

Food and Health

Comparative study on intestinal parasites amongst secondary school pupils in Ikare Akoko, Ondo State, South-Western Nigeria

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Abstract

A total of 200 stool samples were collected from apparently healthy secondary school pupils in Ikare-Akoko, Ondo State, South-Western Nigeria to know the types and distribution of intestinal parasites that are prevalent amongst them. Out of the 200 pupils examined (100 pupils attending public schools and 100 pupils attending private schools), 95 (47.5%) were positive with the presence of one type of intestinal parasite or the other irrespective of the type of school. The following intestinal parasites were isolated and identified: hookworm (40%), *Ascaris lumbricoides* (45.5%), *Trichuris trichuria* (5.5%) and *Taenia saginata* (12.5%). In all the age groups sampled (10-20 years), infection was found to be higher in pupils attending public secondary schools than in those attending private secondary schools.

Key words: Secondary school pupils, type of school, stool samples, intestinal parasites.

Introduction

Parasitism is an obligatory association between two distinct species in which the dependence of the parasites upon its host is a metabolic one involving mutual exchange of substances¹. Parasites are generally smaller in size than their host and depend upon the host for nutrition, developmental stimuli and habitat but they possess a higher reproduction potential than do their host². The intestinal parasitic worms are referred to as helminthes and they cause a disease known as "helminthiasis"³. This infection is common in areas where villagers are not supplied with sanitary facilities, where animals run loose scavenging for foods with ready access to human faces and children go bare-footed⁴. The effects of the parasites on the host are related to the type and worm burden. Heavy infestation cause severe anemia and damage to the gut wall and high susceptibility to other diseases⁴⁻⁶.

Although there are some reports on the distribution of helminthes among different communities in Nigeria and around the world, more information is desired so as to know the current status in these and other areas where such investigation has not yet been carried out. This therefore prompted the present investigation to know the types of helminthes present among secondary school pupils in Ikare-Akoko, Ondo State South-Western Nigeria and to study the distribution in relation to age and affluence.

Materials and Methods

Sampling method: Two hundred questionnaires were prepared reflecting information such as age, sex, state of health, drinking water source and access to proper toilet facility. These were distributed randomly to secondary school pupils in Ikare-Akoko. The stools of the pupils that filled the questionnaire were collected in sterile McCartney bottles and taken to the laboratory for analysis.

Examination of the stool samples: An application stick was used to make a smear of the stool on a grease free slide containing a drop of normal saline (each stool specimen was treated separately). The smear was thoroughly mixed until there was an even mixture and then viewed under the microscope (x 40 objective) after it had been covered with a cover slip. For the next stage, about 1 g of the stool sample was mixed with a small amount of sterile normal saline inside a labeled test tube. The tube was placed in its rack and more saline solution was added until a deposit could be seen at the bottom of the tube and the solution was about to overflow the tube, a sterile cover slip was lowered to the surface avoiding air bubbles and left for 15 min. The cover slip was then removed in an upright position and placed face down to an already labeled slide (air bubbles are avoided). The slide was then viewed under the microscope first with the x10 objective and then with the x40 objective.

Results

Out of the 200 faecal samples examined, 95 (47.5%) were positive for the presence of the ova of one type of helminthes or the other (Table 1). From the 100 pupils sampled from the public schools, 54% were positive while 41% were positive of the 100 pupils sampled from private schools. The rate of occurrence of the intestinal parasites based on sex and type of school can be seen in Table 2. Out of the 100 faecal samples examined from pupils going to public secondary schools (68 males and 32 females), 41 (60.3%) of the males were found to be infected and 13 (40.6%) of the females were infected while 30 (50.9%) of the 59 male pupils going to private secondary schools were positive and 11 (26.8%) out of the 41 females sampled in this category were positive for the presence of the ova of one or more intestinal parasites. Table 3 shows the types and frequency of occurrence of these parasites

Table 1. Rate of occurrence of intestinal parasites in secondary school pupils in Ikare-Akoko, Ondo State, South Western Nigeria.

School type	No. examined	No. positive	%
Public	100	54	54.0
Private	100	41	41.0
Total	200	95	47.5

Table 2. Rate of occurrence of intestinal parasites in secondary school pupils based on sex and type of school.

