International Journal of Science and Research Archive
eISSN: 2582-8185
Cross Ref DOI: 10.30574/ijsra
Journal homepage: https://ijsra.net/

(RESEARCH ARTICLE)

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Parasitic intestinal infection in students of disabilities centers in Sanaa governorate, Yemen

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International Journal of Science and Research Archive, 2024, 13(02), 068–074

Publication history: Received on 22 September 2024; revised on 30 October 2024; accepted on 02 November 2024

Article DOI: https://doi.org/10.30574/ijsra.2024.13.2.2092

Abstract

Background: Intestinal parasite infections remain prevalent in low-income countries, especially among children, due to poor drinking water quality and insufficient personal and environmental cleanliness. This study sought to diagnose, prevent, and manage intestinal parasites in individuals with special needs in Sanaa Governorate.

Method: We collected stool samples from 232 students, aged 1 to 18, of which 143 were male and 89 were female. We collected data using a validated standard questionnaire. We processed and analyzed fecal samples using a wet mount preparation, adhering to the standing concentration technique.

Results: We found an overall prevalence of intestinal parasitic infection of 83.6%. *E. histolytica* (76.7%), *G. lamblia (8.6%), A. lumbricoides (0.4%), H. nana (6.5%), S. mansoni (0.4%), Ent. vermicularis (6.5%), and S. stercoralis* (2.2%).

Conclusions: In children, E. histolytica was the most common intestinal parasite infection. There are few methods of transmission and protection for students with special needs.

Keywords: Special needs; Parasitic infection; Sanaa city; Yemen.

1. Introduction

Parasites are organisms that obtain food and shelter from other organisms or the host and frequently harm them. An intestinal life cycle phase is necessary for a parasite to qualify as an intestinal one. Additionally, it could have a life cycle stage

in the heart, circulation, lung, tissue, and other animals on the surrounding (Ali, 2016). Intestinal parasitic infections in developing countries are regarded as a primary contributor to public health issues (Savioli et al., 1992). Recent studies indicate that approximately 30% of the global population is infected with intestinal parasites (Keiser and Utzinger, 2010).The prevalence of intestinal parasitic infections varies significantly across different regions of the world. The situation is influenced by various factors, including geographical and socioeconomic conditions, humidity levels, poverty, malnutrition, hygiene practices at both personal and community levels, population density, access to potable

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water, overall health status, and the quality of sanitary facilities. The aforementioned factors create ideal conditions for the growth and transmission of intestinal parasites, thereby increasing the likelihood of exposure. (Brooker et al., 2009).

Also the distribution of such infections by several factors influence this situation, including appropriate climatic conditions, environmental sanitation, and human activities such as population movements and inadequate sanitation. Intestinal parasitic infections can occur year-round in temperate regions. The primary pathways for the transmission of intestinal parasites include the contamination of food or water, as well as personal contact through the fecal-oral route (Raza and Sami, 2009; Amer et al., 2016). Infections caused by Ascaris lumbricoides, Trichuris trichiura, and hookworms, known as soil-transmitted helminths (STHs), typically occur in specific regions.

2. Methodology

2.1. Study area

The investigation will focus on the special needs within Sanaa Governorate. A total of two hundred thirty-two (232) samples were gathered from students at the district schools of Al-Bardouni, Al-Zubairi, Al-Amal, and Al-Salah.

2.2. Methods

2.2.1. Sample collection

- Two hundred thirty-two (232) were collected from students.
- Collect sample of stool on a wide-clean container.

2.2.2. Labelled number of samples on the container then asked all student selected with some questions to our study.

2.2.3. Laboratory examination of sample.

Concentration Technique (-Sedimentation Technique)

2.3. Standing method

- Emulsify 1 g of faeces in 5 times its volume of physiological saline.
- Allow to stand in a conical flask for 20-30 minutes.
- Two layers form: a clear layer of saline and sediment. Remove the saline from the tube.
- Take a sample of sediment with a pipette and examine microscopically at low and high dry magnifications (10X and 40X).

2.4. Sample size determination

The size of the sample was determined by randomly selecting two hundred thirty-two (232) samples from students attending the district schools Al-Bardouni, Al- Zubairi, Al-Amal, and Al-Salah. These students were chosen because they met the criteria that were given and because they volunteered to take part in the study by providing their informed consent.

3. Results

3.1. Data analysis

The analysis of data was conducted utilizing SPSS Version 25. To conduct the analysis, quantitative variables were expressed as percentages as well as mean ± standard deviation.

3.2. Ethical Consideration

Ethical Approval for this study was taken from the medical research and ethic committee in Faculty of Medical Sciences at Al- Saeeda University. (research code: REC-69-2023)

3.3. Result

This study included 232 students with special needs from Sanaa Schools, comprising 143 males and 89 females.

Table 1 indicated that the prevalence of intestinal parasites was highest among males at 61.4%, whereas females exhibited the lowest prevalence at 38.2%.

Table 1 Frequency of Gender among students of special needs

Gender	Frequency	Percent %
M	143	61.4
F	89	38.2
Total	232	100

In the study, it was discovered that the percentage of years was 28.8% for the age group of 14-18 years. The prevalence of intestinal parasites was highest in the age group with the lowest percentage, which was 21.9%. Individuals aged 10–13 years constitute 48.9%, followed by those in the age group of 3–9 years. This information is presented in Table 2.

Table 2 Frequency of age among students of special needs.

