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Prevalence of Intestinal Parasitic Infestations among Children in a Tertiary Care Centre

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: Intestinal parasitic infestations are more common in developing countries and an important cause of morbidity in pediatric age group. It causes abdominal pain, diarrhoea, anemia, impaired cognitive function, growth retardation and poor academic performance among school going children.
Objectives: To analyze age, gender and most common parasitic infestations among children in a tertiary care hospital in south India.
Materials and Methods: Stool samples of pediatric patients in a tertiary care hospital is analysed for a period of one year for detection of prevalence of parasitic infestations.
Results: In our study, 115 stool samples were analysed and prevalence of intestinal parasitic infections was found to be 7.82% (9/115).There were five different parasites encountered. The most common parasite identified was *Giardia lamblia*(4/9)(44.44%) followed by *Entamoeba histolytica*(2/9)(22.22%), *Ascarislumbricoides*(1/9)(11.11%), *Trichuris trichiura*(1/9)(11.11%), and *Hymenolepis nana*(1/9)(11.11%).
Conclusion: *Giardia lamblia* and *Entamoeba histolytica* were found to be the most common organism in our study. Awareness about proper hygiene, sanitation and prophylactic anti-protozoal medications is important to prevent the occurrence and complications of intestinal parasitic infestations.

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1. INTRODUCTION

Intestinal parasitic infestations are more common in developing countries due to several factors like poor sanitation, personal hygiene, topical hot and humid climate conditions and contamination of water resources. According to WHO, 780 million individuals lack access to improved drinking water and 2.5 billion lack improved sanitation worldwide [1].

Intestinal parasitic infestations are caused by protozoa and helminths. Protozoa is the most common cause of intestinal parasitic infestations than helminthes [2]. Protozoa are single cell organisms which multiply inside human body. This includes *Giardia lamblia, Entamoeba histolytica, Cyclospora cayetanensis, and Cryptosporidium spp* [3]. Helminths are worms which cannot multiply in human body. It includes *Ascaris lumbricoides*(round worm), *Trichuris trichiura*(whip worm), *Anchylostoma duodenale,* and *Nectator Americanicus.* These parasites enter human body through mouth(feco-oral) and skin contact with larvae infected soil(transdermal). Cysts produced by these intestinal parasites are passed in stool which is seen in stool examination. These parasitic infestations are more common among rural than urban population [4]. Intestinal parasites spend a portion of their life cycle in the human digestive tract, where they exhibit parasitic activity [5]. They are transmitted directly or indirectly through contaminated water, food and hands [6].

Symptoms caused by these intestinal infestation includes diarrhoea, abdominal pain, lethargy(due to dehydration and anemia), nausea, and significant weight loss. It causes impaired cognitive function, growth retardation and poor academic performance among school going children [7]. Childhood anaemia has many irreversible effects like physical growth impairment, impairs immune function, increases susceptibility to infections, and weakens motor development, resulting in reduced cognitive ability and, in severe cases, short or long term mortality [8].

Infants, toddlers, and very young children in day care settings are at risk for the parasitic disease called giardiasis that causes diarrhea and is spread through contaminated feces. Children of all ages can develop parasitic diseases such as giardiasis and cryptosporidiosis from swallowing contaminated water during swimming, playing, and other activities in contaminated recreational water (e.g. pools, fountains, lakes, rivers and streams, etc.) [9].

1.1 Aim and Objectives

This retrospective study was done to assess the prevalence of intestinal parasitic infections among children in tertiary healthcare centre and to analyze age, gender and most common parasitic infestations among children in a tertiary care hospital over a period of one year.

2. MATERIALS AND METHODS

This retrospective study was done from a period of January 2020 to December 2020 at Pediatrics Department in Saveetha Medical College and Hospital after getting clearance from Institutional Research Board. Stool samples were analyzed to determine age and sex wise distribution and the most common parasitic etiology among children between age of 0 -12 years. Stool routine examination for parasitic prevalence was done by following methods. Macroscopic examination was done to look for color, consistency, presence of mucus and blood and presence of parasitic structures such as proglottids, scoliosis, adult tapeworm, enterobius, ascaris, or hookworm. For microscopic examination saline wet mount was done to detect protozoa trophozoites and helminthic eggs or larvae and iodine wet mount was done to detect cysts [10]. Stool concentrations was done by Formalin-ether sedementation technique and zinc sulphate flotation method. Modified Ziehl Neelsen staining was also done for all samples to detect acid fast parasites [11].

3. RESULTS AND DISCUSSION

In this retrospective study, 115 stool samples of pediatric patients were analyzed based on age and sex distribution, and the most prevalent organism responsible for intestinal parasitic infestations in age group 0-12 years.

Among the 115 stool samples collected, 7.82% (9/115) samples were positive for intestinal parasitic infestation.

These parasitic infestations was prevalent among age groups 3-6 years (44.44%) and followed by 6-12 years(33.33%), 1-3 years (11.11%) and less than 1 year(11.11%)(Table 1).

