INTESTINAL PARASITIC INFECTIONS AMONG PATIENTS ATTENDING A TERITIARY CARE HOSPITAL IN SOUTH INDIA

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ABSTRACT: BACKGROUND: Intestinal parasitic infections are among the most common infections in the world and are responsible for considerable morbidity and mortality. "There is increased prevalence of these infections in rural areas of developing countries." **AIM**: The present study was done to determine the intestinal parasitic infection among patients attending to the hospital, who are residents of Sullia taluk only. **MATERIALS AND METHODS**: Faecal samples from 500 randomly selected patients were collected and screened using conventional saline and iodine wet mount and examined by direct microscopy. Samples were further concentrated by formal-ether sedimentation technique. **RESULTS**: In the present study the occurrence of intestinal parasitic infection was found to be 14.60%. The common parasite detected was *A. lumbricoides* (47.94%) followed by hookworm (30.13%). However *E. histolytica* and *G. lamblia* were only 1.36%, 5.74% respectively. Multiple infection was detected only in 0.80% of infected cases. **CONCLUSION**: Soil transmitted helminthic infections are more common than protozoal infections. Hence there is a need for health programmes to be held regularly that will involve health education regarding personal hygiene, hand washing, importance of sanitary procedures and periodic deworming.

KEY WORDS: Intestinal parasites, Occurrence, Ascaris.

INTRODUCTION: Human intestinal parasitic infections have a worldwide distribution, with the greatest incidence and intensity occurring in developing countries[1]. The high prevalence in rural area of developing countries is probably due to poverty, poor sanitation, inadequate personal hygiene and lack of clean water supply. Helminths and protozoa are the two groups of pathogens causing intestinal illness with both direct and indirect method of transmission among people[2]. Helminthic infections are the main cause of loss of appetite, iron deficiency anemia, gastrointestinal symptoms, perianal pruritis, gastrointestinal or biliary obstruction[3]. They also cause malnutrition in children[4] which leads to impairments in physical, intellectual and cognitive functions[4,5,6].

In India overall prevalence rate of intestinal parasitic infection ranges from 12.5% to 66% with varying prevalence rate for individual parasite. About 50% of the urban population and 68% of the rural population in India is affected[7]. Intestinal parasitic infections are found in

every age group and in both sex[8]. The purpose of this study was to determine the intestinal parasitic infection in the patients who are residents of Sullia attending to the hospital.

MATERIALS AND METHODS: The present study was carried out in the Department of Microbiology, in K.V.G. Medical College & Hospital, Sullia. Five hundred patients of both sexes aged between 1 to 50 years with or without symptoms suggestive of parasitic infections were included in the study. Inpatient and outpatients residing only in Sullia taluk were included in the study group. The study was conducted between November 2010 and September 2011. Informed oral consent was obtained from the patients. Questionnaire was administrated on each subject so as to collect sociodemographic data including age, sex, type of toilet used, family size, source of drinking water and method of water treatment. Each patient was provided with a wide mouthed clean, dry, screw- capped container for collection of stool sample. The stool samples were examined within one hour of collection. Macroscopic examination was done to look for consistency, presence or absence of blood and mucus, adult intestinal worms and proglottids of *Taenia* species. The microscopic examination was done by normal saline and iodine mount directly from the stool. The samples found negative by microscopy were further concentrated by formal- ether sedimentation technique[9]. The mounts were screened under the microscope for the presence of helminthic ova, larva, trophozoites and cysts of protozoa. The modified Ziehl- Neelsen stain was used for the identification of coccidian parasites[10].

RESULTS: The overall occurrence of intestinal parasitic infections was 14.60% (73/500). Out of which 54 cases were detected by direct microscopy, 19 more cases were found positive after formal-ether concentration technique. Single infection was detected in 13.80% and dual infection was detected only in 0.80% of infected cases. *Ascaris lumbricoides* (47.94%) was the most common intestinal parasite, followed by hookworm (30.13%), *Trichuris trichiura* (9.58%), *Giardia lamblia* (5.47%), *Enterobius vermicularis* (4.10%), while *Entamoeba histolytica* and *Strongyloides stercoralis* (1.36%) has the same frequency [Table 1]. *A. lumbricoides* was found in single infection as well as in association with other helminthes in mixed infection [Table 2]. No coccidian parasites were found.

Infection rate was highest (32.87%) in the age group 11-15 years, followed by 6-10 years (15.06%). The distribution of intestinal parasitic infections in various age groups is shown in Table 3. Among the 73 positive cases, 59 were outpatients and remaining 14 were inpatients. Out of 500 patients, 318 were males and 182 were females. Infected case distribution among males and females was 15.40% and 13.18% respectively [Table 4]. The sociodemographic data of the study group is given in Table 5. Among the positive cases, 66 (90.41%) used well water of which 59 (80.82%) boiled water before drinking. 61 positive cases did not use footwear regularly, 46 of them also gave history of defecation in open fields.

DISCUSSION: Intestinal parasitic infections are endemic worldwide and remain a major public health concern in many tropical and subtropical countries. The prevalence rates of intestinal parasitic infections and type of parasite exhibit wide variation from country to country, between geographical areas, communities and even seasonal variations also occurs[11]. Study on the occurrence of infection by various intestinal parasites is important to formulate appropriate intervention measures.

