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OCCURRENCE OF INTESTINAL PARASITIC INFECTIONS WITH GASTROINTESTINAL SYMPTOMS IN CHILDREN IN SIKKIM.

Microbiology

N.Onila Chanu* PhD Scholar, Department of Microbiology,Sikkim Manipal Institute of Medical Sciences, Gangtok, India.*Corresponding Author

T.S.K Singh Professor and Head, Department of Microbiology, Sikkim Manipal Institute of Medical Sciences, Sikkim, India.

Sudip Dutta Professor and Head, Department of Paediatrics, Sikkim Manipal Institute of Medical Sciences, Sikkim, India.

ABSTRACT

Introduction: Intestinal parasitic infections are an important but neglected health problem especially among children in developing countries. These infections are among the major causes of undernourishment morbidity, impairment of physical and mental development.
Aim: The aim was to study the occurrence of intestinal parasitic infection in children of 1 to 15 years of age and their effect on health. **Materials and method:** A total of 400 stool specimens were collected from the children with gastrointestinal symptoms at Central Refferal Hospital and Sir Thodup Namgyal Memorial Hospital during 2015 to 2017. Stool smears were examined microscopically using direct and after concentrated with saline and iodine mounts. Acid fast stain smears were used to stain *Taenia* eggs and coccidian oocysts. Agar plate culture techniques were used for hookworm eggs for species identification.
Results: The prevalence of parasitic infection was found to be 17.5%. The most common parasites were *Giardia intestinalis* (5%), followed by *Taenia* (3.7%) and hookworms (3.5%). Among the *Taenia*, *T.saginata* was 15.7% (11/400) and *T.solium* was 5.7 %(4/400) and among the hookworms, *Necator americanus* was 2.8% (11/400), *Ancylostoma duodenale* was 0.5 %(2/400) and Strongyloides was 0.2% (1/400).
Conclusion: Understanding the occurrence of various intestinal parasitic infections in children in different sectors of the society, localities are very important to develop appropriate control strategies as the frequency of infestation varies with age, sex and different geographical location of the general population.

KEYWORDS

Children, Gastrointestinal symptoms, Occurrence, Parasitic infection.

INTRODUCTION:

Intestinal parasites cause considerable morbidity and mortality, especially in children in developing countries like India and more than two billion people around the world with unrelenting illness due to it, mainly due to fecal contamination of food and water [1, 2]. Intestinal parasitic infection varies geographically in relation to the diseases [3]. As reported by World Health Organisation, globally there are 800-1000 million cases of Ascariasis, 700-900 million of Hookworm, 500 million of Trichuriasis, 200 million of Giardiasis and 500 million of *Entamoeba histolytica* [4]. It causes one of the most important health problems through their effects causing undernourishment, morbidity and incapacitation due to their behaviour particularly in children compare to adults [5]. Approximately, 400 million school aged children are infected worldwide with intestinal parasites which hampered their attention deficits, learning disabilities, school absenteeism and the higher dropout's rates [6]. Also the incidence of protozoa and helminthes varies with different geographical location. No study was conducted on the occurrence of intestinal parasitic infection in this part of India. Therefore this study was carried out to study the occurrence and identify intestinal parasite species by morphology, agar plate culture for larval nematodes and Acid fast stain smears for coccidian parasites for species differentiation between the *T.saginata* and *T.solium* in the children of Sikkim. This study also aimed at determining the associated clinical features and socio economic status.

