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Research Article

PATTERN OF HELMINTHIASIS IN PEDIATRIC OPD OF A TERTIARY CARE INSTITUTION OF HARYANA (INDIA)

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ABSTRACT

Intestinal parasitism is a public health problem and endemic in many developing countries like India. The worm infestations are very common in children and adversely affect the health status of children like loss of appetite, decreased growth and development, school absenteeism and decreased cognitive performance. The study was record based and was carried out at Pt B D Sharma PGIMS, Rohtak. The study included the results of stool specimens of pediatric age group from 1st July 2014 to 30th June 2015. A total of 1250 stool specimens were collected in OPD of a tertiary care institute of Haryana. The prevalence of worm infections from total stool specimens collected was found to be 34.5%. In the present study, maximum 44.3% (191/431) subjects were infected with Ascaris lumbricoides followed by 23.7% (102/431) with Entamoeba histolytica (EH), 16.7% with Giardia while 14.8% subjects had Taenia solium and only 0.4% subjects had Hymenolepis nana (H. nana). Worm infection is a major public health problem among children in India and most common reasons are that the children are not washing hands before eating, drinking unclean water and lack of proper sanitation for defecation. A comprehensive control strategy for school children is recommended.

Keywords: *Helminthiasis, Worm, Infestation, Children, Stool Specimen*

INTRODUCTION

Intestinal parasitism is a public health problem and endemic in many developing countries like India. The pediatric age group is at a higher risk for intestinal helminthiasis. In India, worm infestations are very common in children and adversely affect the health status of children like loss of appetite, decreased growth and development of child, school absenteeism and decreased cognitive performance of the children (Tadesse, 2005; Nokes *et al.,* 1993). Many studies in India have shown that there is significant influence of intestinal helminthiasis on the anthropometric indices in pediatric age group (Quinhui-Cota *et al.,* 2004).

About 2 billion people in the world are infected with at least one species of Soil Transmitted Helminthiasis (STH) (due to Ascaris lumbricoides 1 billion, Trichuris trichiura 800 million and hookworm 740 million) and 4 billion are at risk of infection (WHO, Eliminating Soil-Transmitted Helminthiasis, 2012). STH infections are also more commonly prevalent in children especially in developing countries. More than 613 million school-age children in the world are at risk of STH infection. The most common STH in children are ascariasis, trichuriasis and hookworm. The geographical distribution of helminthiasis in India is dependent upon many factors like age, sex, culture, socio-economic status, occupation of individual and environmental conditions like children playing in polluted soil, absence of sanitary facilities, unsafe waste disposal system, inadequacy and lack of safe water supply and types of toilet used (WHO, Soil-transmitted helminthiases, 2012).

The problem of worm infestations are likely to be more common in India because of poor personal hygiene, low awareness, poverty, unclean water supply, lack of access to clean sanitation, open defecation, overcrowded living conditions and illiteracy which makes them more susceptible to helminthiasis especially the children (Hennequin, 1997; Nilanth *et al.,* 2003). Further, lack of resources in

terms of health infrastructure, manpower, waste management, drugs, political will, traditional beliefs and customs are some of the common barriers to achieving a "worm- free India". Non-availability of accurate information on the prevalence or burden of disease in the community is another major obstacle to the timely implementation of preventive and control strategies.

In Nepal, 86.7% of the school children are infected with a single helminth and 13.3% of children had mixed infections (Mukhopadhyay *et al.*, 2008). Various studies of India have reported the prevalence of intestinal parasitism upto 30-50% among pediatric age group (Chakma *et al.*, 2000; Mahajan *et al.*, 1993) Thus Government of India should focus on this public health problem especially among children. In Haryana, no such type of study has ever been conducted to find out the prevalence and type of worm infestations among children, therefore the present study was undertaken in a tertiary care hospital with the objectives to find out the parasite load and type of worm infections in stool specimens in pediatric OPD of a tertiary care hospital of Haryana.

MATERIALS AND METHODS

The study was record based and was carried out at Pt B D Sharma PGIMS, Rohtak which is a tertiary care hospital having 1700 beds and it is one of the premier institutes of Haryana. This is a teaching institute having 200 MBBS seats, 145 MD & Diploma students, 06 MCh, 02 DM students and 250 faculty members. This tertiary care hospital is providing health care services to an average of 4000- 5000 patients daily including 500-600 pediatric OPD cases. The study included the results of stool specimens of pediatric age group from 1st July 2014 to 30th June 2015. The data was collected on semi-structured proforma from OPD laboratory which deals with all the routine investigations coming from all OPD like Hb, TLC, DLC, ESR, Urine examination, Stool examination etc. The laboratory technician in the OPD laboratory was qualified with 15 years' work experience in the same lab. The microscopic examination of stool was done by preparing a slide using normal saline and Lugol's iodine to observe the type of ova of Helminthiasis. The stool specimens were observed first using low (10x) power lens and then under high (40x) power lens to differentiate the type of ova/cyst. The proforma includes age, sex, whether worm infestation was found or not, type of worm etc.

