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A study of intestinal parasitic infections among parents and their children

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ABSTRACT: Two hundred and fifty apparently healthy subjects from families, comprising of 50 fathers, 50 mothers and 150 children, were included in this study. Only families with 3 children, of ages ranging from 1 year to 12 years were included.

Questionnaires were administered to obtain information from the subjects. Stool samples were collected from each of the subjects and examined within 20 minutes of collection, for larvae, cysts and ova of parasites, by saline and iodine methods.

Stoll count was carried out on every stool sample that was positive for helminthes ova. Negative samples were further examined, using sedimentation, concentration methods for "cysts, ova and schistosomes".

Intestinal parasites detected included *Ascaris lumbricoides* 51.2%, Hookworm 0.4%, *Strongyliodes stercoralis* s8%, *Trichuris trichiura* 1.2%, Taenia species, 0.4%, *Diphilobothrium latum* 1.6%, *Entamoeba histolytica* 5.2%, *Giardia lamblia* 2.4%, and *Trichomonas hominis* 3.2%. The positive rate among the families was76%.

Subjects with close contacts with the rural areas had increased rate of intestinal parasites. Eating outside the family setting had no influence on the presence or absence of intestinal parasitic infections. Boiling of drinking water reduced parasitic infections. Keeping of pets at home had no influence on intestinal parasitic burdens. It was observed that there was no association between the parasites of parents and their children. Also children of the same family had varieties of intestinal parasites, (indicating different possible sources of infection). Intestinal parasitic status of apparently healthy subjects, with a high positivity rate of 76%, is highlighted.

Key Words: Intestinal parasites; *Ascaris*; Hookworm; *Strongyloides; Trichuris; Taenia; Diphilobothrium; Entamoeba; Giardia; Trichomonas.*

Introduction

Parasitic diseases are very common in developing countries, and are of major health hazard because of their high prevalent rate, as well as the negative effects they have on nutritional and immune status of the populations. Intestinal parasitic infections mainly affect the physical and mental development of the children who are most vulnerable. (Sinniah, 1984).

Also, the implication of the infection may vary from retardation in growth and development in children, to prevention from school attendance. Adults may also be impaired of their daily routines and may be

significantly inhibited from maximum productivity. Patients may suffer from anaemia, intestinal obstruction and sometimes death, (Walsh 1990). Helminths have been found to have negative effects on nutrition (Stephenson 1987, Holland, 1987a, 1987b). Intestinal parasitic diseases therefore lead to malnutrition, functional impairment and disability.

Amount of harm caused by intestinal parasitic infections to the health and welfare of families and communities depend on the parasite species, the intensity and course of the infection, the nature of the interactions between the parasites species and concurrent infections, the nutritional and immunological status of the population, and some other socio-economic factors.

It is generally difficult to measure the sufferings caused by infectious diseases in cases of intestinal parasitic infections because many cases of the diseases are asymptomatic and therefore, remain undetected. (Bulletin WHO, 1987).

This investigation compared the data of intestinal parasites, obtained from stool samples of different apparently healthy family members, comprising of parents and their offspring (children). The investigation was conducted in order to determine if members of a family are cooperatively infected with various intestinal parasites in order to be able to target the control of intestinal parasites accurately. This will improve the physical and mental developments of the inhabitant, especially children, in developing countries.

Materials and Methods

A questionnaire was constructed to give information about the various habits of each family member included in the study. (A copy of the questionnaire is included in the appendix.) Only families with three children of ages 1-12, with both the father and the mother in each family, were included. Fifty families were included in this investigation.

Stool samples were collected from each family member and examined for the presence (or absence) of larvae, cyst or ova of parasites, by saline and iodine methods. Stoll counts were carried out on all positive stool samples, using the stoll, egg counting method.

Negative samples were further examined by the brine concentration methods for cyst and ova, while saturated zinc sulphate method was used to detect eggs of *Schistosomes.*

Examination of Faecal Samples

A drop of fresh physiological saline was placed on a clean slide and a drop of iodine was placed on another slide. Using a swab stick, a small amount of stool specimen was covered with a cover slip and examination under the microscope for the presence (or absence) of ova, larvae or cyst of parasites using x10 and x40 objectives.

