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Research Paper

Intestinal Parasitic Infestations Among School Children in Piparia Village, Vadodara District

Medical Science

KEYWORDS :

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INTRODUCTION:

The discovery of human parasites goes way back to Antony van Leeuwenhoek, a Dutch draper of Holland, who used single lens microscopes to observe microscopic organisms in faeces of man and animals and named them as animalcules. Parasites have been the bane of mankind for centuries and continue to cause high morbidity and sufferings in world – especially in the developing countries like India. At any given moment most of the world's population would be found to be infected with parasites, the majority being children. According to a report of World Health Organization (WHO) "the total number of protozoal & helminthic infections currently existing worldwide far outnumber the total world population since multiple infections is the rule rather than the exception. (1)School-age children are particularly susceptible to parasitic infestations, often carrying higher burdens of parasites than adults. According to Brooker *et al.*, the greatest obstacle to effective control of parasites in at-risk populations is inadequate knowledge of the geographical distribution of infection and the demographic variables that influence the prevalence of infection (2).

The high prevalence of these infestations is closely correlated to bad hygiene, poor awareness, illiteracy, misbelieves, poverty and variety of allied factors (3). Intestinal helminthic infestations are the most common infestations among school age children and they tend to occur in high intensity in this age group (4&5). Helminthic infestations lead to nutritional deficiency and impaired physical development, which have negative consequences on cognitive function and learning ability (6 &7). Human parasites account for inestimable loss of life, widespread morbidity and the retardation of economic development in many countries (8).

In this study we report the status of intestinal parasitism among school children of age 6-12 years in Piparia village, Vadodara district located in the southern part of Gujarat state.

This village was chosen as there were large numbers of patients complaining of abdominal discomfort and loose stools coming from the village to our hospital's OPD. Patient including large number of children had complained of diarrhea so we chose this village school.

AIMS & OBJECTIVES:

To find out the prevalence and the factors responsible for the transmission of intestinal parasitic infestations among school children of age 6-12 years in Piparia village and to emphasize on implementation of strategies that help in prevention of parasitic infestations.

MATERIALS & METHODS

The study was conducted from middle of June (when school reopens) to October (monsoon period in India). The children aged 6-12 years attending Municipal school in Piparia were included in the study.

This study was carried out after approval from Institutional Research and Ethical committees.

The purpose of the study and procedure for stool sample collection was explained to the teachers, parents and children and informed consent was obtained from them.

A Performa containing name, age, sex, school grade, family size, past history of diarrhea or dysentery in last six months, water source, sewage disposal and hand washing before meals and after defecation was filled by verbal interview with the parents.

Initially the children and parents were reluctant in providing the stool samples. Hence, in order to convince them, a small presentation, projecting the pictures of various forms of parasites and their diseases, was shown and advantages of stool examination were explained in vernacular language. After their check-up, the children were explained the ways to prevent parasite infections by emphasizing on hand-washing, following healthy hygiene practices, dental care, and importance of basic nutrition. Moreover, the children who were found to have parasitic infestations were further counseled to come to the OPD of our hospital for further examination & treatment.

Sample Collection.

Clean, dry, screw capped and wide mouthed stool collecting plastic disposable containers were given to all the children with identification numbers and name. The samples were collected next day and were brought to the Microbiology laboratory immediately for processing.

Macroscopic Examination

The received faecal samples were examined macroscopically for any indications of the presence of adult worms, segments of tapeworm, larvae, blood and mucus.

The stool consistency (formed, soft, loose or watery) was noted. Color and odor of the stool were also noted.

Microscopic Examination

Saline wet mounts of stool specimens were done for presence of intestinal parasitic cysts, trophozoites, ova & larvae and also for presence of erythrocytes, leukocytes etc. Lugol's Iodine wet mounts were also performed.

Also Formol ether concentration technique was done and the deposits were examined again microscopically by wet film preparation using saline as well as Lugol's iodine ,first under low power (10X) and later high power (45X). The findings were tabulated and data was analyzed. Statistical analysis was done using Chi-square test and p value was calculated. Individual testing positive for the presence of intestinal pathogenic parasites were informed and were referred to the Paediatric OPD of our hospital for treatment.

