



Prevalence of Pediatric Intestinal Worm Infestations among School Going Children in Moradabad District, Uttar Pradesh

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Abstract

Introduction: Aim of this study was to determine the prevalence rate of intestinal Worm infection in school children in the rural areas around Moradabad, Uttar Pradesh.

Materials and Methods: Sociodemographic data were collected from the parents. Fecal samples were collected in dry and clean screw capped plastic containers. Stool specimens were examined under direct light microscopy of smear in normal saline and iodine preparation, concentration method was used wherever required. p -value < 0.05 was considered statistically significant.

Results: Out of 50 students examined, 76% were found to be infected with intestinal worms. Comparatively girls (44%) were found More infected than boys (32%), ($p < 0.05$). *T. trichiura* was most common (36.8%) followed by *A. lumbricoides* (18.4%), *H.nana* (13.2%) and hook worm (7.9%) while 23.7% cases showed mixed infection with various helminthic as well as protozoan parasites like *G. lamblia* and *E. histolytica*

Conclusion: poor personal hygiene (such as not wearing shoes, no proper hand washing before and after eating, biting nails, improper toilet habits, poor socioeconomic conditions and a low level of education among parents) appear to be powerful determinants of infection.

Keywords: Prevalence, Helminthic, *T. trichiura*.

Introduction

Soil-transmitted helminth (STH) infections form the most important group of intestinal worms affecting two billion people worldwide and the main species which infect are *Ascaris lumbricoides*, (roundworms), *Trichuris trichiura*, (whip worms) and *Necator americanus*/*Ancylostoma duodenal* (hookworms).¹ According to World Health Organization (WHO), globally

there are 1221e1472 million cases of Ascariasis, 750e1050 million cases of Trichuriasis and 740e1300 million cases of hookworm infestation.² Globally an estimated 100 million people have been reported to have experienced stunting or wasting as a result of worm infections.³

The nutritional status of people infected with helminths is altered through a decline in food

intake and/or an increase in nutrient wastage through blood loss, vomiting or diarrhea.⁴ These effects can lead to or aggravate protein energy malnutrition, anemia and other nutrient deficiencies. In children, infection leads to profound alterations in intellectual, cognitive and physical growth. The disease is most prevalent among the lower social groups and also in children whose parents are mostly contact with the contaminated soil while working outdoors.⁵ This practice encourages the penetration of the infective larvae present in the soil. Infection is by swallowing infective eggs in the case of *Ascaris lumbricoides*, *Trichuris trichuria* or by infective larva penetrating the skin in the case of hookworm and *Strongyloides stercoralis*.⁶ The main clinical manifestation of the disease caused by these parasites is diarrhea.⁷ Diarrhea is defined as an increased loss of stool with a frequency and fluidity greater than the usual habit for each individual.⁸

High rates of infestation are seen in rural areas due to poor sanitation, contaminated water supplies and high population densities.² School children aged 5–10 years are at increased risk of helminthiasis. Helminthic infections are the main cause of loss of appetite, anemia, and malnutrition in children. The aim of this study was to determine the prevalence rate of intestinal Worm infection in school children in the rural areas around Moradabad, Uttar Pradesh.

Materials and Methods

The present study was conducted in total 50 patients visiting pediatric OPD or admitted at pediatric ward at Medical College and Hospital, Moradabad, India, and having complaints of diarrhea, weight loss, anorexia, and other conditions, which may raise suspicion of intestinal parasitic infection, were included in this study. Written consent was taken from the parents.

Detailed questionnaire was filled with the help of the children's parents. It contained four sections: Sociodemographic data including age, gender, residence, education and occupation of parents,

number of adults and children in the family and birth order of the child; environmental factors including housing status (number of rooms and bathrooms) and water supply; behavioral habits including type of toilet, hand washing (no washing/washing with only water/washing with soap); and complaints including abdominal pain, lack of appetite, abdominal distention, habit of eating mud, perianal itching, teeth grinding, and history of parasitic infections. To collect stools, children were given sterile containers the day before sampling along with comprehensive instructions. Fecal samples were collected in dry and clean screw capped plastic containers according to standard technique and processed partly in department of Microbiology-Teerthanker Mahaveer Medical College, Moradabad, Uttar Pradesh. Stool specimens were examined under direct light microscopy of smear in normal saline and iodine preparation, concentration method was used wherever required. The laboratory diagnosis of smear for parasite infestation was based on demonstration of ova, cysts or trophozoites.

