

## Parasitic Intestinal Infections of Children in Lagos

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### Summary

**Fagbenro-Beyioku AF and Oyerinde JPO. Parasitic intestinal infections of Children in Lagos.** *Nigerian Journal of Paediatrics* 1987; 14:0. Microscopic examination of stool samples from 1,659 children, aged 15 years and below in metropolitan Lagos showed that 71.9% were infected with *Trichuris trichiura*, 68.3% were infected with *Ascaris lumbricoides* while the infection rate with hookworm was 22.5%. Among the protozoa, the highest prevalent rate was recorded for *Entamoeba coli* with 20.0% followed by *Iodamoeba butschilii* in which the frequency of infection was 8.9% while 8.3% were infected with *Entamoeba histolytica*. Infection with more than one parasite was also very common. Those children whose households had no toilet facilities had the lowest frequency of infection with all the intestinal parasites surveyed, while those who used buckets as their means of faecal disposal had the highest rates.

### Introduction

Of the intestinal pathogenic protozoa of man, only *Entamoeba histolytica* and *Giardia intestinalis* are frequently reported in Nigeria.<sup>1-4</sup> *Balantidium coli*, though rare, has also been reported.<sup>1 5</sup> Among the helminths, *Ascaris lumbricoides*, *Trichuria trichiura*, the hookworm and *Strongyloides stercoralis* are most frequently reported. Although much work has been done on the prevalence of intestinal parasites among the

general population in Nigeria,<sup>1 2 4 6</sup> very few workers have studied children aged 0-15 years separately. In 1956, Okpala<sup>5</sup> reported a survey on Lagos school children; in 1976, Ogunba<sup>3</sup> reported his findings among Ibadan school children, while Odugbemi *et al*<sup>7</sup> in 1981, described their findings in hospitalised patients under the age of 5 years, in Lagos.

The aim of the present investigation was to determine the prevalence of intestinal parasites among Lagos children.

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### Materials and Methods

The study group consisted of 1,659 children (777 males and 882 females) aged 15 years and below, chosen at random from 10 survey areas of metropolitan Lagos out of the 30 areas in which the Lagos metropolis was demarcated<sup>8</sup>

One to three stool samples were collected from each child depending on his/her cooperation. The unformed part of the stools was examined as quickly as possible for trophozoites, while the rest was concentrated by the formol-saline-ether technique.<sup>9</sup> The deposit was microscopically examined after staining with iodine.

In addition to information pertaining to the kind of toilet facility used for the disposal of faeces in each child's home, the eating habit of the child, and the level of environmental sanitation around the home was also obtained.

**Results**

Microscopic examination of the stool samples showed that 138 (8.3%) of the children studied (3.6% males and 4.7% females) were infected with *Entamoeba histolytica*, 148(8.9%), consisting of 4.2% males and 4.7% females, were infected

with *Iodoamoeba butschilii* and 332(20%) (8.4% males and 11.6% females) were infected with *Entamoeba coli*. A breakdown of the figures in relation to age groups (Table I) shows that the group aged below 6 months had the highest percentage (69.2%) of negative microscopic findings, while the 6-15 years group had the lowest (4.7%) Two hundred and forty seven children (14.9%) were completely free of the intestinal parasites.

It is of interest to note that among the protozoa, except for *Trichomonas hominis* and *Giardia intestinalis*, the infection rate increased as the age-group increased (Fig. 1). Similarly, the prevalence of the helminths increased as the age-group increased (Fig 2). The prevalences of *Endolimax nana* and *Giardia intestinalis* were 9.9% and 8.4% respectively, while *Trichomonas hominis* had a low infection rate of less than 0.5% (Table 1).

