

STOOL ANALYSIS OF 3000 CHILDREN IN BANGLADESH

by

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Kunz (1960) first published a report of stool examination of 300 school children near Dhaka showing a high prevalence of intestinal protozoa and helminths. Muttalib et al. (1976) published a report on the prevalence of intestinal parasites in the rural children of Bangladesh. Muazzam et al. (1968) published a similar report from Rajshahi Medical College based on 664 stool examinations of which 564 were children and 100 were infants. There are several publications showing the incidence of intestinal parasites in this area but these included all the age groups (Muazzam and Ali, 1961; Muazzam, 1962a, 1962 b; Khan and Muazzam, 1962; Muazzam, 1963; Muazzam, 1964; Khan and Muazzam, 1965; Khan and Muazzam, 1966; Muazzam, 1966 and Muazzam et al. 1968). The reports of Kunz and Muttalib seem too high and their number of subjects is very small for giving a national incidence. Besides, the pattern of findings of stool analysis varies in different age groups due to different living conditions, diet, environment etc. So a report on a large number of children is necessary to get a more reliable incidence rate.

Materials and Methods

3000 stool specimens of children aged above one year to twelve years were mostly examined in the Ibn Sina Laboratory, Dhaka during the period 1984-1987. Among them 1854 (61.8%) were male and 1146 (38.2%) were females making a ratio of 1.6 : 1.

Routine saline and iodine preparations were examined as soon as possible and floatation technique (Maplestone, 1934) was done if necessary. Test for reducing substance in the stool was also done in some cases if requested by the clinicians. The diagnosis of acute bacillary dysentery was based on both physical and microscopic findings, characterised by the presence of a large number of epithelial cells, pus cells, red cells and macrophages.

Results and Discussion

Table 1 shows the microscopic findings and Table 2 shows the total number of pathological findings including those found in combination. Table 3 and 4 show the age and sex distributions of ascariasis and trichuriasis.

Microscopic findings

1. Indigestion - In 1200 (40%) children, the only pathological finding was indigestion (Table 1) characterised by the presence of significant number of vegetable cells, fat globules, fatty acid crystals or soaps, starch granules and muscle fibres either singly or in

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combination. Thus a very large number of children complaint of G I tract trouble due to simple indigestion. In 495 cases, indigestion was found in combination with other pathological findings, making a total of 1695 (56.50%) Table 2.

2. Helminths - Only helminthic infections were found among 742 (24.73%) subjects while helminthic infections in 168 cases in combination with other pathological findings were found making a total of 910 (30.33%). The incidence of different types of helminths varied widely (Table 1 and 2).

(a) Ascariasis - Round worm infection was the commonest intestinal helminth in children in our study. There were 569 (18.98%) specimen showing the presence of ova of *Ascaris lumbricoides* alone (Table 1) but in 16 more cases ascaris ova was found along with other significant pathological findings like acute bacillary dysentery and giardiasis. Thus the actual number of ascariasis is 585 (19.50%) (Table 2). Kunz (1960) reported 66.0% ascariasis among village children of a primary school near Dhaka. Hassan (1986) reports 60.48% ascariasis among 946 school children of Dhaka city. Muazzam et al. (1968) reported 25.60% ascariasis in Rajshahi Medical Collge. It seems there are many silent cases of ascariasis among children and only those with somewhat serious complaints go for treatment to the clinicians. So to obtain true incidence, study should include slum area, modernised area and areas with or without sanitary facility. Besides the patients coming to the consultants belong to richer group with modern living conditions.

The incidence of ascariasis in the series between male and female children had a ratio of 1.67 : 1 which is comparable to the 1.6 :1 sex ratio of 1968 (Muazzam et al.) series. Age distribution of ascariasis shows that higher incidence of ascariasis was found between 1 to 2 years to the 8th year and the incidence declined gradually from the 9th year. Hassan (1986) however reported higher prevalence in the 5 to 9 years group.

(b) Trichuriasis - Whip worm infection alone accounts for only 127 (4.23%) subjects (Table 1) which is comparable to 4.06% reported in the 1968 series (Muazzam et al. 1968). But the actual number of positive specimens for whip worm (*Trichuris trichiura*) ova was 263 (8.76%) as in 136 cases (Table 2) these were present in combination with ascariasis, hook-worm infection, giardiasis, bacillary and amoebic dysenteries. Hassan (1986) however reports a very high percentage of trichuriasis (60.72%) in his paper. The infection in this series was higher in 3 to 9 years group and the sex ratio is 1.94:1 for male and female children.