School type	Sex	No. Sample	No. Positive	%
Private	Male	59	30	50.9
	Female	41	11	26.8
Public	Male	68	41	60.3
	Female	32	13	40.6
Total		200	95	47.5

Table 3. Types and frequency of occurrence of intestinal parasites amongst secondary school pupils in Ikare-Akoko irrespective of type of school.

Type of intestinal parasite	Frequency of occurrence
<i>Ascaris lumbricoides</i>	91(45.5%)
Hookworm	80(40%)
<i>Trichuris trichuria</i>	11(5.5%)
<i>Taenia saginata</i>	25(12.5%)

among the pupils sampled irrespective of type of school (whether public or private), sex and age. The ova of *A. lumbricoides* were found in 91 (45.5%), hookworm in 80 (40%), *T. trichuria* in 11 (5.5%) and *T. saginata* in 25 (12.5%) of the pupils sampled.

The distribution based on type of school and sex can be seen in Table 4. Out of the 59 males from the private secondary school that were positive for the presence of the ova of intestinal parasites, 24 (40.7%) were found to be infected with hookworm, 30 (50.9%) with *A. lumbricoides*, 4 (6.8%) with *T. saginata*, 2 (3.4%) with *T. trichuria*. In the public secondary school, 5 (7.4%) males were infected with *T. trichuria*, 3 (4.4%) with *T. saginata*, 40 (58.8%) with *A. lumbricoides* and 36 (52.9%) with hookworm (Table 4). Out of the 41 female pupils sampled from private secondary schools that were positive for the presence of the ova of intestinal parasites, 8 (19.5%) were positive for *A. lumbricoides*, 11 (26.8%) for hookworm, 1 (2.0%) for *T. trichuria* and 11 (26.8%) for *T. saginata* while for their counterparts in the public school, 13 (40.6%) were positive for *A. lumbricoides*, 9 (28.1%) for hookworm, 3 (9.0%) for *T. trichuria* and 7 (21.9%) for *T. saginata*. The most prevalent of the intestinal parasites was *A. lumbricoides* among the male students from the private school (50.9%) and from the public school (58.8%). For the females, hookworm (26.8%) and *T. saginata* (26.8%) were the parasites commonly found in those sampled in the private school while *A. lumbricoides* (40.6%) was the most prevalent in those sampled in the public school.

The distribution of these parasites according to age can be seen in Tables 5-8. For *A. lumbricoides*, male pupils within the age range 19–20 years had the highest incidence of 100% while 0% was found in their female counterpart (Table 8). The same result was seen in the distribution of *T. trichuria* (Table 6) and hookworm (Table 7). *T. saginata*, however, was not seen in any of this category.

Table 4. Rate of occurrence of the isolated intestinal parasites amongst secondary school pupils based on sex and type of school.

A	B	C	Al	Hk	Tt	Ts
Private	M	59	30(50.9%)	24(40.7%)	2(3.4%)	4(6.8%)
	F	41	8(19.5%)	11(26.8%)	1(2.0%)	11(26.8%)
Public	M	68	40(58.8%)	36(52.9%)	5(7.4%)	3(4.4%)
	F	32	13(40.6%)	9(28.1%)	3(9%)	7(21.9%)

Key: A - School type, B- Sex, C - No. examined, Al - No. positive for *A. lumbricoides* (%), Hk -No. positive for Hookworm (%), Tt- No. positive for *T. trichuria* (%), Ts- No positive for *T. saginata* (%)
M - Male, F - Female

Table 5. Distribution of *Taenia saginata* according to age in the secondary school pupils examined.

A	B	C	D	E	F	G	H	I	J	K
Public	13 – 14	18	1	5.6	15	2	13.3	33	3	9.1
	15 – 16	41	2	4.9	17	5	29.4	58	7	12.1
	17 – 18	8	0	0.0	0	0	0.0	8	0	0.0
	19 – 20	1	0	0.0	0	0	0.0	1	0	0.0
	Total	68	3	4.4	32	7	21.9	100	10	10.0
Private	10 – 11	24	1	4.2	15	2	13.3	39	3	7.7
	12 – 13	18	2	11.1	14	4	28.6	32	6	18.8
	14 – 15	16	1	6.3	12	5	41.7	28	6	21.4
	16 – 17	1	0	0.0	0	0	0.0	1	0	0.0
	Total	59	4	6.8	41	11	26.8	100	15	15.0

Key: A- School type, B-Age, C-No. of males examined, D-No. of males infected, E-% infected, F-No. of females examined, G-No. of females infected, H-% infected, I-Total no. of pupils examined, J-Total no. infected, K- Total % infected.

