8
Incoherent/incorrect response	22.5	75.0	30.0	65.0	70.0	105,0	10.0	80.0	40.0	32.9	75.0	62.0	56.6
Did not know how to answer	82.5	10.0	65.0	35.0	30.0	25.0	0.0	0.0	70.0	57.1	12.5	50.0	39.9
Giardiasis													
Protection of food	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Basic sanitation	0.0	0.0	0.0	5.0	0.0	5.0	10.0	0.0	10.0	2.9	0.0	4.0	2.3
Personal hygiene	0.0	0.0	0.0	0.0	0.0	5.0	10.0	0.0	10.0	1.4	0.0	4.0	1.8
Sanitary education	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Treatment of the infected	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incoherent/incorrect response	2.5	20.0	0.0	25.0	0.0	15.0	10.0	40.0	0.0	10.0	20.0	6.0	12.0
Did not know how to answer	97.5	85.0	100.0	70.0	100.0	85.0	70.0	90.0	90.0	85.7	90.0	92.0	89.2
Trichuriasis													
Sanitary education	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wash hands before touching food	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Food protection against insects	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incoherent/incorrect response	2.5	5.0	0.0	10.0	0.0	15.0	10.0	0.0	0.0	40.0	2.5	6.0	16.2
Did not know how to answer	97.5	95.0	100.0	90.0	100.0	90.0	90.0	100.0	100.0	94.3	97.5	96.0	95.9

*The sum of the percentages for each class, subtotal or total, exceeds 100%, once the same student could have mentioned more than one response classification.

Table 3: Ascariasis, giardiasis and trichuriasis prevention measures mentioned by high-school students from the IF Goiano technical courses – Urutaí Campus. Urutaí, 2013.

Classification	Agriculture technical course (%)			Information Technology technical course (%)			Management technical course (%)			Subtotal (%)			Total (%)
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd	
Contents treated by teachers from the elementary school and/or high school	17.5	43.3	45.0	35.0	90.0	35.0	50.0	60.0	60.0	27.1	56.0	44.0	42.4
Knowledge shared among relatives and/or friends	7.5	10.0	10.0	15.0	40.0	25.0	10.0	20.0	10.0	10.0	18.0	16.0	14.7
Information spread by internet	2.5	16.7	0.0	5.0	10.0	20.0	10.0	0.0	0.0	4.3	12.0	8.0	8.1
Information spread by textbooks	5.0	13.3	0.0	5.0	0.0	15.0	20.0	0.0	0.0	7.1	8.0	6.0	7.0
Information spread by newspapers and/or magazines	0.0	6.7	0.0	5.0	0.0	0.0	0.0	0.0	10.0	1.4	4.0	2.0	2.5
Cases regarding these diseases experienced by the family	45.0	3.3	25.0	15.0	0.0	15.0	30.0	30.0	20.0	34.3	8.0	20.0	20.8
Other	0.0	0.0	10.0	5.0	0.0	10.0	20.0	0.0	10.0	4.3	0.0	10.0	4.8
Did not answer	22.5	6.7	10.0	15.0	0.0	0.0	0.0	10.0	0.0	17.1	6.0	4.0	9.0

*The sum of the percentages for each class, subtotal or total, exceeds 100%, once the same student could have mentioned more than one response classification.

Table 4: Means of communication used by high-school students of the IF Goiano technical courses - Urutaí Campus as source of information on ascariasis, giardiasis and trichuriasis. Urutaí, 2013.

transmissible diseases are prevented is an indispensable factor for the success of any prophylactic campaign.

Ribeiro et al. [17] point out that health education can effectively contribute to parasite control and prevention, and may achieve more lasting effects in comparison to other approaches, because, when aware of the facts, individuals can avoid or minimize the acquisition of parasitic diseases and their consequences. Besides, the authors stress out that the costs of these actions are quite often lower than those of a curative treatment, which reveals that health education is important in the betterment of the quality of life. The activities involved should not be carried out singly, being fundamental the participation of the population, involvement of the scientific community and authorities.

Lastly, the students were questioned about means of communication used to acquire knowledge on the investigated parasites. In general, the majority pointed as information source "Contents treated by teachers from the elementary school and/or high school" (42.4%) (Table 4). The second-year classes of the Information Technology technical course and the second- and third year of the Management technical course yielded the highest indexes for this classification, with 90.0%, 60.0% and 60.0%, respectively (Table 4).

In a similar study by Santos et al. [18], the main sources of information on parasites were television/radio, according to 37.0% of the interviewees; in the second place "home" (33.0%), and in the third place "the school" (24.0%);. The authors stress out that this is the result of the little attention given to teacher training in health education and to the importance of disease prevention [18].

Zancul et al. [19] point out that the educational activities that promote health in the school are very important, when it is considered

that well-informed people are more likely to actively participate in the promotion of their own welfare. Besides, the authors show that the school plays an educational and social role, being a privileged site to work with educational activities related to health.

In the present study, "the school" was mentioned as main information source, by means of the classification "Contents treated by teachers from the elementary school and/or high school" (Table 4). However, it is worth mentioning that, in general, the results demonstrate that the majority of the adolescents know a little or know nothing about the investigated parasites (Table 1), as the indices of correct responses for transmission forms are low. The majority did not answer the question (Table 2), and indices for responses taken as incorrect and/or incoherent were high for prophylactic measures (Table 3).