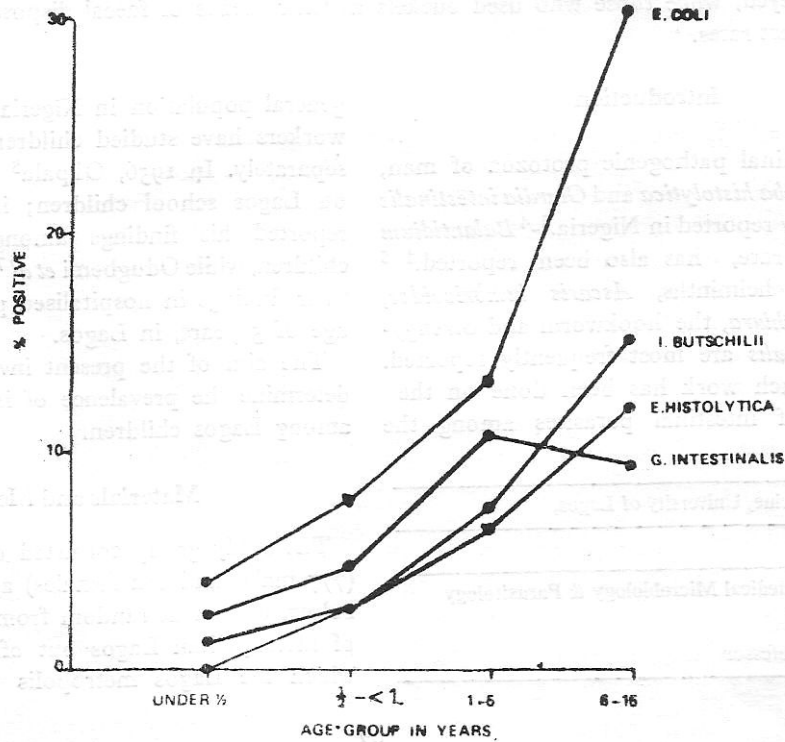


Figure 1: The prevalence of some intestinal protozoa in relation to age.

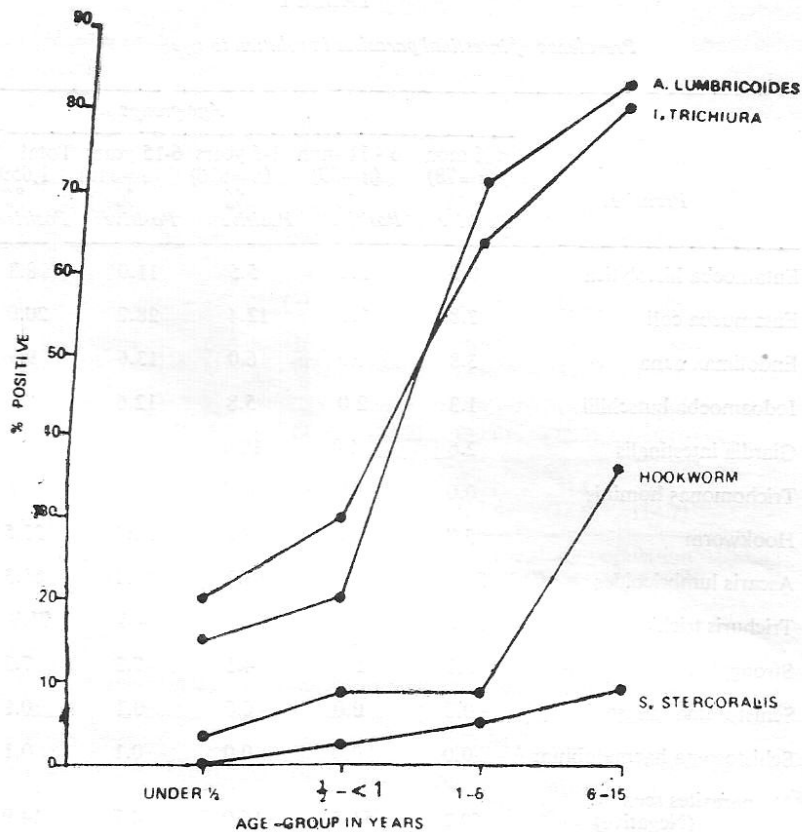


Figure 2. The prevalence of some intestinal helminths in relation to age.

Among the helminths, *Trichuris* had the highest prevalence rate of 71.9% (36.2% males and 35.7% females), followed closely by *Ascaris lumbricoides* with 68.3% (33% males and 35.4% females), while the infection rate with *Strongyloides stercoralis* was 7.3% (Table 1).

Of all those examined, a 14-year old girl was infected with both *Schistosoma mansoni* and *Schistosoma haematobium* along with other parasites (Table I).

Poly parasitism or infection with more than one parasite, was also a common finding in the study population. The common combinations of occurrence of the various species of the parasites

included *Ascaris lumbricoides*, *Trichuris trichura* and the hookworm. The three parasites sometimes occurred together, singly or as a combination of any two and in some cases, in conjunction with *Entamoeba coli* with or without any of the other parasites.