The following formula is used to calculate the prevalence and intensity of infection in a community according to WHO guidelines:

$$\text{Prevalence} = \frac{\text{Number of subjects testing positive}}{\text{Number of subjects investigated}} \times 100$$

The collected data were entered in the MS Excel spread sheet, coded appropriately and later cleaned for any possible errors in the SPSS (Statistical Package for Social Studies) for Windows version.18.0. Anaysis was carried out using SPSS (Statistical Package for Social Studies).

RESULTS AND DISCUSSION

Results

Table 1: Demographic distribution of study subjects according to stool collection and worm infestation (n=1250)

Sr No.	Age Group	Sex	Stool collected (%)	Worm Infestation (%)
		M	485 (38.8)	160 (32.9)
1.	0-5 years			
		F	242 (19.3)	92 (38.0)
		M	219 (17.5)	74 (33.7)
2.	5-10 years			
		F	130 (10.4)	47 (36.1)
		M	112 (9.0)	37 (8.5)
3.	10-14 years			
		F	62 (5.0)	21 (33.8)
	Total		1250 (100)	431 (34.5)

Table-1 shows that a total of 1250 stool specimens were collected in OPD of a tertiary care institute of Haryana. Out of these, 58.1% (727/1250) stool specimens were collected only from 0-5 years children, 29.7% stool specimens from 5-10 years children and rest from 10-14 years children. The prevalence of worm infections from total stool specimens collected was found to be 34.5%. Gender wise, 32.9% specimens of males and 38% specimens of females had worm infestation in 0-5 years age group. Similarly, stool of 33.7% male and 36.1% female had worm infestation in the age group of 5-10 years and 8.5% of males and 33.8% of females stool were found to have worm infections in the age group 10-14 years. In conclusion, the worm infections were found more among males as compared to females in all age groups.

Table-II shows the type of worm infestations among children in a tertiary care institution in a one year period. In the present study, maximum 44.3% (191/431) subjects were infected with Ascaris lumbricoides followed by 23.7% (102/431) with Entamoeba histolytica (EH), 16.7% had Giardia while 14.8% subjects had Taenia solium and also 0.4% subjects stool had Hymenolepis nana. The study also analyzed the gender wise distribution of type of worm infestation among study subjects and found out that Ascaris Lumbricoides was found in 42.4% male stool specimens in comparison to 19.4% females in the age group of 0-5 years. Similarly, 25.5% male stool specimens had Entamoeba Histolytica in the age group of 0-5 years while 20.6 % female had same worm infestation. 44.4% male stool contains giardia while 26.4% female had giardia. The stool specimens of 14.8% subjects had Taenia solium. Out of these, maximum (32.8%) male stool specimens had Taenia solium in the age group of 0-5 years while 21.8% female stool specimens had same worm in the same age group. H Nana was detected in stool of two study subjects i.e one male and one female in the age 0-5 years and 5-10 years respectively.

Table 2: Type of worm infestations among children in a tertiary care institution (n=431)

Sr No	Age	Sex	Ascaris lumbricoides	EH	Giardia	Taenia solium	H. nana	Total
1.	0-5 yrs	M	81 (42.4)	26 (25.5)	32 (44.4)	21 (32.8)	0 (0)	160 (37.2)
		F	37 (19.4)	21(20.6)	19 (26.4)	14 (21.8)	1 (50.0)	92 (21.3)
2.	5-10 yrs	M	29 (15.2)	23 (22.6)	12 (16.7)	09 (14.0)	1 (50.0)	74 (17.2)
		F	22 (11.5)	14 (13.7)	04 (5.6)	07(11.0)	0 (0)	47 (10.9)
3.	10-14 yrs	M	14 (7.3)	13 (12.7)	03 (4.2)	06 (9.4)	0 (0)	37 (8.5)
		F	08 (4.2)	05 (4.9)	02 (2.7)	07 (11.0)	0 (0)	21 (4.9)
Total			191 (44.3)	102 (23.7)	72 (16.7)	64 (14.8)	2 (0.4)	431 (100)

Discussion

Worm infections generally infect people who live in poverty with lack of adequate safe and clean water and poor sanitary conditions. Socioeconomic status and socio-cultural factors of people are significantly responsible for STH infection. Worm infestations are responsible for various morbidities in children. Many studies pointed out that helminthiasis are an important public health problem in children (Ragunathan *et al.*, 2010). The objective of the present study was to find out the prevalence and type of worm infestation among children in Haryana.