Table 6. Distribution of *Trichuris trichuria* according to age in the secondary school pupils examined.

A	B	C	D	E	F	G	H	I	J	K
Public	13 – 14	18	1	5.6	15	1	6.7	33	2	6.1
	15 – 16	41	2	4.9	17	2	11.8	58	4	6.9
	17 – 18	8	1	12.5	0	0	0.0	8	1	12.5
	19 – 20	1	1	100.0	0	0	0.0	1	1	100.0
	Total	68	5	7.4	32	3	9.0	100	8	8.0
Private	10 – 11	24	0	0.0	15	0	0.0	39	0	0.0
	12 – 13	18	0	0.0	14	0	0.0	32	0	0.0
	14 – 15	16	1	6.3	12	1	8.3	28	2	7.1
	16 – 17	1	1	100.0	0	0	0.0	1	1	100.0
	Total	59	2	3.4	41	1	2.0	100	3	3.0

Key: Same as for Table 5.

Table 7. Distribution of hookworm according to age in the secondary school pupils examined.

A	B	C	D	E	F	G	H	I	J	K
Public	13 – 14	18	8	44.4	15	4	26.7	33	11	33.3
	15 – 16	41	20	48.8	17	6	35.3	58	26	44.1
	17 – 18	8	7	87.9	0	0	0.0	8	7	87.9
	19 – 20	1	1	100.0	0	0	0.0	1	1	100.0
	Total	68	36	59.2	32	9	28.1	100	45	45.0
Private	10 – 11	24	6	25.0	15	3	20.0	39	9	23.1
	12 – 13	18	7	38.9	14	4	28.6	32	11	34.4
	14 – 15	16	10	62.5	12	4	33.3	28	14	50.0
	16 – 17	1	1	100.0	0	0	0.0	1	1	100.0
	Total	59	24	40.7	41	11	26.8	100	35	35.0

Key: Same as for Table 5

Discussion

The results obtained in this study showed that there is a higher prevalence of *A. lumbricoides* and *T. trichuria* among the pupils in the public secondary school than among those in private secondary schools sampled in Ikare–Akoko. This might be due to inadequacy of toilet facilities because in most public schools pupils defecate indiscriminately around the school premises. Moreover the level of hygiene of pupils in such schools is low. Many of them wear dirty uniform and feed on dirty food materials bought from roadsides where dusts are raised and being sold very close to the gutter. They also depend on untreated stream and river water for drinking. Furthermore, the unavailability of proper refuse disposal system in the schools examined might contribute to the high incidence. Refuse were seen dumped at the back of the classrooms and the whole premises were littered with dirt. These

habits encourage worm infestation⁷. On the other hand, this result showed that *Taenia* infestation was higher in private school pupils than in the public school pupils. This might probably be due to affluence because roasted beef meat is a delicacy for the children of the rich and these children are the ones in most cases that go to private schools because their parents can afford the high school fees that are paid there. Cattles and pigs that are sold as roasted meat have been reported⁵ to be the main host of tapeworms. The higher intestinal parasites in males generally might be due to their involvement in various activities like playing of football, hunting or playing of one kind of local games or the other on the ground which can make their hands to be very dirty and at the same time use the same hand to eat without washing. Eating with dirty hands is the chief route of transfer of ova of intestinal parasites from contaminated soil to human system⁸.

Table 8. Distribution of *Ascaris lumbricoides* according to age in the secondary school pupils examined.

A	B	C	D	E	F	G	H	I	J	K
Public	13 – 14	18	8	44.4	15	6	40.0	33	14	42.4
	15 – 16	41	4	58.5	17	7	41.1	58	31	53.5
	17 – 18	8	7	87.5	0	0	0.0	8	7	87.5
	19 – 20	1	1	100.0	0	0	0.0	1	1	100.0
	Total	68	40	58.8	32	13	40.6	100	53	53.0
Private	10 – 11	24	7	29.2	15	2	13.3	32	9	23.1
	12 – 13	18	10	55.6	14	2	14.3	32	12	37.5
	14 – 15	16	12	75.0	12	4	33.3	28	16	57.1
	16 – 17	1	1	100.0	0	0	0.0	1	1	100.0
	Total	59	30	50.9	41	8	19.5	100	38	38.0

Key: Same as for Table 5.

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