Conclusion

Our research shows that:

- High-school students from the IF Goiano technical courses – Urutaí Campus have a limited knowledge on ascariasis, giardiasis and trichuriasis, which constitutes a problem that deserves the institution managers' and teachers' attention;
- Dealing with pertinent syllabuses in the classroom represent important means of information on intestinal parasitic infections, constituting an important strategy of health education and prevention of ascariasis, giardiasis and trichuriasis;

In this sense, the implementation of educational actions in IF Goiano – Urutaí Campus (GO, Brazil) is suggested, aimed at promoting health among students, supplying information about intestinal diseases and contributing to the acquisition/construction of knowledge that can be useful in preventing, controlling or combating intestinal parasitic infections.

References

1. Andrade E, Leite ICG, Rodrigues VOR, Cesca MG (2010) Intestinal Parasitosis : A review of its Social, Epidemiological, Clinical and therapeutic. Rev APS 13: 231-240.
2. Rocha RS, Silva JG, Peixoto SV, Caldeira RL, Firmo JOA, et al. (2000) Evaluation of schistosomiasis and other intestinal parasites in school children of Bambuí , Minas Gerais, Brazil. Rev Soc Bras Med Trop 33: 431-436.
3. Seixas MTL, Souza JN, Souza RP, Teixeira MCA, Soares NM (2011) Frequency of assessment of intestinal parasites and nutritional status of school children in peri-urban areas of Salvador, Bahia, Brazil. Rev Patol Trop 40: 304-314.
4. Manrique-Abril FG, Suescún-Carrero SH (2011) Prevalence of intestinal parasitism and nutritional status in children and adolescents of Tunja. Rev CES Med 25: 20-30.
5. Belo VS, Oliveira RB, Fernandes PC, Nascimento BWL, Fernandes FV, et al. (2012) Factors associated with the occurrence of intestinal parasites in a population of children and adolescents. Rev Paul Pediat 30: 195-201.
6. Tome RO, Serrano ACM, Nunes CM, Perri SHV, Bresciani KDS (2005) Epidemiological survey of parasitic zoonoses concepts for municipal schools of kindergarten teachers. Araçatuba – SP Ciênc Extension 2: 38-46.
7. Lima AMA, Alves LC, Faustino MA, Lira NMS (2010) Perception of knowledge and prevention of zoonoses and responsible ownership in parents of preschool students from schools located in the community located in the neighborhood of Two Brothers in Recife (PE). Ciênc Public Health 15: 1467-1464.
8. Moreira FRC, Morais NRL, Oliveira FLM, Souza JC, Lima MS, et al. (2013) Evaluation of the knowledge of some zoonoses in public schools in the municipalities of Apodi , Felipe Guerra and Severiano Melo (RN) - Brazil. Holos 2: 66-78.
9. Malafaia G, Gonçalves RC, Faleiro JH, Castro ALS, Rodrigues ASL (2013) Students knowledge of primary and secondary education of a public school Urutaí (Goiás) on intestinal diseases. Rev Health Research 6: 237-247.
10. Pasquali L (2009) Instrumentação psicológica: fundamentos e práticas. Porto Alegre: Artmed. pp: 559.
11. Neves DP, Melo AL, Linardi PM, Vitor RWA (2011) Human Parasitology. (12th edn.) São Paulo: Editora Atheneu. pp: 546.
12. http://conselho.saude.gov.br/resolucoes/2012/Reso466.pdf
13. Ludwig KM, Ribeiro ALT, Conte AOC, Decleva DV, Ribeiro JTD (2012) Enteroparasitosis of occurrence in the population of a district of the city of Cândido Mota – SP. J Health Scienc Inst 30: 271-276.
14. Menezes RAO, Gomes MSM, Barbosa FHF, Brito GCM, Proietti-Junior AA, et al. (2013) Intestinal parasites in the population living in damp area in Macapa, Amapa, Brazil. Biol Rev Ciênc Earth 13: 10-18.
15. Pelicioni MCF, Pelicioni AF (2007) Education and health promotion : a historical retrospective . The World Health 31: 320-328.
16. Oliveira UD, Chiuchetta SJR (2009) Enteroparasitosis of occurrence in the population of the municipality of Goioere, PR. Biology studies: Amb Di 31: 81-85.
17. Ribeiro DF, Correia BR, Soares AKF, Rocha MKL, Alves ERP, et al. (2013) Health education: a tool for the prevention and control of parasitic diseases. Rev University Vale do Rio Verde 11: 300-310.
18. Santos MB, Oliveira M, Barreto AS, Pereira JM, Costa MCFS, et al. (2012) Evaluation of knowledge about parasitosis and an educational intervention with students of a municipal school in Santana do Ipanema, Alagoas state. Scientia Plena 8: 1-7.
19. Zancul MS, Gomes PHM (2011) The undergraduate training in Biological Sciences to work in health education topics in school. Elect Mestr Prof Ens Ciênc Health Amb 4: 49-61.