Results:

Stool samples from 140 school children of age groups 6-12 years were screened using saline & iodine wet mounts. Stool samples were also examined microscopically after formal ether concentration technique. Of the total of 140 samples, parasitic forms were found in 59 (42.14%) stool samples. Of the 59 stool

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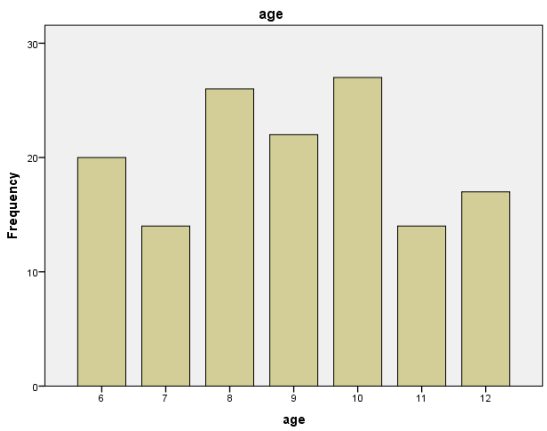
samples 7 stool samples did not reveal presence of any parasitic form on direct saline and iodine mounts but were detected only after the concentration technique was employed. Age-wise distribution of children is shown in (Chart 1).The gender-wise distribution among the school children showed 49.3% male & 50.7% female.

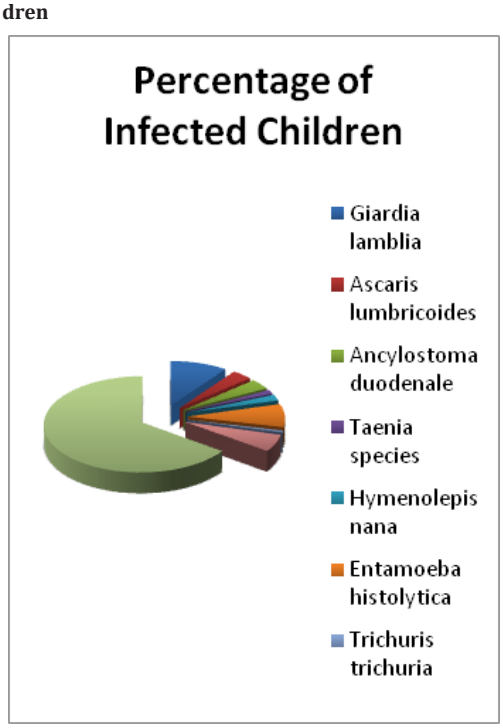
Chart 1: Age-wise distribution of children



Out of the 140 children 62.9% practiced open defecation while 37.1% closed defecation with proper sewage disposal. Also 80 (57.14%) children did not follow proper hand washing habits before taking meals and 33 (23.57%) after using toilets. Moreover, 73 children were not wearing shoes or slippers while moving around in their locality. Fifty two children (37.14%) had a past history of diarrhea, other abdominal complaints and parasitic infestations and 88 had no significant past history related to loose stools.

Both macroscopic & microscopic examinations of stool samples revealed that the overall percentage prevalence of parasite species in children was G. lamblia (10%) followed by E.hisolytica (7.9%), E.coli (5.7%), 3.6 % each of A. lumbricoides & A. duodenale and 2.1% H. nana, 1.4% of Taenia and 0.7% Trichuris trichuria (shown in chart 2)

Chart 2: Percentage prevalence of parasitic species in children



All the children were assessed for malnutrition and were graded accordingly (Table 1). The percentage of children with severe malnutrition was 7.1%, moderate was 22.1%, mild was 12.1% and 58.6% were found to be normal. All the parasites were individually assessed for various parameters considered in the study (Table 2 & 3)

Table 1: Grading of malnutrition among school children

Grade	Frequency	Percent
Normal	82	58.6
Mild	17	12.1
Moderate	31	22.1
Severe	10	7.1
Total	140	100.0

Table 2: Summary of Odds Ratio & Confidence Interval of Individual Parasites

Table 3: Summary of Model Parameter Estimates for Individual Logistic Regressions

Discussion:

The present cross-sectional study was carried out in the Dept. of Microbiology associated with a tertiary care hospital, catering to the health needs of people of the village and district where it is located and nearby areas. The stool samples were collected from children of a primary school located in the village having population of approximately 1700. The occupation of the people in the village is farming and/or working in our institution and hospital or the nearby industrial area. The water source in the village is a common water tank. The village has approximately 100 kuccha & 150 pukka houses.

The prevalence of GI parasite infection depends upon various factors like socio – economic status, hygiene, availability of clean drinking water, living conditions, sanitation facilities (9) etc.