Results

The parasites found in this study were *Ascaris lumbricoides*, *Trichuris trichiura, Strongyloides stercoralis, Entamoeba histolytica* cysts, *Trichomonas hominis,* hookworm ova, ova of *Taenia* species and *Giardia lamblia*.

Out of the 250 family members examined, 190 (76%) were infected with intestinal parasites. Multiple infections were found to be common.

A total of 51.2% of all the people examined had ova of *Ascaris lumbricoides* which was the most common parasite in the study. *Strongyloides stercoralis* larva, 8.0%, followed this. *Entamoeba histolytica* was present in 5.2%, while Trichomonads hominis was next, with a percentage of 3.2 *Giardia lamblia* was present in 2.4%, followed by *Diphylobothrium latum*, with a positivity rate of 1.6%. Tricuris trichiura was present in 1.2% while the ova of hookworm and *Taenia* species were both present in only 0.4% of the total number examined, (see Table 1).

Table 1: Prevalence of intestinal parasites in all subjects

Species	Stool Samples With Intestinal Parasites			
	Negative Samples		Positive Samples	
	No	%	No	%
Ascaris lumbricoides ova	122	48.8	128	51.2
Strongyloides stercoralis larva	230	92.0	20	8.0
Hookworms ova	249	99.6	1	0.4
Diphyllobotrium latum ova	249	98.4	4	1.6
Taenia species ova	249	99.9	1	0.4
Entamoeba histolytica	237	94.8	13	5.2
Giardia lamblia	244	97.6	6	2.4
Trichomonas hominis	242	96.8	8	3.2
Trichiuris trichiura	247	98.8	3	1.2

Six species of Helminth ova and larvae were detected in the subjects examined, (see Table 2) while only three species of protozoa were detected (see Table 3).

Among (5). The percentage positivity of worms more species of parasites (7) than females (5). The percentage positivity of worms was significantly higher ($p < 0.05$) in male subjects than in females, (Table 4). Male children also harboured higher percentages of parasites than the female, although there was no statistical difference in the results, (see Table 5).

Among the children examined, there were fewer parasites among children belonging to the age range of 1-3 yrs. Intestinal parasites were most common among children 3-4 years old only. (See table vi). The only parasite, which was not present in any of the children, was Hookworm, although it was present in a few parents.There was no association between worm load and the ages of the children (χ^2= 12.56, df. =6, $p > 0.05$).

Also there was no association between *Ascaris* worm loads of parents and their children, (χ^2 =135.8, df = 250, $p > 0.05$).

The infection level of hookworms, *Strongyloide stercoralis*, *Trichuris trichiura* and *Taenia* infections were very low. (See Table 1).

Results of the stoll count on Helminths ova, on all 250 subjects, showed that 39 (51.6%) had between 600 and 1,500 eggs count for *Ascaris lumbricoide*/gm, while 7 (2.8%) were found to have between 2,600 and 3,500/mg, (see Table 7). In hookworm infection, only 1(0.4%) of the subjects had between 600 and 1,500 eggs/gm of faces while 4 (1.6%) had between 600 and 1,500 eggs Diphylobothrium latum/gm. Only 1 (0.4%) or the subjects had between 600 and 1,500 eggs of Teania species/gm of faeces.

Table 2: Prevalence of helminths in all subjects

Species	Stool samples with helminths ova			
	Negative samples		Positive samples	
	No	%	No	%
Ascaris lumbricoides ova	122	48.8	128	51.2
Strongyloides stercoralis larva	230	92.0	20	8.0
Hookworm ova	149	99.6	1	0.4
Diphyllobortium latum	246	98.4	4	1.6
Taenia species	249	99.9	1	0.4
Trichiuris trichiura	147	98.8	3	1.2

Table 3: Prevalence of Protozoa infections in all subjects

Species	Stool samples with protozoa infection			
	Negative samples		Positive samples	
	No	%	No	%
Entamoeba hystolytica	237	94.8	13	5.2
Giardia lamblia	244	97.6	6	2.4
Trichomonas hominis	242	96.8	8	3.2
Balantidium coli	–	0	–	0

