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Full Length Research Paper

Prevalence and intensity of intestinal parasites in five communities in south-west Nigeria

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An investigation was conducted to determine the infection rate of intestinal parasites among 312 primary and post primary school children in randomly selected schools in five communities in Ilesa West Local Government Area, Osun State, Nigeria, between January and July, 2005. Faecal samples were collected from these subjects and examined. Direct saline and iodine preparations were examined as well as the preparation from sedimentation technique. The kato-katz technique was used for determination of intensity of worm infestation. 151 (48.40%) school children were infected. *Ascaris lumbricoides* and *Entamoeba histolytica* were the intestinal parasites found in the study population. Out of the 151 (48.40%) infected, 122 (39.10%) were positive for *A. lumbricoides* and 29 (9.29%) were positive for *E. histolytica*. Age group 5 - 7 years was mostly (50.00%) infected in primary school and age group 13 - 15 years was mostly (54.12%) infected in post-primary school. The intensity rate of *A. lumbricoides* was light (100 - 3,000 egg) among the school children in both primary and post–primary schools. The overall infection rate in both primary and post-primary schools for males and females were 20.79 and 28.21% respectively, which implies that infection rate was higher in females but not statistically significant (P>0.05). The differences observed in the infection rates in the study locations were also not statistically significant (P>0.05).

Key words: Intestinal helminthes, *A. lumbricoides*, *E. histolytica*, sedimentation technique, kato-katz technique, south-west Nigeria.

INTRODUCTION

Intestinal parasites are identified as a cause of morbidity and mortality throughout the world particularly in the under developed countries and in persons with co-morbidities. They are one of the most common infections in humans especially in tropical and sub-tropical countries (Adeyeba and Akinlabi, 2002). The parasites frequently encountered include *Ascaris lumbricoides*, hookworms, *Trichuris trichiura*, *Strongyloides stercoralis*, *Entamoeba histolytica*, and *Giardia lamblia* (Agi, 1997; Nikolic et al., 1998).

More than one billion of the world's population, including at least 400 million school children are chronically infected with *A. lumbricoides*, *T. trichiura* and the hook-worms (WHO, 1987). There have been reports (Arogun, 1984; Adeyeba and Akinlabi, 2002) on high prevalence among paediatric age group in Nigeria.

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The high prevalence of these infections is closely correlated with poverty, poor personal and environmental hygiene and impoverished health services (Tomkins, 1983).

Worms get into human body by ingestion, skin penetration or when injected by insects (Nathan, 1997). Amoebiasis caused by *Entamoeba histolytica* spreads through faecal-oral route and through oral-anal sex while giardiasis are caused by the flagellated protozoan, *G. lamblia* is spread by faecal-oral contamination and it is commonly water borne.

The objective of this study is to determine the prevalence and intensity of intestinal parasites among school children in Ilesa West Local Government Area, Osun state, Nigeria.

MATERIALS AND METHODS

Study area

The study was carried out in five randomly selected communities/

quarters in Ilesa West Local Government Area (LGA) of Osun State, Nigeria. The communities are Idasa, Ilaje, Ikoyi, Oloruntedo and Oke Omiru. This LGA consists of Urban Communities/Quarters with a population of 151,581 (1991 National Census). It is located on latitude $7^0 37^1$N to $7^0 39^1$N and longitude $4^0 43^1$E to $4^0 47^1$E. The LGA shares boundary with Obokun and Oriade LGAs in the North; Ilesa East LGA in both East and South; Atakunmosa and Obokun LGAs in the West. The inhabitants of the communities/quarters are traders, farmers, civil servants and students.

Study subject selection

Children of both primary and post-primary schools in Ilesa West LGA constituted the target population for the study. Four primary and four post-primary schools were randomly selected from 10 primary and 9 post-primary schools found in the communities under study by using lottery method. One arm of each class in the chosen schools was selected by using lottery method again. In the selected primary schools, lottery method was also used to select 5 students in each of the selected arm of the class (Class 1 to 6). Total number of students selected in each primary school was 30. So also, the same lottery method was used to select 8 students in each of the selected arm of class in post-primary schools. Thus, a total number of 48 students were randomly selected in each of the post primary school selected for the study.

Sample collection and examination

All selected subjects were given washed stool containers with labels for serial number, name, age and sex. Early morning faecal samples were got from these students.

Faecal samples collected were promptly treated in the laboratory by using the methods described by WHO (1994). Direct saline and iodine preparation were examined as well as the preparations from sedimentation technique. The kato-katz technique described by WHO (1994) was used for the determination of intensity of worm infestation.

The intensity of infection of *A. lumbricoides* in the studied population was determined by calculating the number of eggs per gram of faeces (epg). The thresholds proposed by WHO (1987) were used for chatting. Statistical analysis was done by Chi-square test and $P<0.05$ was regarded as significant.