Age	Frequency	Percent%
3-9	67	28.8
10-13	114	48.9
14-18	51	21.9
total	232	100

According to the findings of the study, which are presented in Table 3, the most common source of water was the main source, which accounted for 83.6% of the total, followed by the external source, which accounted for 16.4% of the total.

Table 3 Frequency of water among students of special needs

Source of water	Frequency	Percent
Main source	194	83.6
External source	38	16.4
Total	232	100

According to the data presented in Table 4, the home was the primary source of food, accounting for 99.1% of the total intake.

Table 4 Frequency of water sources that used by students with special needs

Source of food	Frequency	Percent
At home	231	99.1
At restaurant	1	0.4
Total	232	100%

An analysis of the prevalence of intestinal parasites according to age is presented in Table 5. The highest infection rate is found in children aged 10 to 13 years, followed by adults aged 14 to 18 years.

Table 5 Prevalence of Intestinal parasites among student of special needs according to age

	Age yrs.			**Total**
3-9	Positive		58 86.6 %	67 100 %
	Negative		9 13.4 %	
10-13	Positive		94 82.5 %	114 100 %
	Negative		20 17.5 %	
14-18	Positive		42 82.4 %	51 100 %
	Negative	9	17.6 %	

As can be seen in Table 6, the prevalence of intestinal parasites varies according to gender, with a higher percentage of males than females.

Table 6 Prevalence of Intestinal parasites among students of special needs according to gender

		Gender	
			Total
M **N= 138**	Positive	116 84.1 %	138 100 %
	Negative	22 15.9 %	
F N= 94	Positive	78 83 %	94 100 %
	Negative	16 17 %	

Table 7 Prevalence of Intestinal parasites among students of special needs according to Water in the school

Water in the school	**Positive**	**Negative**	**Total**
Main Source N=123	103 83.7 %	20 16.3 %	123 100 %
External Source N=109	91 83.5 %	18 16.5 %	109 100 %

Table 8 Prevalence of Intestinal parasites among students of special needs according to Source of food

Source of food	**Positive**	**Negative**	**Total**
At home N=231	193 83.5 %	38 16.5 %	231 100 %
At restaurant N=1	1 100 %	0 00 %	1 100 %

Table 9 Prevalence of Intestinal parasites among students of special needs according to consistency

Consistency	Positive	Negative	Total
Diarrhea N= 11	9 81.8 %	2 18.2 %	179 100 %
Soft N= 56	45 80.4 %	11 19.6 %	56 100 %
Formed N= 89	77 86.5 %	12 13.5 %	89 100 %
Semi solid N= 76	63 82.9 %	13 17.1 %	76 100 %

Table 10 Percentage of Intestinal parasites among student of special needs

Parasite	Positive	Negative	Percentage %
E. histolytica	178	54	76.7
G. lamblia	20	212	8.6
A.lumbricoides	1	231	0.4
H. nana	15	217	6.5
S. mansoni	1	231	0.4
Ent.Vermicularis	15	217	6.5
S. stercoralis	5	227	2.2

4. Discussion

G. lamblia, E. histolytica, A. lumbricoides, H. nana, S. mansoni, Ent. vermicularis, and S*. stercoralis* were the parasites that were investigated in this particular study respectively. Only 232 people between the ages of 3 and 18 were evaluated, and out of those, 194 were confirmed to be infected with intestinal parasites (83.6%), while 38 were found to be negative (16.4%). Within the male population, the largest percentage of parasites was found in infection (61.4%). This conclusion is consistent with the findings of other research, which demonstrated a higher prevalence in males (Azazy and Al-Tiar, 1999). Despite the fact that previous research revealed that the prevalence of *E. histolytica* infection was greater among children from Al-Mahweet (64.0%) and Ibb (33.7%), the findings of our study demonstrated that the prevalence of *E. histolytica* infection was higher than that of other infectious parasites (Alsubaie et al., 2016, Alwabr and Al-Moayed, 2016). And G. lamblia was found in 8.6% of our research. Al-Haddad and Baswaid (2010), Alsubaie et al. (2016), and Al-Mekhlafi et al. (2016) found that the prevalence of the disease among children hailing from Ibb was 23.6%, Hadhramout (16.8%), and Sana'a (16.1%) in the previous study. According to the findings of the current study, the percentage of *S. mansoni and A. lumbricoides* was 0.4%. In other studies, the percentage of *S. mansoni* was 1.1%, and the percentage of A. lumbricoides in Thailand was 1.3% (Azazy and AlTiar, 1999; Wongsaroj et al., 2014; Farag, 1985; Boonjaraspinyo et al., 2013). In our research, the percentage of *S. stercoralis* was 2.2%, whereas the percentage of *Ent. vermicularis* and *H. nana* was 6.5%. It has been claimed by a number of publications that *S. stercoral* has a prevalence rate of 5%, while *Ent. Vermicularis* has a prevalence rate of 2.8%, and H. nana has a prevalence rate of 12.2%. This may be due to the number of samples analyzed and the procedures that were utilized.

5. Conclusions

E. histolytica was the parasite that caused the largest incidence of intestinal parasitic infections in children. There is a lack of transmission and protection methods among students with special needs.

Compliance with ethical standards

Acknowledgments

Our gratitude goes out to every one of the study participants.

Disclosure of conflict of interest

The authors of this study do not report any conflict of interest.

Statement of ethical approval

This study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Intuitional Review Board in the Ethics Committee of the Faculty of Medicine and Health Science, Thamar university, Yemen (Research code: REC-45-2021).

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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