MATERIALS AND METHODS

This prospective study was carried out in 400 children attended at Central Refferal Hospital and Sir Thodup Namgyal Memorial Hospital situated in East Sikkim, during April 2015 to April 2017. Children in the age group of 1-15 years who presented with gastrointestinal symptoms were investigated for intestinal parasitic infection. All stool specimens were collected prior to radiological studies using barium or the administration of bismuth, minerals oil and anti-diarrhoeal medication. Children above 15 years and children below 15 without gastrointestinal symptoms were excluded from this study. This study was approved by University ethical committee. Written informed consent was obtained from parents/guardians and children. Questionnaire was designed to obtain the demographic data, socio economic conditions which include dietary habit, personal hygiene, and source of drinking water. Other information includes clinical symptoms and history of parasitic infection

COLLECTION AND PROCESSING

The children/guardians were given a labelled, leak proof container with a plastic scoop (Hi-media) to collect sample as per the standard procedure of the WHO and processed within 4hours of collection. Then the samples were examined microscopically before and after formal ether concentration techniques using saline and iodine mount coverslip preparations. Positive samples for hookworm eggs were further subjected to agar plate culture method to obtain rhabditiform larvae for morphological identification and positives samples for *Taenia* eggs were subjected to modified acid fast stain smears to differentiate between *T.saginata* & *T.solium*.

STATISTICAL ANALYSIS

All the statistical analysis were done using Microsoft excel. Categorical variables were analysed by Chi-square test. Different variables were summarised using frequency tables.

RESULTS

A total of 400 stool samples were examined in which 70.3% were males and 29.7% were females. Out of this 12.25% of male and 5.25% of female were intestinal parasites positive. Age wise distribution of the study population showed higher proportion of intestinal parasites occurrence in patients between the age group of 6-10 years (**Table: 1**).The overall rates of infection were higher in males than female.

Stool concentration enhances the recovery of intestinal parasites from 10.75% to 17.5%. **(Table: 2)** The overall intestinal parasites found in this study were 17.5% **(Figure 1)**. The most common intestinal parasites in this study was *Giardia intestinalis* (5%), followed by *Taenia* species (3.7%), Hookworms (3.5%), *Entamoeba histolytica/dispar* (2.8%), *Ascaries lumbricoides* (0.25%) and *H.nana* (0.25%). Mixed infection was seen in 18.5% and single infection in 81.5%. Acid fast stained smear showed 15.7% of *T.saginata* and 5.71% of *T.solium*. Agar plate culture of hookworm eggs, yielded 2.8% *N.americanus*, 0.5%, *A.duodenale* and 0.25%, strongyloides. Diarrhoea accompanied with dehydration, weakness, fever & bloating was the most symptoms at presentation (66%), other symptoms include diarrhoea alone (15%), loss of weight & appetite (8%), abdominal pain (7%), dysentery (3%) and constipation (1%).

Figure: 1 Column chart showing prevalence of intestinal parasites

in the study.

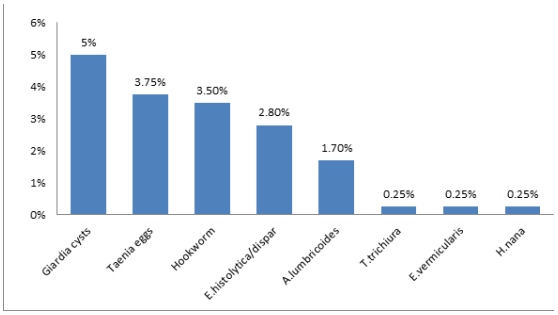

Table 1: Age and sex wise distribution

Age group	Total male	Positive male case	Total female	Positive female cases
1-5	56(19.9%)	6(1.5%)	19(15.9%)	5(1.3%)
6-10	141(50.1%)	31(7.8%)	62(52.1%)	10(1.5%)
11-15	84(29.8%)	12(3%)	38(31.8%)	6(1.5%)

Table 2: Microscopic examination in the study population

Microscopic examination	Intestinal parasites	Before concentration	After concentration
Iodine mount	*T.trichiura*	-	0.2%
	G.intestinalis	2.6%	5%
Saline mount	*E.histolytica/dispar*	1.7%	2.8%
	Taenia species	2.8%	3.7%
	A.lumbricoides	1.5%	1.7%
	Hookworms	2.6%	3.5%
	E.vermicularis	-	0.2%
	H.nana	-	0.2%

Table: 3 Statistical significance between intestinal infection with clinical and socio economic status.