Data were captured using IBM SPSS Statistics 21 manufactured by IBM USA for entire calculations. p -value < 0.05 was considered statistically significant. Chi-squared and Fisher's tests were used to examine differences for proportions.

Results

Out of 50 students examined, 76% were found to be infected with intestinal worms. Comparatively girls (44%) were found more infected than boys (32%), ($p < 0.05$) (Table-1, Figure 1).

Out of total 38 patients, 15 belonged to established family background while 23 were not. Moreover, 17 children belong to poor families while; 21 reported to have moderate family background. As far as socioeconomic conditions were concerned, 26 children had satisfactory status and 12 had good status. In response to drinking water source, 13 rely upon regular water supply, 16 children reported boring water system

while; 9 drink via filtration water source as indicated in Table 2.

T. trichiura was most common (36.8%) followed by *A. lumbricoides* (18.4%), *H.nana* (13.2%) and

hook worm (7.9%) while 23.7% cases showed mixed infection with various helminthicas well as protozoan parasites like *G. lamblia* and *E.histolytica* (Table-3, Figure 2).

Table 1: Prevalence of intestinal worm infections among children

Gender	Total	Positive (%)	P value
Male Child's	21	16 (32%)	<0.05
Female child's	29	22 (44)	
Total	50	38 (76)	

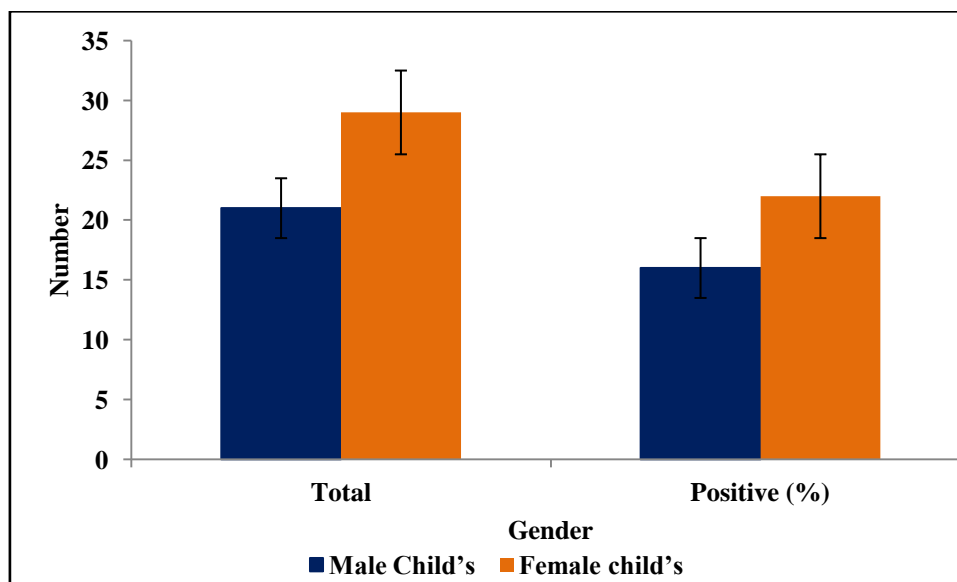


Figure 1: Prevalence of intestinal worm infections among children

Table 2: Demographic characteristics of School going children included in the study

Demographic Characteristics	
Gender	
Male	16
Female	22
Residential area	
Established	15
Un Established	23
Socioeconomic status	
Poor	17
Rich	21
Hygienic condition	
Satisfactory	26
Good	12
Source of drinking water	
Boring system	13
Govt. supply	16
Filtration plant	9

Table 3: Type of worms detected

Worms	Positive (%)
<i>Trichuris trichiura</i>	14 (36.8)
<i>Ascaris lumbricoides</i>	7 (18.4)
<i>Hymenolepis nana</i>	5 (13.2)
Hookworm	3 (7.9)
Mixed (Helminths + Protozoa)	9 (23.7)

