

Prevalence of Intestinal Parasitic Infection among Public School Children in Sub-Urban Area of Patna (Bihar)

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Abstract: Intestinal parasitic infections (IPI) are one of the most prevalent infection among school children in developing countries including India. This study was conducted to determine the prevalence of intestinal parasitic infection and its type in the suburban public schools around Patna Bihar, India and include students from Nursery to class IX. Among the 191 participating children prevalence of intestinal parasitic infections was found as 23.2% (28% for boys and 20.1% for girls). Amongst the infected children single infection was detected in 42 (93%) and mixed parasitic infection was found in 4(7%). Among protozoan *Entamoeba histolytica* was the commonest and *Giardia* was the second most common. Among helminths, *Ascaris lumbricoides* was the commonest after *Entrobium vermicularis*. Prevalence of different types of parasites were observed among children above 10 years, between 6-10 years and below 10 years. IPI was the highest (37%) among children less than 6yrs, followed by children aged 6-10 years (31.5%), and in children more than 10 years which was 16.7%. There was no genderwise statistical difference detected. This study indicate the need of regular screening and treatment of intestinal parasitic infection among public school children of Bihar along with good health education and awareness programs.

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I. Introduction

Parasitic infection of intestine is one of the commonest intestinal infections in humans caused by helminths and protozoan parasites in developing countries¹. According to WHO , 3.5 billion people affected worldwide with these parasites, and about 450 million people fall ill due to parasitic infections, majority being children². Intestinal parasitic infection (IPI) is a major public health problem in developing countries including India, Nepal, Bangladesh Pakistan and Srilanka³⁻⁵

School going children are particularly susceptible to IPI with higher parasitic load⁶.

Prevalence varies from place to place and time to time.

Most common intestinal parasites in school going children near Patna was found to be *Ascaris lumbricoides*, *Entrobium vermicularis*, hookworm, *Giardia Lamblia*, *Entamoeba histolytica* and in a few *Trichuris trichura*, *Taenia saginata* and *T.solium*. These parasites cause a variety of clinical problems like malnutrition, malabsorption Syndrome, iron deficiency anemia, poor mental and physical growth and sometimes can even cause intestinal obstruction particularly with *Ascaris lumbricoides*⁷.

This study was conducted to determine the prevalence of intestinal parasitic infection and their types among public school children in suburban area of Patna, Bihar.

II. Material and Methods

This cross-sectional study was conducted on October, 2017 at a government public school near Patna, Bihar. Students from Nursery to Class IX were included in the study and consent has been taken from the school authorities prior to the commencement of the study. All the children were distributed with a properly labelled clean dry plastic container and a plastic spatula one day before the study. The method of stool collection were explained to the students from class IV to IX and to the parents of students from Nursery to Class III. They were provided with an information leaflet explaining the purpose of the study and instructions about the method of stool sample collection. On the day of study, a team of faculty member from NMCH Patna and members of a private lab (SARAL Diagnostic) went to school with equipment like microscope, reagents, glass slides etc., to carry out the study. Demographic data in the study were verified from school records.

Both macroscopic and microscopic examination of stool sample were done. Direct microscopy of the sample were done with normal saline and iodine wet mount. Data entry and analysis in the study was approved by research committee & faculty members of NMCH Patna. Chi-square test was used to analyze the difference of proposition.

III. Result

Out of 290 enrolled students only 191 (65%) children were selected to participate in the study. The overall prevalence of intestinal parasites was found to be 23.2%. Among all infected children n=45 single parasitic infection was detected in 42(93%) children, while 4(7%) children had mixed infection. The prevalence of protozoal infection and helminthic infestation including mixed infection were found to be 18.4% and 6% respectively.

Six different types of IPI were found: 2 protozoan and 4 Helminths. Among Protozoan *E.histolytica* was the commonest (58.2%) followed by *Giardia lamblia* (19.5%). Among helminth, *Ascaris lumbricoides* were the most common (21.5%), after that *Entrobium vermicularis* were the commonest (2%), and in a few hookworm was found. Mixed infection with Protozoan (*E.Histolytica*) and helminths (*Ascaris lumbricoides*) were found in 3 children.