Characteristics	Positive	Negative	Total	*P* value
Gender				
Female	21	98	119	
Male	49	232	281	0.20
Dietary habit				
Vegetarian	8	21	27	
Non vegetarian	62	309	372	0.05
Mode of preparation (non vegetarian)				
Smoked	12	51	63	
Cooked	21	116	137	
Fried	5	41	46	
Soup	24	101	125	0.50
Types of meat consume				
Beef	39	175	214	
Pork	16	90	106	
Chicken	35	35	42	
Fish	0	9	9	0.001
Mode of preparation (vegetarian)				
Cooked	7	14	21	
Fried	1	5	6	
Salad	0	2	2	0.001
Parents are aware of intestinal parasitic infection				0.001
Yes	29	60	89	
No	41	270	311	
Personnel hygiene Sanitary latrine				
Yes	57	231	289	
No	13	98	111	0.001
Habits of washing hands after toilet				
Yes	26	120	146	
No	37	140	177	
Tissue paper using	7	70	77	0.001
Habits of washing hands before eating				
Yes	41	263	304	
No	29	67	96	0.001
Feeding habits				
By spoon	27	143	170	
By hands	43	187	230	0.20
Source of drinking water				
Tape/spring water	39	211	250	
Boiled water	7	32	39	
Filtered water	24	87	111	0.001
Clinical symptoms History of parasitic infection				
Yes	2	13	15	
No	68	317	385	0.20
Current or past infection of allergy or rhinitis				
Yes	4	21	25	
No	66	309	375	0.50

DISCUSSION

The overall intestinal parasitic infection found in this study was 17.5%. Other similar studies done by Rashid MK *et al* found 28.8% and Singh HL *et al* found 24.5% and by Muzaffian *et al* found 34% [7,8,9].However other studies by Das et al showed 9% and 15.2% by Gangga *et al*, showed lower prevalence rate than our present study [10]. Most of the Indian studies have the prevalence rate within the range of 12% to 39%. The most common intestinal parasites found in this study were *G.intestinalis* (5%) followed by *Taenia* species (3.7%) and hookworms (3.5%). This finding were consistent with those studies done by Yones *et al*. [11].They found the most common intestinal parasites as *G.intestinalis* (28%) followed by *Cryptosporidium* species(21%) and *B.hominis* (9.5%). However in other studies, Rashid MK *et al* found *A.lumbricoides* (22.8%) and G.intestinalis (6.25%) (7). Another study by Nxasana *et al* have reported *A.lumbricoides* (29.9%) followed by *G.intestinalis* (9.9%) [12].

In this study the infection rate was lower in female than male and higher prevalence of infection was from the age group of 6-10 years. This might be due to close contact with household pets, playing with the bare foots, frequently contact with pollutes soil and less care about the hygiene. The findings are similar with other studies done by Muzzaffian et al, Kabitha G *et al* and Dakshina B *et al* [9, 13, 14].However, in another study done by Sharma BK *et al* found significantly higher prevalence (70%) among children in the age group of 11 to 14 years [15].

Intestinal protozoa are usually transmitted by the faecal oral route and their transmission involves the ingestion of food or water contaminated with the infected cysts. In this study *G. intestinal* was the most common parasite found, which may be due to the contamination of municipal water supplies or spring water with human wastes. The ova of soil transmitted helminthes such as *A.lumbricoides* could be due to ingestion from the contaminated fingers, water food or soil [16]. However, other helminthes like hookworm and *S.stercoralis* infection are usually acquired when the larva penetrate to the exposed human skin. Among the hookworm species, *A.duodenale* causes more blood loss than *N.americanus*. It has been estimated that a single *A.duodenale* worm ingests about 150µl (0.15ml) of blood per day and *N.americanus* worm about 30µl (0.03ml) [17]. In this study, among the *Taenia* eggs, 15.7% showed *T.saginata* which is acid fast and 5.71% showed *T.solium* which is non acid fast. This could be due to consumption of raw or inadequately cooked infected beef in case of *T.saginata* or pork in case of *T.solium*. Among the helminthes infection, there was a low prevalence of *E.vemicularis* and *H.nana*. *E.vermicularis* is usually occurring intestinal parasites in children; however, low prevalence rate in this study might be high because we didn't use the cellulose tape method (gold standard) to diagnose it.