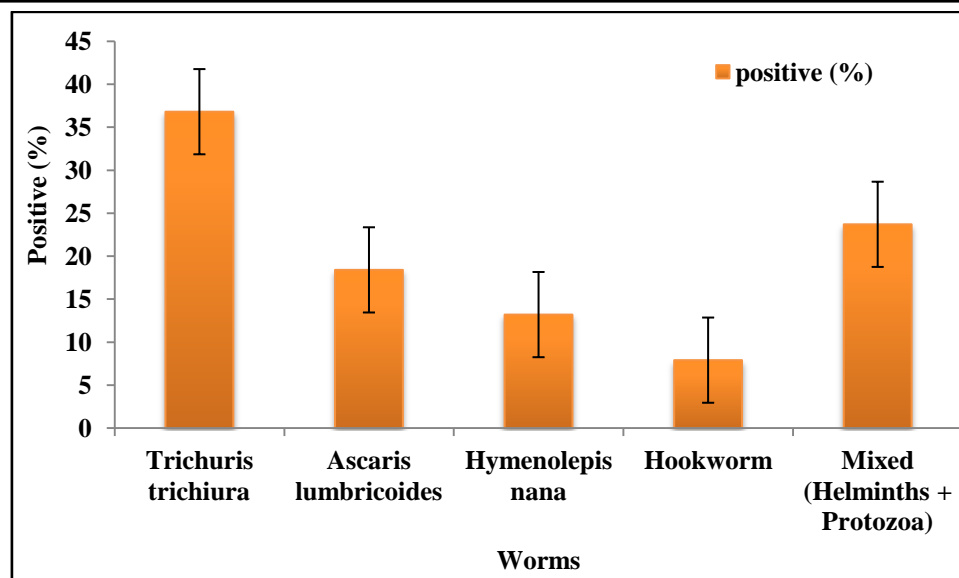


Figure 2: Type of worms detected

Discussion

The prevalence of intestinal worm infestations among school children found in the study (76%) is very high. Comparatively girls (44%) were found more infected than boys (32%), ($p < 0.05$). *trichiura* was most common (36.8%) followed by *A. lumbricoides* (18.4%), *H.nana* (13.2%) and Hook worm (7.9%) while 23.7% cases showed mixed infection with various helminths as well as protozoan parasites like *G. lamblia* and *E.histolytica*. Intestinal worm infestation is a global health problem and is a matter of serious concern for the third world countries. Overcrowding, contamination of water, poor sanitation and migration of people to cities greatly favour transmission of parasitic infection resulting in high endemicity. STH infections form the most important group of intestinal worms and account for 27% of entire school-age and preschool-age children population in the World, who are in need of anthelmintic treatment.⁹ The most frequent triple infections is *A. lumbricoides* + *T. trichiura* + hookworm (0.99%), which is in agreement with the report of Dada-Adegbola et al¹⁰ Intestinal worm infestation was found to be significantly high among girls compared to boys in the study ($p < 0.05$) which contrasts with findings of previous studies elsewhere in the globe.¹¹⁻¹⁴ Although intestinal worm infestation is gender

independent,¹⁵⁻¹⁷ difference in prevalence among boys and girls found in the study might be related to personal hygiene.

Our research findings endorse and support other studies conducted in other parts of the world as well as in Pakistan. Some studies show that the prevalence of worms infestation as 25% - 91% in some parts of the world.¹⁸ It has been observed that worm infestation is not only confined to certain geographical areas of the world but is an emerging problem globally even an increasing number of cases being reported from Europe and the USA.¹⁹ Worms infestation in some parts of the world were reported as 31.8% in Turkey,²⁰ in South Africa,²¹ 19.3% in Iran 47.2%²² in Nigeria 49.7%²³ and 44% in Sudan.²⁴

The results of this study indicate that poor personal hygiene (such as not wearing shoes, no proper hand washing before and after eating, biting nails, improper toilet habits, poor socioeconomic conditions and a low level of education among parents) appear to be powerful determinants of infection. Implementation of short-term control measures like anti-microbial therapy, supplemented with long-term strategies like clean drinking water, adequate sanitation, and improvement in nutritional status and health education programs, are needed to control these parasitic infections. The parents of the infected

school children were called for counseling and were educated about personal hygiene and the importance of washing hands, wearing shoes, and cleanliness of the household and surrounding areas.

Conclusion

The prevalence of infection suggests that it is still major public health problem in tropical countries such as India. These infections were found to be due to low standards of housing, faulty technique of hand washing, non usage of sanitary latrine, and illiteracy. As found in this study, higher rate of parasitic infection in school-going children requires hygiene education to students and parents. Anthelmintic drugs were prescribed to those who were found to be positive for the helminthes.

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