Table 4: Prevalence of intestinal parasites in parents

Species	Stool samples with intestinal parasites			
	Male		Female	
	Negative	Positive	Negative	Positive
	No (%)	No (%)	No (%)	No (%)
Ascaris lumbricoides ova	20 (70)	30 (100)	48 (96)	27 (54)
Strongyloides stercoralis larva	37 (74)	13 (26)	49 (98)	1 (2)
Hookworm ova	19 (98)	1 (2)	50 (100)	0 (0)
Diphyllobotrium latum	19 (98)	1 (2)	50 (100)	0 (0)
Taenia species	50 (100)	0 (0)	50 (100)	0 (0)
Entamoeba histolytica	74 (94)	3 (6)	45 (90)	5 (10)
Trichomonas hominis	49 (98)	1 (2)	47 (94)	1 (2)
Trichiuris trichiura	50 (100)	0 (0)	50 (100)	0 (0)

Table 5: Prevalence of Intestinal Parasites in Children

Species	Stool samples with intestinal parasites			
	Male		Female	
	Negative	Positive	Negative	Positive
	No (%)	No (%)	No (%)	No (%)
Ascaris lumbricoides ova	37(48.7)	39 (51.3)	42 (56.8)	32(43.2)
Strongyloides stercoralis	(94.7)	4 (5.3)	72 (97.3)	2(2.7)
Hookworm Ova	76 (100)	-(0)	74 (100)	0 (0)
Diphyllobotrium latum	74 (97.4)	2 (2.6)	73 (98.0)	1 (1.4)
Taenia species	76 (100)	-(0)	73 (98.6)	1 (1.4)
Entamoeba histolytica	74 (97.4)	2 (2.6)	71 (95.9)	3 (4.1)
Giardia lamblia	76 (100)	-(0)	70 (94.6)	4 (5.4)
Trichomonas hominis	74 (97.4)	2 (2.6)	72 (97.3)	2 (2.7)
Trichiuris trichiura	75 (98.7)	1(1.3)	72 (97.3)	2 (2.7)

Among all the parents, the Stoll count of Helminth ova showed that 14% had a count of between 600 and 1,500 eggs / gm each, 39% had between 1,600 and 2,500 eggs /gm / each, while
% had between 2,600 and 3,500 eggs of *Ascaris lumbricoides* / gm of faces. Two of the parent had count of between 600 and 1,500 eggs of hookworm of *Diphylobothrium latum* / gm of faces each, while none had *Taenia* or *Trichiuris trichiura* ova. (See table viii)

Stoll count of Helminth ova on all the positive children showed that 6% had between 600 and 1,500 eggs of *Ascaris lumbricoides* / gm of faces each.2% had between 600 and 1,500 eggs of *Diphylobothrium latum* each, while the egg count of *Taenia* species and *Trichuris trichiura* were low (Table 9).

The result from the questionnaires drawn up to investigate the possible source of intestinal parasites in the subjects showed that 70% of the families with low income salary scales of between Grade level (GL). 02 to 06 had more intestinal parasitic infections. 60% of the families with salary scale of G.L. 07 and above had no intestinal parasite infections.

Table 7: Stoll Count Of Helminths Ova On All Subjects

Helminths	Stoll Count					
	600 – 1,500		1,500 – 2,500		2,500 – 3,500	
	No.	%	No.	%	No.	%
Ascaris Lumbricoides	39	15.6	82	32.8	7	2.8
Hookworms	1	0.4	-	0	-	0
Diphyllobotrium Latum	4	1.6	-	0	-	0
Taenia	1	0.4	-	0	-	0
Trichiuris trichiura	3	1.2	-	O	-	0

Table 8: Stoll Count of Helminths Ova on All Parents

Helminths	Stoll Count					
	600 – 1,500		1,500 – 2,500		2,500 – 3,500	
	No.	%	No.	%	No.	%
Ascaris Lumbricoides	14	14	39	39	4	4
Hookworms	1	1	–	0	–	0
Diphyllobotrium Latum	1	1	–	0	–	0
Taenia	–	–	–	0	–	0
Trichiuris trichiura	–	–	–	0	–	0

Table 9: Stool Count of Helminths Ova on All Children

Helminths	Stoll Count					
	600 – 1,500		1,500 – 2,500		2,500 – 3,500	
	No.	%	No.	%	No.	%
Ascaris Lumbricoides	24	6	44	29.3	3	2
Hookworms	–	0	-	0	-	0
Diphyllobotrium Latum	3	2	-	0	-	0
Taenia	1	0.6	-	0	-	0
Trichiuris trichiura	3	2	-	O	-	0