Table 1. Age wise distribution of positive samples

S. No.	Age(years)	Percentage (%)
1	<1	11.11
2	1-3	11.11
3	3-6	44.44
4	6-12	33.33
	TOTAL	100

Table 2. Sex wise distribution of positive samples

S. No.	age(years)	Positive samples	Percentage (%)
1	MALE	7	77.77
2	FEMALE	2	22.22
	TOTAL	9	100

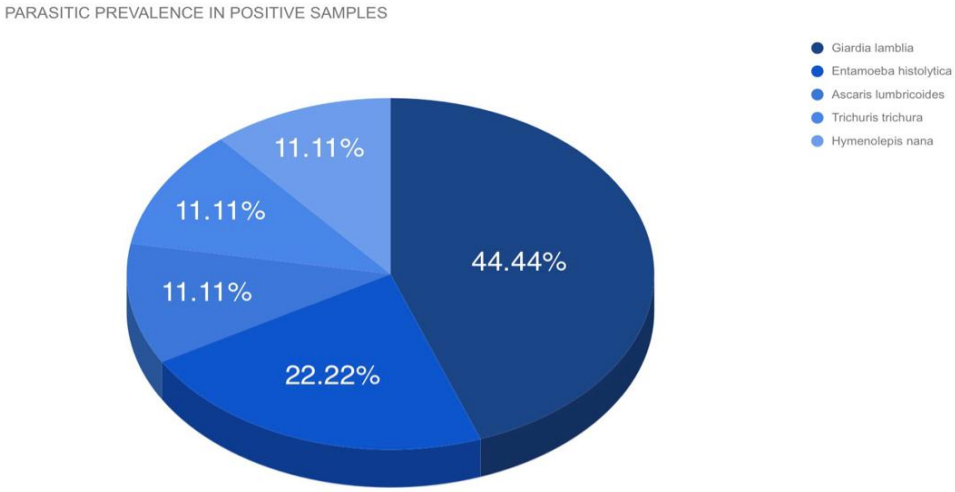

Fig. 1. Parasitic prevalence in positive samples

In our study parasitic prevalence was most common among males(77.77%) than females(22.22%)(Table 2).

In our study the most common organism was found to be *Giardia lamblia*(44.44%) followed by *Entamoeba histolytica* (22.22%). Cyst forms of *Giardia lamblia* was found in stool routine examination. Among helminths, *Ascaris lumbricoides*(11.11%) is found to be the most common parasite, followed by *Trichuris trichiura*(11.11%), and *Hymenolepis nana*(11.11%) which was confirmed by presence of egg forms in stool routine examination. Protozoa(66.66%) are found to be more common than helminths(33.33%).

4. DISCUSSION

Among the 115 stool samples collected during the period of study, 7.82% samples were positive for intestinal parasitic infestation. Similar studies by Patel P. et al. and Banerjee S. et al., showed prevalence of 8.7%(26/298) and 17% (50/294) respectively [12,13]. The prevalence varies according to various geographical areas, education level and climatic conditions [14].

These parasitic infestations was prevalent among age groups 3-6 years. In a similar study by Suman et al., showed prevalence among 2 and 5 years age children [15]. Intestinal parasitic infestation is more common among preschool and school age child. This was also the case with Sindhur P.K. et al. and Samie A et al. [16,17]. This could be due to sharing of tiffins, transfer through fomites in the school, and increased contact with soil while playing.In our study parasitic prevalence was most common among males than females. This result is supported by studies by Suman et al. and Bisht D. et al. in

which males were more affected as compared to females [15,18].

Protozoa are found to be more common than helminths(33.33%). Similar studies by Tinaude et al., Banerjee S. et al., and Bisht D. et al., Protozoa was the most common cause of intestinal parasitic infestation [2,13,18]. Among Protozoa, *Giardia lamblia* is the most common parasite which was also the case with Sindhur P.K. et al. and Zemene T. et al. [9,16].

Infestations caused by parasitic worms can be prevented. As a result, immediate actions should be implemented, including public health education, safe food and water, enhanced sanitation in schools and the community, and proper personal cleanliness. Awareness about properly washing hands before food can be really beneficial. Covering open water sources, as well as enhancing food storage and handling, are examples of low-tech, low-cost solutions. Albendazole and mebendazole are given for both prophylaxis and to treat intestinal parasitic infestation. Areas where hookworms are common, knowledge should be given about wearing of foot wares to prevent larvae transmission through infected soil [19].

5. CONCLUSION

Giardia lamblia and *Entamoeba histolytica* were found to be the most common parasitic organisms causing intestinal parasitic infections in our study. Awareness about proper hygiene, sanitation and prophylactic anti-protozoal medications is important to prevent the occurrence and complications of intestinal parasitic infestations.

CONSENT AND ETHICAL APPROVAL

It is not applicable.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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