

Prevalence of Intestinal Helminthic Parasites in School Going Children in Rural Area of Kuppam, Andhra Pradesh

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Abstract – This paper presents the status of intestinal helminthiasis in public school children aged 5 – 14 years in a rural area of Kuppam, Andhra Pradesh. A total of 135 school children (69 girls and 66 boys) were included in this study. A protocol was filled out regarding hygienic and other habits, including factors predisposing to helminthic infections. Fecal samples from the children were examined by direct method and concentration techniques. The overall prevalence of helminthiasis was 15.55%. The most common helminthes were Hook worm, Ascaris and Hymenolepis nana. The frequency of parasitic infection is high in Kuppam, possibly due to low socio-economic status, lack of health education, poor sanitation and warm climate in this area and should be regarded as an issue of public health priority..

Keywords – parasitic infection, helminthiasis, hook worm, ascaris, hymenolepis nana

1. Introduction

World health organization (WHO) estimates that over billion of world's population is infested with soil transmitted diseases [1]. Intestinal parasitic infestations are amongst the most common infections worldwide, Intestinal parasites still constitutes one of the major causes of public health problem in the world [2].

Intestinal parasitic infestations are the most common consequences have been shown to cause nutritional status, physical development mental functions, and verbal ability and inhibition control aspects of cognitive behavior of the children[3]. Parasitic worms are the commonest infections particularly in children and adults, which estimates that there are more than 3 billion worm infections in the today's world [4].

India being a developing country both urban, rural areas are among the poorest global estimates indicating more than half of the total population nearly (3.5 billion people) are affected by parasitic infections and among them 450 million are children [5].

As large percentage of Indian population lives in rural, peri-urban, slum and Industrial areas by makeshift dwellings. They normally go for open defecation and move about bare feet. Living conditions of these people in crowded or unhealthy situations may also facilitate the spread and distribution of various helminthic infections [6].

With this present background we carried out prevalence of these intestinal parasites-helminths as main focus and to characterize their epidemiology to control spread of these intestinal parasites as well as increase awareness about these intestinal parasitic infestations.

2. Methods

So a study protocol was designed and got approved from the Institutional Ethical committee of P.E.S.I.M.S and R Hospital, Kuppam. This study was carried from the period March 2008 to September 2008. Stool samples were collected from children between 5-14 yrs, who attended Pediatrics OPD in P.E.S Hospital, Kuppam. Kuppam is a

rural area and it is an agriculturally focused area with majority of the people depending on agriculture for their live hood. The community is poor and children are malnourished most of the people resort to open field for defecation.

2.1. Sample collection

Sterile screw capped tight fitting containers were provided to the children for the collection of stool samples. The containers were these labeled correctly. Every child was instructed to bring his/her own stool sample without mixing water and urine. Morning samples were collected and transport to the Department of Microbiology Laboratory in PES Medical Hospital Kuppam and a specific lab number was allotted for each container.

2.2. Methodology

Methodology was followed from K.D. Chatterjee text book of Parasitology Twelfth edition.[7]. Stool samples were tested for the presence of ova and cyst of intestinal parasites within 2 hours for both Macroscopic and Microscopic examination, using normal saline (8.5g NaCl/liter of water) and Lugol's iodine preparation as direct method. Examination was done with low power objective and the high power objective of microscope for identification of intestinal helminthic eggs. All negative samples were re-examined by Formalin-Ether sedimentation and Zinc-Sulphate flotation technique (Concentration methods).

2.2.1. Staining preparation

2.2.1.1. Direct Method

a) Iodine wet mount is made by mixing 0.5 g of stool sample with a drop of Lugol's iodine after making a smooth and equal suspension.

b) Saline wet mount is made by mixing 0.5 g of stool sample with a drop of saline after making a smooth suspension.

2.2.1.2. Concentration Method

If the number of organisms in the stool specimen is low and examination of direct wet mount may not detect parasites, hence the concentration were done to detection of eggs and cysts and larvae but trophozoites get destroyed during the concentration procedure. This makes direct wet mount examination obligatory as the initial phase of microscopic examination.