Out of all the subjects who were positive for-intestinal parasites, 70% had previous close contact of frequent visit to the rural areas. Previous deworming had influence ($P<0.05$) on worm burdens but no influence on the presence of worms in affected subjects, (subjects dewormed within 6 months before this investigation were not included in the study). Eating outside the family did not have any influence on the subjects concerned. Among the subjects that boiled their drinking water, only 5% had intestinal parasites, with a low worm load of 600-1,500 eggs/gm.

Only 11(4.4%) of all the subjects liked to play near brooks and rivers but results of subjects who liked eat raw foods (from vegetable and salads) and those who did not. The presence or absence of pets in the family had no influence on the presence of intestinal parasites.

Discussion

The study confirms the presence of high intestinal parasitic infections rates among apparently healthy parents and their children. Investigation carried out by Okpala (1956) among school children, Gilles and Akufo (1964) in the village community, Cowper and Woodward (1960) in a group of employees in Ibadan,

Cowper (1966). Who also worked in Ibadan, Gupta, maithak, Arora and Tandon (1977) who worked on pre school children, all reported high incidents of parasitic infections in apparently healthy individuals.

Insanitary conditions of toilets, and careless handling of human stool samples, especially in rural areas, where it was detected in this study, that close contacts of urban dwellers with rural dwellers increased the rate of infection among such subjects. This condition could aid the spread of intestinal parasites.

The study carried out on intestinal parasites in this project showed that individuals in a family are independently infected with different intestinal parasites, and children of the same family may have varieties of intestinal parasites which may be different from their parents. There was no association between the parasites op parent and their children. (*With Ascaris* worm burden). This therefore shows that infections in children had no relationship with infections of their parents. Therefore, children get infected independent of their parents.

Conclusion

Ages have no influence on worm burdens and the rates of Ascariasis, amoebiasis, giardiasis and trichomoniasis infections in children were not dependent on their parasitic infections. Parents and their children get by intestinal parasites independent of each other. Close contact with the rural areas seemed to increase the rate of positivity of intestinal parasites in human subjects. Deworming had influence on the worm burdens of individuals while eating outside the family setting had no influence on the presence or absence of worms in affected individuals. Boiling of drinking waters reduced intestinal parasitic burdens and infections. Keeping of pets in the family had no influence on intestinal parasitic infections.

Recommendations For The Control Of Intestinal Parasitic Infections

Families should:

1. Maintain a high hygienic status.
2. Eat properly cooked foods
3. Boil water before drinking
4. Dispose of stool samples and waste products properly.
5. Encourage control programmes against intestinal parasitic infections, which also has public health significance,
6. Take proper precautions when in close contacts with rural areas.

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APPENDIX 1

A questionnaire for investigating the possible sources of intestinal parasites among parents and their children

Fill the questionnaire below. Mark X where appropriate.

1. Name:……
2. Age last birthday:……
3. Sex: Male_____ Female_____
4. Home Address:…….
5. Grade Level (if adult):……..
6. Have you never lived in, or visited the rural area within the last 7 years?
   YES _____ NO _____
7. Did you eat any food in the rural area? YES _____ NO _____
8. Did you drink water or any liquid (apart from bottled drinks) in the rural area? YES_____
   NO_____
9. When last did you de-worm……..
10. Where do you normally eat? AT HOME_____ OUTSIDE_____ BOTH AT HOME AND OUTSIDE_____
11. What is the source of your drinking water? BROOK _____ RIVER _____TAP WATER_____ WELL WATER_____ BORE HOLE WATER_____ Any other ? specify…….
12. Do you normally boil your water before drinking it? Yes_____ No _____
13. Do you like playing in Brooks, Rivers or Streams?
    YES_____ NO _____-
14. Do you like eating raw food (e.g. salad, garden egg etc)?
    YES_____ NO_____
15. Name all the raw foods you eat…….
16. Do you have pets at home? (e.g. dogs, cats, etc) YES_____ NO _____
17. Do you play with pets? YES _____ NO _____
18. Which of the pets do you like playing with most?