An unusual polyparasitism was found in a 14-year old girl who harboured 9 different species of intestinal parasites, namely: *Entamoeba coli*, *Iodamoeba butschilii*, *Giardia intestinalis*, *Trichomonas hominis*, hookworm, *Ascaris lumbricoides*, *Trichuris trichiura*, *Schistosoma mansoni* and *Schistosoma haematobium*.

TABLE I  
Prevalence of intestinal parasites in relation to age

Parasites	Age groups				Total 1,659 %
	< 6 mon n=78 % Positive	6 - 11 mon (n=99) % Positive	1-5 years (n=636) % Positive	6-15 years (n=846) % Positive	
Entamoeba histolytica	0.0	2.0	5.5	11.0	8.3
Entamoeba coli	3.8	7.1	12.4	28.7	20.0
Endolimax nana	3.8	4.0	6.0	13.6	9.9
Iodoamoeba butschilii	1.3	2.0	5.8	12.6	8.9
Giardia intestinalis	2.6	4.0	10.0	8.0	8.4
Trichomonas hominis	0.0	1.0	0.3	0.6	0.5
Hookworm	3.8	9.1	8.5	36.4	23.5
Ascaris lumbricoides	20.5	30.3	63.2	81.1	68.3
Trichuris trichiura	14.1	20.0	70.0	84.4	71.9
Strongyloides stercoralis	0.0	1.0	4.1	7.3	7.3
Schistosoma mansoni	0.0	0.0	0.0	0.1	0.1
Schistosoma haematobium	0.0	0.0	0.0	0.1	0.1
No parasites seen (Negative)	69.2	51.5	16.0	4.7	14.9

Table II shows the number of individuals infected with various numbers of parasites according to the age groups. Four hundred and thirty two (26%) of those studied were infected with one species of parasite, 421 (25.4%) had 2 different species, 314 (18.9%) three species, and 245 (14.7%) were infected with more than 3 different species of intestinal parasites.

The prevalence of all the intestinal parasites was highest among children from households where buckets were used as the means of faecal disposal; this was closely followed by those who used water closets. The infection rates among those who used pit latrines was relatively low, while those who had no toilet facilities had the lowest (Table III).

### Discussion

This study has demonstrated that intestinal parasites are highly prevalent among children in metropolitan Lagos. All the parasites earlier reported<sup>6</sup> in the population were recorded in this study.

It is significant to note that with the exception of *Giardia intestinalis*, the prevalence of each protozoal infection in the study population was lower than in the population earlier studied by Oyerinde, Adegbite-Hollist and Ogunba.<sup>6</sup> The reason for this is obvious since most of the protozoa parasites are non-pathogenic and as such, would not require treatment, those who acquire such parasites at an early age are likely to retain

TABLE II

Number of Persons infected with one or more specie(s) of Parasites

Age	No of specimens examined	Number of Parasites species(s)				
		Negative	1	2	3	> 3
< 6 mon	78	54 (69.2)*	20 (25.6)	4 (5.1)	0 (0)	0 (0)
6 - 11 mon	99	51 (51.5)	37 (37.3)	10 (10.1)	1 (1.0)	0 (0)
1 - 5 years	636	102 (16)	170 (26.7)	157 (24.7)	123 (19.3)	84 (13.2)
6 - 15 years	846	40 (4.7)	205 (24.2)	250 (29.6)	190 (22.5)	161 (19.0)
Total	1,659	247 (14.0)	432 (26.0)	421 (25.4)	314 (18.9)	245 (14.7)

\* Figures in parenthesis are the percentages of the study population harbouring the respective numbers of different species of parasite.