(c) Hook worm infection - Ova of hook-worm were found in only 28 (0.93%) specimens (Table 1) which is much lower than 47.0% reported by Kunz (1960) and 16.4% reported by Muazzam et al. (1986), in Rajshahi. With 5 more cases in combination the total number is however 33 (1.11%) Table 2. The reason of such low incidence may be the same as suggested for ascariasis. However, in a previous study in Dhaka (Muazzam and Ali, 1961) hook worm ova were found in 23.9% of 2412 stool specimens and 14.5% among 820 cases admitted in Rajshahi Medical College (Khan and Muazzam, 1965). But these two reports included patients of all age group. Hassan (1986) reported no hook-worm ova in

his study of school children in Dhaka. He used only cellophane thick smear technique and floatation method was not employed. Thus in this case also no reliable rate of national prevalence is known.

(c) *Enterobius vermicularis* - Thread worm infection was found in only 5 (0.17%) subjects (Table 1) but the actual number was 9 (0.3%) (Table 2). As stool examination is not enough to exclude thread worm infection, the actual prevalence remains unknown. Scotch-tape method should be adopted to find out true prevalence rate of enterobiasis. Hassan (1986) reported 0.76% prevalence in school children of Dhaka.

(d) Trematodes - Only 10 (0.33%) cases of *Hymenolepis nana* were found in this series (Table 1) though actual number was 12 (0.4%) (Table 2). Hassan (1986) reported 0.57% whereas Muazzam et al. (1968) reported 0.90% in Rajshahi. So all these figures are comparable. Only one case of *Fasciolopsis buski* was found (0.03%) (Table 1), which is lower than 0.2% reported by Muazzam and Ali, 1961 in their series of all age groups.

3. Protozoa :- (a) Amoebiasis - *Entamoeba histolytica* infection was detected in 42 subjects (Table 1) but the total number was 45 (1.50%) with three more cases of combined infection. This is lower than 2.26% reported by Muazzam et al. (1986) in Rajshahi and much lower than 37.0% reported by Kunz (1960). The total number of all strains of amoeba as single infection was 82 (2.73%) and the total prevalence of all stains including those non-pathogenic strains found in combination is 317 (Table 2) making a rate of 12.06% (362) which is still lower than that of Kunz (1960).

(b) Giardiasis - There were 230 (7.67%) cases of giardiasis (Table 1) as single infection but the actual prevalence was 8.67% (260) in the series (Table 2). This is comparable to 9.37% reported by Muazzam et al. (1986) though lower than 18.0% reported by Kunz (1960).

(c) Trichomoniasis - There were 4 cases of single infection and 2 cases of combined infection making a total of 6 (0.2%) in this series (Table 2). This figure is lower than 1.66% reported by Kunz (1960) but much lower than 7.68% reported by Muazzam et al. (1968). Kunz examined only preserved specimen carried to USA and it is very difficult to identify trichomona species unless they are alive and moving. Hassan (1986) did not report on trichomona infection.

4. Blastocystis hominis - The single infection of *Bl. hominis* was 98 (3.27%) though the actual number found was 220 (7.33%) in the series (Table 1 & 2). Kunz and Hassan did not report any blastocystis infection.

5. Yeasts - Yeast infection was found in 49 (1.63%) subjects though actual number was 84 (2.80%) with the combined infections (Table 1 & 2).

6. Bacillary dysentery - There were 148 (4.93%) cases of acute bacillary dysentery based on microscopic findings (Table 1). There were 30 (1.0%) cases of non-specific colitis characterised by patches of mucus with epithelial cells, pus cells and few red cells and occasional macrophages but these are not spread all over the field. Since bacteriological study was not done, these are labelled as non-specific colitis.

417 (13.90%) specimens showed no significant pathological findings (Table 1). Thus

86.10% specimens of faeces showed some abnormal findings under microscope. Total prevalence of intestinal helminths was 30.33% (910) and total pathogenic protozoa were 10.33% (311) making a prevalence rate of 40.66% for all intestinal parasites. This figure is much lower than 66.09% (helminths-46.97%+Path. protozoa 19.12%) reported in the 1968 series and 80% reported among rural children by Muttalib et al. (1976). The lower incidence than that of 1968 series may be due to type of children reported to the specialists in Dhaka to whom poorer class rarely go for treatment.