CONCLUSION

Timely diagnosis and identification of the etiological agents of gastrointestinal tract infection in young children towards the benefits on deworming. Conclusively, the examination of personal hygiene, improving environmental sanitation, food and water hygiene, appropriate health education as well as routine medical examination and treatment is strongly recommended in children.

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REFERENCES

1. Odu NN, Akujobi CO, Maxwell SN, Nte AR. Impact of mass deworming of school children in rural communities in Rivers State, Nigeria: option for programme sustainability. Acta Parasitologica. 2011; 2:20-24.
2. World Health Organisation: Report of the third global meeting of the partners for parasite control. Geneva. 2014; 72:29-30.
3. Luka SA, Ajoi I,Umoh JU. Helminthosis among primary school children in statem, Nigerian. Niger J Parasitol.2000; 21:109-16.
4. Roma B,Worku S, Magnitude of Schistosoma mansoni and intestinal helminthic infections among school children in wondogenet zuria, Southern Ethiopia. Ethiop J Health Dev.1997:11:125-9.
5. Jevitha D, Pradep PS and K.Muthuswamy. Comparative Study of the Prevalence of Intestinal Parasites in Low Socioeconomic Areas from South Chennai, India. Journal of Parasitological research. PLoS Med 2014; 7: e 630968.
6. WHO. Control of Schistosomaisis and soil-transmitted helminths infections. Report by the Secretariat, Executive Board. 2001,107th Session, Provisional agenda item 3.3 (EB 107/31), Geneva.
7. Rashid MK, Joshi M, Joshi HS, Fatemi K. Prevalence of intestinal parasites among school going children in Bareilly District. Natl J Integr Res Med 2011; 2:35-7.
8. Singh HL, Singh NB, Singh YI, Helminthic infestation of primary school going children in Manipur, Journal Communi Dis,2004;36:111-16
9. Yasmeen M. Study of the prevalence of Intestinal parasitic infection in children of Ghaziabad. Indian J of Res. 2015; 4(2).
10. Ganga N, Ravichandran R. Intestinal parasites in children from middle income families. Indian Pediatr 1995; 32:828.
11. Doaa A, Lamia A, Alameldin. Effect of enteric parasitic infection on serum trace elements and nutritional status in upper Egyptian children. Trop Parasitol 2015; 5:29-34.
12. Nxasana, Baba K, Bhat VG, Vasaikar SD. Prevalence of Intestinal Parasites in Primary School Children of Mthatha, Eastern Cape Province, South Africa. Ann Med Health Sci Res.2013; 3(4): 511-516.
13. Kavitha G, Pattani M, Dharsandiya M. A prevalence study of Intestinal Parasitic Infections in a Tertiary Care Hospital in Rajkot City of Gujarat (India): A Hospital based study. IOSR-JDMS 2015; 14(5): 45-47.
14. Bisht D, Verma KA,Deep HHB. Intestinal parasitic infestation among children in semi-urban Indian population. Trop Parasitol 2011; 1(2): 104-107.
15. Sharma BK, Rai SK, Rai DR, Choudhury DR. Prevalence of intestinal parasitic infestations in school children in the northeastern part of Kathmandu valley, Nepal. The Southeast Asian Journal of Tropical Medicine and Public Health 2014: 35 501-5.
16. Sastry AS, Bhat SK. Small intestinal Nematodes. In: Sastry AS, Bhat SK, editors. Medical parasitology 1st ed. Pondicherry, India:Jaypee Brothers Medical Publisher (PP Ltd; 2014:230.
17. Jan MS, Liu D. Necator. Jan.MS, Liu D.editors. Molecular detection of human parasitic pathogens. USA: CRC Press.2012: 613.