TABLE III

Prevalence of Intestinal Parasites in relation to Toilet Facilities

Parasite	Toilet Facilities			
	Bucket (n=752)	Pit (n=572)	Water (n=243)	None* (n=102)
	% Positive	% Positive	% Positive	% Positive
Entamoeba histolytica	3.6	1.6	2.9	1.0
Entamoeba coli	9.0	3.1	6.2	2.0
Endol max nana	4.8	1.0	3.9	1.0
Iodoamoeba butschilii	4.6	1.2	3.3	0.0
Giardia intestinalis	3.8	1.2	0.8	1.0
Trichomonas hominis	0.4	0.0	0.8	0.0
Hookworm	9.4	3.3	7.4	2.0
Ascaris lumbricoides	29.2	9.8	25.1	2.9
Trichuris trichiura	29.6	9.4	25.5	3.9
Strongyloides stercoralis	2.8	0.7	1.2	1.0
Schistosoma mansoni	0.0	0.0	0.0	1.0
Schistosoma haematobium	0.0	0.0	0.0	1.0
No parasites recorded	5.7	6.2	3.9	2.0

\* No toilet facilities recorded



them to an older age. In addition, the probability of hitherto uninfected individuals becoming infected would increase as they grow older.

The infection rate with the pathogenic *Entamoeba histolytica* consistently increased as the age-group of the population increased, a similar observation had been previously reported.<sup>4,6</sup> A plausible explanation may be that infected individuals, when treated, do not develop immunity; so that the entire population is always susceptible to infection. The higher rate of infection of 8.4% with *Giardia intestinalis* in this study as compared with a lower frequency of 7.2% reported for the population,<sup>6</sup> is a reflection of the fact that *Giardia intestinalis* is an infection of children, with the highest frequency of infection among the 1-5 years age group.<sup>4</sup>

The frequency of infection with the helminths was similarly higher in the population<sup>6</sup> than in the current study among children, except for *Trichuris trichiura* and *Strongyloides stercoralis*. The higher prevalence of *Strongyloides stercoralis* in the present study is difficult to explain, more so as hookworm, which is transmitted in a similar manner i.e. (penetration of the infective stage through the skin) had a lower frequency rate (22.5%) in the children population than in the general population where the infection rate was reported to be 26.6%.<sup>6</sup>

An interesting observation is that while the infection rate of 71.5% reported for *Ascaris lumbricoides* among Lagos school children by Okpala<sup>5</sup> and that of 64.6% recorded for the parasite among Ibadan school children by Ogunba<sup>3</sup> are of about the same order as the infection rate of 68.3% found in this study, the infection rate with *Trichuris trichiura* recorded in this study was double that recorded previously by these workers.<sup>3,5</sup> It is highly improbable that the difference is due to improved host behaviour since both parasites have similar modes of transmission; rather, it might be due to factors inherent in the parasites themselves. For example, they might have become less pathogenic and better tolerated with time as a result of which a

number of cases might not require medication as may be the case with *Ascaris lumbricoides* infection of children. It is also possible that they have become resistant to common antihelminthic drugs as a result of which the infection persists albeit in small numbers, once an individual becomes infected.

At first sight, the rate of infection with intestinal parasites particularly *Ascaris lumbricoides*, *Trichuris trichiura* and *Entamoeba histolytica* reported recently by Odugbemi *et al*<sup>7</sup> appears to be much lower than that recorded in this study, however, a comparison of their findings in the age group 1-4 years, which they studied, with those obtained for the corresponding age-group in the present study shows that the rates of infection with the parasites were similar.

This study shows a striking correlation between means of faecal disposal and prevalence of intestinal parasites. It is interesting to note that those whose households had no special means of faecal disposal had the lowest prevalence of intestinal parasites. As 6% of the population surveyed belonged to this category, the low prevalence rate may be because the possibility of environmental contamination is greatly reduced as these people rarely use the same area twice and generally walk a good distance away from their dwelling place before defaecating, and also generally use water for cleaning. Although this method of faecal disposal may be considered primitive, it seems obvious that it plays a significant role in keeping down the rate of infection with the intestinal parasites, mainly because it has reduced the chances of human-parasite contact.

Those households, however, which used buckets as their means of faecal disposal recorded the highest prevalence for all the intestinal parasites. Removal of such buckets to where they will eventually be disposed of, is generally very erratic, exposing the faecal contents to flies and other agents of mechanical transmission for long periods of time. This would normally increase the rate of contamination, both by humans and

insects, most of which are reported<sup>10</sup> to be efficient mechanical transmitters of parasites.

Water closets, a means of faecal disposal which is considered the most modern, also recorded a high prevalence of intestinal parasites. It is possible that a general lack of such hygienic habits as washing of hands after defaecation and a lack of constant running water supply for frequent flushings may be responsible for this high rate.

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