2.3. Preservation of Specimen

Preservation of stool helps in maintaining morphology of protozoan parasites and prevents further development of helminthic eggs and larvae.

2.4. Quantification of worm burden

Egg counts are not usually done in a clinical laboratory for routine diagnosis. It is usually done for Hook worm and *Ascaris lumbricoides* for two purposes.

- a) Epidemiological survey
- b) Therapeutic monitoring.

Facal sample can be preserved in 10% formalin-saline (100ml of formaldehyde in 900ml 0.85% sodium chloride) three parts of formalin preservative solution is thoroughly mixed with one part of stool specimen. It adequately preserves protozoan cysts and helminthic eggs and larvae.

2.5. Two Methods Commonly Used For Egg Counts Are

1.1.1. Direct Smear Egg Count

- a) Approximately 2 mg of stool is mixed in a small drop of saline on a slide.
- b) Evenly mix the material, apply a cover slip avoiding the air bubbles formation.
- c) With the low power microscope examine the entire preparation.
- d) Record count of each spp of eggs per smear. Count number of egg/gram of stool using the formula:
No. of eggs/gm of stool = $N/2 \times 1000$ where
N = number of eggs.

2.6. Faecal Culture

Faecal culture was done for hook worm eggs using Harada-Mori culture method. Filter paper with smears of faeces were placed in a centrifuge tube with sterile water in such a way that the lower end of filter paper is dipped in water and incubated in room temperature for 7 – 10 days. Larvae which developed on the filter paper were examined under microscope for confirmation.

2. Results

A total of 135 stool samples were examined for intestinal parasitic infestation in children of age group 5 to 14 years attending Pediatric OPD PESIMS&R, Kuppam during March 2008 to September 2008.

Out of 66 males, 17 (25.75%) were positive and out of 69 females, 19 (27.53%) were positive. Among the Helminthic intestinal parasitic infestation, hook worm 8(5.92%), *Ascaris lumbricoides* 7(5.18%) and *Hymenolepis nana* 6 (4.44%) were observed in (table 1).

In age group of 5 – 10 years in males out of 40 (29.62%), 6 (15%) were positive. Among the 6 (15%), hook worm 1(2.5%), *Ascaris lumbricoides* 2 (5%) and *Hymenolepis nana* 3(7.5%). Among the children between the age group of 11 –

14 years in males out of 26 (19.25%), 4(15.38%) were positive. Hook worm 1 (3.84%) and *Ascaris lumbricoides* 3 (11.53%).

In the age group of 5 – 10 years in females out of 7 (18.42%) were positive. Among the 7 (18.42%), hook worm 6(15.78%) and *Ascaris lumbricoides* 1 (2.63%) were detected. On the other hand children between the age group of 11 – 14 years in females out of 31 (22.69%), 4(12.90%) were positive. Among them *Ascaris lumbricoides* 1(3.22%) and *Hymenolepis nana* 3 (9.67%) were present.

In this study egg counting was done for samples which contained eggs of *Ascaris lumbricoides* and hook worm. In male children age group 5 – 10 years, 1 hookworm and 8 *Ascaris lumbricoides* were detected. In the age group of 11 – 14 years, one egg of hook worm and 11 eggs of *Ascaris lumbricoides* were observed.

In female children age group 5 – 10 years 7 eggs of hookworm and one egg of *Ascaris lumbricoides* were detected. In the age group of 11 – 14 years, one egg of hook worm and 4 eggs of *Ascaris lumbricoides* were observed.

3. Discussion

Parasitic diseases are more common in children from rural areas. Morbidity due to intestinal parasites is always been an important health problem in the tropics, but the incidence and the severity may vary depending on the location and period of time.