The present study reported that the prevalence of worm infections among pediatric age group was 34.5%. Gender wise, the prevalence of worm infestations were found more among males in all age group as compared to females in their stool specimens. The majority of infestations occurs when children are playing on the contaminated soil and do not wash their hands before eating, therefore hand washing after defecation had a protective effect against helminthiasis. An intervention study in Bangladesh showed that combination of periodic anti-helminthic treatment and hygiene education had significant effects and was found to be a cost effective method to control soil transmitted infections in children (Mascie-Taylor *et al.*, 1999).

The study also evaluated the type of worm infestations among children in a tertiary care institution and revealed that maximum (44.3%) subjects were infected with Ascaris lumbricoides followed by 23.7% with Entamoeba Histolytica, 16.7% with Giardiasis, 14.8% with Taenia solium while only 0.4% subjects stool had H. nana. The gender wise distribution shows that the worm infestations were more common in males in all age groups as compared to their female counterparts. H nana also detected in stool of two study subjects i.e. one male and one female in the age 0-5 years and 5-10 years respectively. Surprisingly, in the present study, no hook worm and Trichuris trichiura infections were detected in the stools samples of children.

Avhad *et al.,* and Kaliappan *et al.,* quoted almost similar prevalence of infestations i.e. 32.05% to 34.72% among school children and 39% for all subjects respectively (Avhad *et al,,* 2012; Kalliappan *et al.,* 2013) and Kumar *et al.,* quoted the overall prevalence of intestinal worm infection as 49.38% and reported that Ascaris was the most common parasite (46.88%), followed by Taenia (2.1%) and 0.21% Hymenolepis nana (Kumar *et al.,* 2014). Lone *et al.,* in Kashmir reported that the overall prevalence of worm infestations was 58.1% among children and identified five species of intestinal helminths. The predominant parasite detected was Ascaris lumbricoides (54.9%) followed by Trichuris trichuria (32.5%), Taenia saginata (9.1%), Enterobius vermicularis (2.6%) and 2.05% Hymenolepis nana (Lone *et al.,* 2011). Similarly Khan *et al.,* from Pakistan and Wani *et al.,* from Jammu and Kashmir in India also reported that ascariasis was the commonest infestation in children (Khan *et al.,* 2004; Wani *et al.,* 2010).

Ullah *et al.,* from Pakistan in 2009 reported a high percentage of primary school children from rural Peshawar had intestinal worm infestation and majority of them had Ascaris lumbricoides (Ullah *et al.,* 2009). The high prevalence of soil transmitted infestation is directly related to the unhygienic living conditions or practices associated with lack of knowledge about the communicable disease and many other factors, which need to be studied.

Various studies from India (Avhad *et al.,* 2012) and abroad (Ogwurike *et al.,* 2010; Jemaneh, 2001) show~~s~~ that males had an overall higher prevalence of worm infestation as compared to females and statistically this difference was found to be significant. This could be explained by personal hygiene related to playing in the soils and then drinking water with unclean~~ed~~ hands, open defection, not washing their hands before eating etc. Various studies from developing countries demonstrated a strong relationship between toilet usage and decreased STH infections.

The major limitations of study are that the study was record based and was carried out in pediatric OPD of tertiary care hospital. This study does not reflect the true prevalence of worm infestation in pediatric age group therefore we can't generalized these results to other parts of the country and further more studies need to be carried out in the same area to find out the true picture of worm infestation in children.

Conclusion and Recommendations

In conclusion, worm infection is a major public health problem among children in India and most common reasons are that the children are not washing hands before eating, drinking unclean water and not have proper sanitation for defecation.

The helminthiasis in the children could be prevented by taking proper cleanliness measures like cutting nails, drinking clean and chlorinated water, properly washing of hands before meals, thoroughly washing vegetables and fruits, wearing of footwear etc. A comprehensive control strategy for school children is recommended like school teacher and health functionaries should impart health education to children, teach them about personal hygiene during school visits and ensure provision of safe drinking water and

environmental sanitation. These control strategies will not only increase the effectiveness of control of parasite but also protect children from having other communicable diseases associated with unclean environment like diarrhea, typhoid fever, cholera, hepatitis etc. There should be regular health checkups of children, periodic screening for intestinal parasites and blood indices at the school level and at anganwadi level. As recommended by WHO, "In areas where prevalence of mild to moderate underweight children is greater than 25% and where parasites are known to be widespread, high priority should be given to deworming," (WHO, 1991). The study strongly recommends that there is need of sustainable efforts required in National iron plus initiative programme to deworm the children regularly that could decrease the morbidity which in turn promotes the growth and development of children.

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