Conclusion

From the above findings it is clear that the prevalence of intestinal parasites vary widely in different parts of Bangladesh and in different socio-economic as well as urban and rural population groups.

Stool examination is one of the common investigations in a routine diagnostic laboratory. Clinicians usually advise stool examination for all patients having complaints referable to the gastro-intestinal tract. Stool examination traditionally means exclusion of the presence of larva, ova, protozoa and cysts of the intestinal parasites and amoebic or bacillary dysentery. But there are important findings besides these which may help the clinicians to treat their patients. Presence of fat globules, fatty acids as crystals or soaps, presence of occult blood, presence or absence of bile, presence of excess of vegetable cells, starch granules and muscle fibres, presence of yeasts and Blastocystis hominis and the presence of reducing substance in the stool are of significance for the clinicians. So the clinicians and the clinical pathologists should have close contact and the clinicians must understand the significance of all the microscopic findings in the stool examination report. Thus the detailed examination of stool or faeces should be termed stool analysis instead of stool examination.

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Table 1. Showing the microscoping findings of 3000 stool specimens of children aged up to 12 years.

A. Intestinal parasites : Single infection			B. Other Findings :		
Microscopic Findings	Number positive	Percent	Microscopic Findings	Number positive	Percent
Helminths					
1. Ova, Ascaris L.	569	18.98	1. Indigestion	1200	40.00
2. Ova, Trichuris to	127	4.23	2. Acute Bacillary dysentery	148	4.93
3. Ova, Hook worm	28	0.93	3. Non. specific colited	30	1.00
4. Ova Ent. verm	05	0.17	4. Bl. hominis	98	3.27
5. Egg. H. nana	10	0.33	5. Yeasts	49	1.63
6. Egg. F. buski	01	0.03	6. No Abnormal finding	417	13.90
7. Larva, str. stercorahis	02	0.07	Total	1942	64.73
Total	742	24.74			
Protozoa :					
8. Ent. histolytica	42	1.40			
9. Non-Path. amoebae	40	1.33			
10 Giardia lamblia	230	7.67			
11. Tricho. hominis	04	0.13			
Total	316	10.53			
Grand Total	1058	35.27			

Table 2. Showing total number of pathological findings among 3000 children in Dhaka. Findings :

A. Helminths :	No. as single infection	No. in combination	Total number	True percentage
1. Ascaris L.	569	16	585	19.50
2. Tri. trichura	127	136	263	8.76
3. Hook worm	28	05	33	1.11
4. Ent. verm.	05	04	09	0.30
5. Str. sterco	02	05	07	0.23
6. Hym. nana	10	02	12	0.40
7. F. buski	01	00	01	0.03
Total	742	168	910	30.33
B. Protozoa :				
1. Ent. histolytica	42	03	45	1.50
2. Non-Path. amoebae	40	277	317	10.56
3. G. Lamblla	230	30	260	8.67
4. Tr. hominis	04	02	06	0.20
Total	316	312	628	20.93
C. Other Findings :				
1. Bl. hominis	98	122	220	7.33
2. Yeasts	49	35	84	2.80
3. Indigestion	1200	495	1695	56.50

Table 3. Showing sex and age distribution of *Ascaris lumbricoides* infection among 3000 children in Bangladesh.

Age groups	Number		Total
	Male	Femal	
Above 1 to 2 yrs	44	20	64
" 2 to 3 yrs	43	18	61
" 3 to 4 "	42	21	63
" 4 to 5 "	42	34	76
" 5 to 6 "	41	24	65
" 6 to 7 "	39	31	70
" 7 to 8 "	35	22	57
" 8 to 9 "	28	16	44
" 9 to 10 "	20	14	34
" 10 to 11 "	18	10	28
11 to 12 "	14	09	23
Total	366	219	585

Sex ratio of male : Female = 1.67 : 1

Table 4. Age and Sex distribution of *Trichuris trichiura* infection among Children.

Age groups	Male	Female	Total
More than 1 - 2 yrs.	8	7	15
" " 2 - 3 "	13	8	21
" " 3 - 4 "	22	10	32
" " 4 - 5 "	20	16	36
" " 5 - 6 "	33	10	43
" " 6 - 7 "	18	10	28
" " 7-8 "	20	12	22
" " 8 - 9 "	16	9	25
" " 9 - 10 "	8	7	15
" " 10 - 11 "	5	3	8
" " 11 - 12 "	4	4	8
	167	96	263

Sex ratio- Male : Female = 1.94:1

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