Among the Helminthic parasites, Hook worm, *Ascaris lumbricoides* and *Hymenolepis nana* were detected in the present study. The study shows 8 positive samples with (5.92%). Chandler in 1929 [8] observed 72.7% prevalence in Naida district, 63.9% in Bribhum, 80 – 90% in Malda and 90% in Darjeeling district of West Bengal. *Ascaris lumbricoides* was seen in 7 (5.18%) cases. 0.2 – 0.6% was reported from Chandigarh (Sethi et al, 2000)[9], but much lower than the prevalence of 22.6% and 52.8% that have been reported from other states of India by Estevez et al, 1983; Ganga and Ravichandran, 1988; [10][11].

One third of children were infected with intestinal parasites. Infection rates were almost similar in males and females, indicating equal distribution of parasitic infections. Ischiyama et al, 2003; [12] reported similar findings among school children living in almost identical conditions. Rajeswari et al, 1994; Kight linger et al, 1995[13], [14] reported higher prevalence in females and in males by Agi, 1995 [15]. Parasitic infections in the present study were also seen in children of 5 – 10 years and 11 – 14 years were 26.92% and 26.3% respectively. Our study found males and females have infection rates of 25.75% and 27.53% respectively. A significantly higher prevalence of 71.0% was seen among children in age group of 11-14 years appears to have parasitic infections due to their outdoor activities.

The stool concentration technique was used in the present study because of its higher diagnostic sensitivity to intestinal parasites than the direct smear technique. By the concentration methods formalin-ether technique was more efficient in detecting parasites than zinc-sulphate flotation technique.

Table 1. Showing the prevalence of Helminths from school children.

NO	Parasite	Positive	Percentage
	Helminths	21	15.5%
1.	Hook worm	8	5.92%
2.	Ascaris lumbricoides	7	5.18%
3.	Hymenolepis nana	6	4.44%

Values are expressed in terms of percentage

Table 2. showing the prevalence of Helminthis parasites with respect to age and gender.

PARASITE	Males						Females						Over all		
	5 – 10 years			11 – 14 years			5 – 10 years			11 – 14 years					
	N	+	%	N	+	%	N	+	%	N	+	%	N	+	%
Helminths	40	6	15	26	4	15.3	38	7	18.4	31	4	12.9	135	21	15.5
Hook worm	40	1	2.5	26	1	3.8	38	6	15.7	31	0	0	135	8	5.9
Ascaris lumbricoides	40	2	5	26	3	11.5	38	1	2.6	31	1	3.22	135	7	5.1
Hymenolepis nana	40	3	7.5	26	0	0	38	0	0	31	3	9.67	135	6	4.4

The (+) sign indicates for Positive cases, Values are expressed in terms of percentage

Table 3. Showing the parasites isolated by direct smear and concentration technique

Total number of parasite seen	Direct Smear	By Concentration Method	
		(A) Formalin–Ether Sedimentation	(B) Zinc Sulphate Floatation
HELMINTHS-21	11	5	5
Hook worm-8	3	1	4
Ascaris lumbricoides-7	5	1	1
Hymenolepis nana-6	3	3	0

Values are expressed in terms of percentage

Table 4. showing egg counting for samples containing eggs of Hookworm and Ascaris.

HELMINTHS	Males		Females		N/2 X 1000 = Total Eggs
	5 – 10 years	11 – 14 years	5 – 10 years	11 – 14 years	
Hook worm	1	1	7	1	10/2 X 1000 = 5000 Eggs
Ascaris lumbricoides	8	11	1	4	24/2 X 1000 = 12000 Eggs

The “N” sign indicates that number of eggs present in the mount

4. Conclusion

The study has shown that the intensity of intestinal Helminthic infections reported at Kuppam, Andhra Pradesh were mostly of low grade and can be efficiently be detected by the formol-ether concentration method which exhibited superior sensitivity than Zinc-sulphate flotation method. The employment of formol-ether concentration technique as a confirmatory test in routine laboratory examination of stool will significantly reduce misdiagnosis of intestinal Helminthic infections and its attendant public health consequences.

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