In our study the prevalence of intestinal parasite, came out to be 42.14% (59/140). This is in line with other studies carried out by Wani et al (2007) which reported 46.7 % prevalence of intestinal infestation among school children in Srinagar city and a higher rate as 71.2% in other study in Kashmir Valley in 2008 (10 & 11). Rashid MK et al in 2011 (12) reported prevalence of 22.3%, Bansal et al (2004) (13) and Khurana et al (2005) (14) reported a prevalence ranging from 14.6%-19.3%. Fernandez et al (2002) reported a maximum of 91% of prevalence of intestinal parasite in school going children in rural setting in and around Chennai (15). Bora et al (2006) found a prevalence of 31.5% in school children (16) while Sehgal R et al, in their study in 2010 in school going children in Chandigarh (17), reported a prevalence of 42. 8%.

In our study Giardia lamblia was the commonest protozoa found in the stool (10%). Studies from other parts of India also reported G. lamblia as the commonest protozoa (18). The second most common parasite was again a protozoa E. histolytica (7.9%). Sehgal et al (17) reported cyst of Giardia and cyst of Entamoeba hystolytica as the commonest isolate among school children. Next in the sequence was E. coli (5.7%), Sehgal et al (17) reported (10%) and Aher & Kulkarni reported prevalence of 1.9% E. coli and 3.9% E. histolytica in their studies (19). We found, only 3.6% each of Ascaris lumbricoides & Ancylostoma duodenale in our study, in contrast to a study, by Shreshta B, from Lalitpur district in Nepal, which reported 73.45% prevalence of A. lumbricoides (20) and other studies where Ascaris lumbricoides was reported to be the commonest helminth(16 & 21) whereas another study from Bellary, by Dr. Narayan Shrihari et al reported 1.75% each of A. lumbricoides & A. duodenale (22) and 1.9% & 0.9% were reported, as A.lumibricoides & A. duodenale respectively, by Atul & Kulkarni (19). Hymenolepis nana was found to be 2.1%, less as compared to other studies in which the commonest parasite found in children among the Helminth group was H. nana 6.1% (17) and 4.5% (19). Taenia species were found to be1.4% in our study. Atul & Kulkarni reported 0.6% of Taenia species (19). In our study we found 0.7% Trichuris trichuria which is very less as compared to 27.27%

and 37.91% respectively among the rural & urban school children in a study carried out by Shrestha B (20).

There was no significant association of infestation observed in respect to the gender differences in our study i.e. male (49.3%) & female (50.7%). Though Shrestha B observed that infestation was greater in the male (in rural area -84.7%) & female (in urban area -92.45%) children, she did not find any significant association of infestation with gender & with the locality they lived in (20).

Conclusion:

In conclusion, the results of the study suggest that the prevalence of parasitic infections among children of Piparia village is 42.14%, which is not less; as well as young age, wet season, severe malnutrition and poor hygiene habits could be important factors that facilitate the acquisition of parasitic infections. Implementing simple habits of hand-washing, healthy eating & proper sanitation will certainly help reduce the burden of parasitic infestations not only among children but also the adults.

Table 2: Summary of Odds Ratio & Confidence Interval of Individual Parasites

Characteristics	Giardia	A. lumbricoides	A. duodenale	Eggs of Taenia	H. nana	E. histolytica Cyst
Age (Comparisons in all age groups)	0.792 (0.193-3.238)	1.303 (0.296-5.744)	0.157 (0.018-1.364)	0.611 (0.126-2.965)	1.204 (0.259-5.599)	0.998 (0.242-4.111)
Gender (comparison level=male) Female	1.257 (0.462-3.420)	4.526 (0.905-22.639)	0.849 (0.178-4.036)	0.377 (0.038-3.781)	1.132 (0.152 8.428)	2.037 (0.628-6.609)
Malnutrition (comparison level=Normal) Mild Moderate Severe	* * *	3.233 4.633 *	2.760E-010 5.478E-007 *	1.116E-017 *	1.875E-010 0.000* 66.788*	0.002 103.403* *
Defecation (comparison level=Close) Open Past History (Comparison level= Not Significant) Significant	* 0.839 (1.567E-192-4.491E+191)	* 7.745 (1.443E-191-4.156E+192)	*		* 5.080 (9.439E-1922.734E+192)	* 1.326 (2.484E-192-7.075E+191)

Table 3: Summary of Model Parameter Estimates for Individual Logistic Regressions

	Giardia	Ascaris	Ancylostoma	Eggs of taenia	H.nana	E.H cyst
Malnutrition (comparison level = normal) Mild Moderate	23.154 *	1.666 *	3.940	0.916	0.442 *	21.289 *
Defecation (comparison to close) Open	-2.050	-1.987	11.248	1.027	-1.459	-0.923
Past history of diarrhea (comparison to no positive history) Positive history	-1.438	-0.395	-11.362	-12.007	0.801	-0.70

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