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Study of intestinal parasitic infection among school going children in eastern zone of Patna district of Bihar, India

Afsana Begum*

Parasitology Research Lab, Department of Zoology, Patna University, Patna, Bihar, India

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Abstract : Intestinal parasitic infections caused by protozoan and helminth are one of the major health problems in children of the developing countries like India. Around 450 million children are affected due to these parasites. Therefore the present study was focused to determine the current status of intestinal parasitic infections among school going children. A total of 468 stool samples were randomly collected and examined by simple saline preparation technique. In addition stained preparation of Lugol's iodine was also used for the identification of nuclear character of the cysts. Of the total examined cases 231 (49.3%) were found to be harbor. The incidence of infections for various intestinal parasites was as follows *Entamoeba histolytica*, (13.9%) *Entamoeba coli* (4.4%) and *Giardia lamblia* (6.5%), *Ascaris lumbricoides* (22.5%), *Trichuris trichiura* (3.0%), *Hymenolepis nana* (2.1%) and *Hymenolepis diminuta* (0.3%). About 3.2 % sample contained mixed infections. The study revealed that the prevalence of intestinal parasitic infections among children in Patna district is very high and required special control measures, such as improvement in personal hygiene, sanitation, water supplies, socio-economic conditions and education.

Key words: Intestinal parasitic infection, helminth, protozoan, school children, Patna.

INTRODUCTION

Parasite is a living organism which depends on a living host for survival and derives nutrition from the host without giving any benefit to the host. Intestinal parasitic infections are devastating and prevalent throughout the world including India.¹ They affect an estimated 3.5 billion persons and cause clinical morbidity to approximately 450 million people², majority of the cases occur among school age children.^{3,4} These parasites are highly prevalent in the population with low socio-economic status, poor hygiene and sanitation, scarcity of potable drinking water.^{5,6} The most common parasites causing infections globally are

Ascaris lumbricoides (20%), Hookworm (18%), *Trichuris trichiura* (10%), and *Entamoeba histolytica* (10%)⁷. These parasites are associated with diverse clinical manifestation among school going children such as poor growth, reduced physical activity, impaired cognitive function, hampered learning ability, intestinal obstruction and nutritional deficiency particularly iron and vitamin A as well as mental and physical growth retardation^{8,9}. In India particularly in Bihar there is scant information available regarding the parasitic infections among school going children, whereas a study related to soil transmitted helminth among school children in Bihar have been published in recent past year¹⁰ and another study reported that helminth infections to be greater than protozoan infection in eastern part of Bihar.¹¹

*Corresponding author :

Phone : 8294036786, 7632911275

E-mail : afsana.begum2106@gmail.com

Therefore the objective of the study was to estimate prevalence and current status of intestinal parasitic infections in the school going children in and around the school in Patna.

MATERIALS AND METHODS

This study was conducted among 468 school children of aged 6 - 12 years between 2017- 2018 in Patna district of Bihar. Fresh fecal samples were collected in wide mouthed, sterilized container with and without 10% formalin bearing necessary code. A pre tested questionnaire based on risk factors including information such as age, sex, religion, food habits, living status, source of drinking water, existence of latrines in their homes and hand washing after defecation were also recorded.

First of all a macroscopic examination of all the collected samples was carried out for color, consistency and presence of mucus and blood. For microscopic examination, Saline wet mount and Lugol's iodine wet mount were prepared as per standard protocol¹² for the identification of eggs, cysts, trophozoites, larvae and proglottids of intestinal parasites. The data was statistically analyzed by applying Chi-Square test (χ^2 - test).

RESULTS

The present study showed that out of 468 children 231 (49.3%) students were harbored with various species of intestinal parasites (Fig. 1). Although girls show higher infection rate (56.3%; 98/174) than boys (45.2%; 133/294) and the difference was found to be significant ($p < 0.01$) (Table.1). Out of total 231 infected cases 101 (21.6%) contained only protozoan, 115 (24.5%) only helminth and 15 (3.2%) were having mixed infection (Table 2). The prominent parasites detected were *Ascaris lumbricoides* (22.5%), followed by *Entamoeba histolytica* (13.9%) *Giardia lamblia* (6.5%), *Entamoeba coli* (4.4%) *Trichuris trichiura* (3%), *Hymenolepis nana* (2.1%) and *Hymenolepis diminuta* (0.3%) (Table 3).

DISCUSSIONS

In the present study 49.3% of the school going children revealed positive result of intestinal parasites and seven species (Table.3) of parasite were detected. The findings of our result are consistent with the previous studies conducted in various parts of India, have reported a prevalence of intestinal parasites 30% to 50%¹³⁻¹⁶ among school going children. From this study it is clear that

prevalence and diversity of intestinal parasitic infections vary greatly and the maximum of both these incidence occur in the lower age group 6-12 years.^{17,18} The high incidence of these pathogens in the lower age group is highly associated with the lack of awareness pertaining to hygiene and sanitation, both of which can be expected to provide maximum chances of positive exposure in contaminated surroundings. In our study helminths infection (24.5%) was greater than protozoan infection (21.6%), this result is in line with those reported in the eastern part of Bihar¹¹. In our study *Entamoeba histolytica* (13.9%) was the commonest protozoa, this result is in contrast with other studies where *Giardia lamblia* was the commonest protozoan.^{14,16,19} Among helminth *Ascaris lumbricoides* (22.5%) was more prevalent than other, this finding is similar to the other studies where *Ascaris lumbricoides* was the commonest helminth^{13,20,21} but it is in contrast with those reported 1.9% in school going children in other part of India.¹⁶ In our study *Hymenolepis nana* was found (2.1%), similar to other studies where *Hymenolepis nana* was found in 2-3% of the children.^{14,20} It is also observed that 3.2% mixed infections were found in this study.

This result highlights the intestinal parasitic infections is higher in school children of Patna district, so in order to prevent this infection appropriate education should be given to children and their parents concerning healthy and hygienic living habit, disease transmission, safe drinking water, improvement of sanitation coupled with a nutritional program at the primary school level²² as well as periodic administration of anti parasitic drugs. The findings of this study might be helpful for fortifying the information available so far and encourage policy makers to design effective strategies to prevent intestinal parasitic infections.

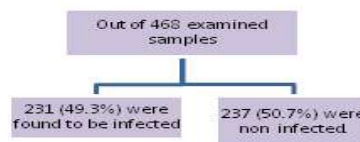


Fig. 1

Total number of Samples = 468



Pie chart with reference to Fig. 1

Table 1. Prevalence of intestinal parasites in the population studied

Variables	Total no. of sample Studied (468)	No. of infected samples (231)	Prevalence (%) 49.3	P value
Sex				
Boys	294	133	45.2	
Girls	174	98	56.3	<0.01

Table 2. Prevalence of protozoan and helminths infection

Parasitic group	Number	percentage (%)
(A)Samples containing only protozoan	101	21.6
(B)Samples containing only helminths	115	24.5
(C) Mixed infections	15	3.2

Table 3. Species wise prevalence of protozoan infection out of 468 samples studied.

Parasites	No. of infected cases (231)	Prevalence (%)
Protozoans		
<i>E. histolytica</i>	65	13.9
<i>E. coli</i>	21	4.4
<i>G. lamblia</i>	30	6.5
Helminths		
<i>A. lumbricoides</i>	105	22.5
<i>T. trichiura</i>	14	3.0
<i>H. nana</i>	10	2.1
<i>H. diminuta</i>	1	0.3

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