The present study showed 14.60% overall occurrence of infection, which is nearly comparable to the study of Baragundi *et al* (12%)[8]. However, our results are considerably lower

than that of earlier studies[1,4,12]. In our study, *A. lumbricoides* (47.94%) was found to be the dominant intestinal pathogen, followed by hookworm (30.13%) and *T. trichiura* (9.58%). The possible reason for this, is the infective stage of *A. lumbricoides*, the embryonated egg have enormous capacity for withstanding the environmental extremes. Furthermore, Ascaris eggs are coated with a mucopolysaccharide that renders them adhesive to a wide variety of environmental surfaces[13]. They readily adhere to raw fruits and vegetables when fertilised with contaminated night soil or washed with contaminated water. They have also been found adherent to eating and cooking utensils and under fingernails. The results showed occurrence rate of helminthic infection are higher than those reported in other studies[14].

In contrast to helminthic infection, the occurrence of protozoan infection in this study was significantly low (6.84%), but higher in other studies[12,15]. This may be due to people having access to clean drinking water, well water being the main source of water. Water is prime source of spread of infection along with contamination of food in protozoal infection[16]. Larvae of S. *stercoralis* (1.36%) were present in patients negative for HIV testing. *Taenia* and H. nana infections were not seen in our study, probably due to restricted consumption of pork and beef and *H. nana* infection significantly occurs by the presence of rodents and beetle in house. Contrary to our study some studies have shown high prevalence of *H. nana*[8]. All other parasites showed low occurrence when compared to other studies. This could be due to variation in geographical distribution of different parasite[11,17].

We found that in our study dual infection was 0.80%, this coincides with the findings of most of the previous studies[7]. This is a clear indication of large number of various species of parasites in the locality. It was noted that occurrence of intestinal parasitic infection was highest among the age group 11-15 years (32.87%), followed by 6-10 years (15.06%). This finding is in agreement with previous studies[12]. 26.67% of the children were malnourished. Even though, gender is not a significant risk factor for intestinal parasitic infection[18], in this study males were more infected than females. This finding is endorsed by earlier studies[19]. *A. lumbricoides* was the most common helminthic parasite in both male (50.12%) and female (41.66%), followed by hookworm (26.53% in male; 37.5% in female). This may be due to the contamination of soil by human faeces, use of raw sewage for agricultural purposes; use of waste water irrigated vegetables and contaminated imported vegetables[20]. 83.56% of the study population do not use footwear, and still 63.01% defecate in open fields which increase the susceptibility to helminthic infections. Mostly children are affected as they come in contact with contaminated water, food, faeces and other source of infection through play and other unhygienic behaviour[20]. No immunocomprised patients found in our study which may be the reason we found no coccidian parasites.

CONCLUSION: Human parasitic infection is a global problem of enormous proportion, responsible for mild but chronic morbidity. This region of study has high rainfall, high humidity, dense shade, poor sanitation and human host, which helps to complete the life cycle of the helminths. Hence there is a need to improve sanitation facilities. Regular health education should be conducted regarding personal hygiene, hand washing using soap, wearing shoes, periodic deworming and food hygiene. These multiple interventions will result in lowering infection rate but would require further investigation to verify the effect of these interventions.

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Table 1. Distribution of intestinal parasites (single infection).

Parasites	Total number of cases (percentage)
Ascaris lumbricoides	35 (47.94%)
Hookworm	22 (30.13%)
Trichuris trichiura	7 (9.58%)
Giardia lamblia	4 (5.47%)
Enterobius vermicularis	3 (4.10%)
Entamoeba histolytica	1 (1.36%)
Strongyloides stercoralis	1 (1.36%)

Table 2. Occurrence of dual infection.

Parasites	Total number of cases (percentage)
A.lumbricoides + Hookworm	2 (2.73%)
A.lumbricoides + T.trichiura	1 (1.36%)
Hookworm + S.stercoralis	1 (1.36%)

Table 3. Distribution of parasites in different age groups.

Parasites	Age in years									Total
	<5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	>40	
A.lumbricoides	3	4	19	5	1	0	1	1	1	**35**
Hookworm	2	4	4	2	2	0	0	1	7	**22**
T. trichiura	1	2	1	1	0	0	1	0	1	**7**
E. vermicularis	2	1	0	0	0	0	0	0	0	**3**
G. lamblia	0	0	2	1	1	0	0	0	0	**4**
E .histolytica	0	0	0	0	0	1	0	0	0	**1**
S. stercoralis	0	0	0	0	0	0	1	0	0	**1**
Total	**8**	**11**	**26**	**9**	**4**	**1**	**3**	**2**	**9**	**73**

Table 4. Sex wise distribution of parasitic infection.

Parasites	Males	Females
A. lumbricoides	25 (51.02%)	10 (41.66 %)
Hookworm	13 (26.53%)	9 (37.5 %)
T. trichiura	5 (10.20%)	2 (8.33 %)
G. lamblia	3 (6.12%)	1 (4.16 %)
E. vermicularis	2 (4.08%)	1 (4.16 %)
E. histolytica	1 (2.04%)	0
S. stercoralis	1 (2.04%)	0
Total	**49 (15.40%)**	**24 (13.18%)**

Table 5. Sociodemographic data of the study group

Parameter	Positive cases- 73 (%)	Negative cases- 427 (%)
Source of drinking water		
Well water	66 (90.41%)	346 (81.03%)
River water	6 (8.22%)	-
Bore water	1 (1.37%)	81 (18.97%)
Method of water treatment		
Boiling	59 (80.82%)	358 (83.84%)
Chlorination	7 (9.59%)	43 (10.07%)
No treatment	7 (9.59%)	26 (6.09%)
Usage of toilet	27 (36.99%)	324 (75.88%)
Open defecation	46 (63.01%)	103 (24.12%)
Usage of footwear	12 (16.44%)	333 (77.99%)
No footwear used	61 (83.56%)	94 (22.01%)
Deworming done	10 (13.70%)	64 (14.99%)
Deworming not done	63 (86.30%)	363 (85.01%)

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