Intestinal Parasites	Number (n)	Prevalence %	Positive %
Protozoa (Single infection)	34	17.00	73.70
<i>Entamoeba histolytica</i>	23	11.90	53.20
<i>Giardia lamblia</i>	8	4.4	18.20
Helminths (Single infection)	8	4.4	19.30
<i>Ascaris lumbricoides</i>	6	3.2	14.90
<i>E.vermicularis</i>	3	1.5	2.10
<i>H.nana</i>	1	0.5	1.50
<i>Trichuris trichura</i>	1	0.5	1.50
Mixed Infection	4	1.8	7.00
<i>Ascaris lumbricoides</i> & Hook worm	1	0.5	2.20
Total (N)	45	191	45
Total (%)	----	23.20%	100

The Prevalence among boys was 28% which was greater than girls 20.1% but this difference was not statistically significant P value=0.19

Prevalence of IPI by gender

Gender	Total	Positive	Positive %	P value
Male	84	23	28	0.19(>0.05)
Female	107	21	20.1	
Total	191	44	23	

Age wise prevalence showed that IPI was highest among children 6 years (37%) followed by children aged 6-10 yrs. (31%) and children aged more than 10 years (16.7%)

Age	Total	Positive(n)	Positive %	P value
< 6	22	8	37%	0.025(<0.05)
6 to 10	55	17	31%	
> 10	114	19	16.70%	

IPI was highest among children studying below primary level (42.2%) followed by primary (38.3 %) and above primary level (16.5%). The prevalence of IPI found to be statistically different among the different grades. Pair-wise comparison in different grades showed statistically different prevalence among children below primary and above primary level. On contrary prevalence of IPI in below primary and primary level as well as between primary and above primary level was not found to be statistically significant.

Prevalence of IPI by grades and pair-wise comparison of different grades

Grade	Total (n)	Positive (v)	Positive %	P Value	Grade	P Value
Below Primary	24	10	42.2	0.018 (<0.05)	Below Primary vs Primary	0.13
Primary	70	26	38.3		Primary vs Above Primary	0.126
Above Primary	97	15	16.6		Below Primary vs Above Primary	0.005
Total	191	51				

Note- below Primary= Nursery, KG, Primary=Grade 1-5, Above Primary = Grade 6 and above this shows that the two proportions are significantly different (P <0.05)

IV. Discussion

In This study nearly 1/4th (23%) of children of rural public school were found to be harboring one or more of intestinal parasites which was close to the finding conducted at different rural school children near Patna^{3,7,13}. The prevalence of protozoal infection was found to be higher than that of helminth in the study. This finding correspond to results of similar studies conducted in rural school children in Bihar & elsewhere.^{7,14,15} Among the protozoan parasites *E. histolytica* was the commonest intestinal parasite followed by *Giardia lamblia*, and among helminths *Ascaris lumbricoides* was the commonest intestinal parasite. This corresponds to finding in other studies conducted on school going children of Bihar^{7, 9,11,13,14}.

revalence of intestinal parasites was found slightly higher in boys than girls , But the difference was not statistically significant . Similar finding were also reported by various studies conducted in Bihar^{11,13} and elsewhere¹⁵, however same studies have been reported with higher prevalence of intestinal parasites among girls^{14,20}.

Age-wise prevalence of IPI showed highest among children of age below 6 years, followed by children of age 6-10 years and least among 10 years and above.

Pair-wise comparison also revealed statistically lower prevalence of IPI among children above 10 years. The decrease in prevalence of IPI in children of higher age were attributed to be increased awareness regarding hygienic practice^{9,14} and environmental sanitation.

Gradewise prevalence of IPI was found to be highest among children of below primary level followed by children of primary level and then children above primary level, however pair-wise comparison showed significantly different prevalence of IPI between children below primary level and children above primary level¹³.

In conclusion the prevalence of intestinal parasites was found to be 24%. No significant difference in prevalence of IPI between boys and girls were observed, however significant difference of IPI were observed between students aged less than 10 years and above 10 years as well as students of below primary level and above primary level.

Mass deworming programmes by government of India including state government of Bihar were found to be effective in reducing helminthic infections like ascaris & hookworm but it is ineffective against protozoan parasites and helminths like *H. nana*. Therefore this study indicates the need of targeted health education, practice of hygiene, regular screening and specific treatment among school children, teachers and parents.

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