RESULTS

Three hundred and twelve (312) school children were examined for intestinal parasites, 142 (45.5%) were males and 170 (54.5%) were females, with the age range of 2 - 21 years in both primary and post–primary schools. 151 (48.40%) were infected. Out of those infected, 63 (20.19%) were males and 88 (28.21%) were females. There was no significant difference in the distribution of intestinal parasitic infection between males and females ($P>0.05$) (Table 1). Among the primary school children, age group 5-7 years was mostly (50.00%) infected and age group 13-15 years was mostly (54.12%) infected in post-primary school (Table 1). The differences in the prevalence of gastro-intestinal parasites between the different age groups were not statistically significant ($P>0.05$).

A. lumbricoides and *E. histolytica* were the intestinal parasites found in the study population. Table 2 shows that out of the 312 school children examined, 122(39.10 %) were positive for *A. lumbricoides* and 29 (9.29%) were positive for *E. histolytica*. There was a significant difference in the prevalence of *E. histolytica* ($P<0.05$) and none in *A. lumbricoides* ($P>0.05$) in the primary and post primary schools (Table 3).

The results in Table 4 shows that the class of intensity of *A. lumbricoides* was light in both primary and post primary schools. Table 5 shows that infection rate was highest in Ilaje (50.80%) as compared to the remaining study locations. However, the difference observed in the infection rates in the study locations were not statistically significant ($P>0.05$).

DISCUSSION

A. lumbricoides (39.10%) and *E. histolytica* (9.29%) were the two parasites found among the school children in this study. This differs from other surveys where more kinds of intestinal parasites were found in study populations. In a survey, conducted to determine the prevalence of intestinal parasitic infections among school children in Igboora, a rural community of Oyo State, Nigeria, Adeyeba and Akinlabi (2002) discovered that of 554 subjects examined, 50.4% harbored intestinal parasites. Data showed that *A. lumbricoides* (24.2%) followed by hookworm infections (10.1%) were most prevalent, while infections with *G. lambia* was 2% and infection with *E. histolytica* (1.8%) was least encountered. So also, of the 515 individuals examined in three vill-ages of Ezinifite, a rural community of Aguata LGA of Anambra State, Nigeria, 158 were found positive for intestinal parasitic infections. The prevalence of parasites found were *A. lumbricoides* (12.04%), hookworm (8.93 %), *E. histolytica* (6.79%), *Entamoeba coli* (2.14%), *Taenia* sp. (0.58%) and *G. lamblia* (0.19%). Ogbe et al. (2002) also found *A. lumbricoides*, *Trichuris trichiura* and hookworm in stool examination done in five LGAs in Delta State. This difference might be due to the fact that urban communities are involved in this study as compared to the rural communities in the other studies where sanitation level is lower.

The overall prevalence of intestinal parasites (48.4%) in the study locations is not very different from those got in studies conducted by Adeyeba and Akinlabi (2002) and Igbinosa et al. (1996), 50.4 and 50.6% in Igboora and some parts of Edo State respectively. In contrast, some workers in Nigeria had earlier on reported higher figures (70.8%) in Ilorin (Awogun, 1984), 76.3 and 77.3% were reported in Eastern Nigeria by Nwosu (1981). Despite the fact that the majority of residential and educational buildings in this present study depend on pit latrine and well water for domestic purposes, the overall lower percentage recorded may be attributed to the observed efficiency of community health officers who are seriously engaged in environmental sanitation in Ilesa West Local Government Area, Osun State.

Table 1. Distribution of intestinal parasitic infections among school children by age and sex in Ilesa West LGA.

School	Age (yrs)	Male			Female			Male and Female		
		No. Examined	No. Infected	% Infected	No. Examined	No. Infected	% Infected	No. Examined	No. Infected	% Infected
Primary School	2 - 4	2	1	33.33	1	0	0	3	1	33.33
	5 - 7	7	3	15.00	13	7	35.00	20	10	50.00
	8 - 10	22	10	18.87	31	16	30.19	53	26	49.06
	11 - 13	16	5	15.15	17	9	27.27	33	14	42.42
	14 - 16	4	1	9.09	7	4	36.36	11	5	45.45
Post-Primary School	10 - 12	12	6	28-57	9	4	19.05	21	10	47.62
	13 - 15	39	19	22-35	46	27	31.76	85	46	54.12
	16 - 18	24	10	18-52	30	12	22-22	54	22	40.74
	19 - 21	16	8	25.00	16	9	28.13	32	17	53.13
Total		142	63	20.19	170	88	28.21	312	151	48.40

Table 2. Age-specific prevalence of gastro-intestinal parasites in schools under study in Ilesa West LGA.

School	Age (years)	No examined	No infected (%)	No infected with *A. lumbricoides* (%)	No infected with *E. histolytica* (%)
Primary School	2 - 4	3	1 (33.33)	1 (33.33)	0
	5 - 7	20	10 (50.00	10 (50.00)	0
	8 - 10	53	26 (49.05)	18 (33.96)	8 (15.09)
	11 - 13	33	14 (42.42)	10 (30.30)	4 (12.12)
	14 - 16	11	5 (45.45)	5 (45.45)	0
Post Primary School	10 - 21	21	10 (47.62)	8 (38.10)	2 (9.52)
	13 - 15	85	46 (54.11)	37 (43.53)	9 (10.59)
	16 - 18	54	22 (40.74)	20 (37.04)	4 (3.70)
	19 - 21	32	17 (53.43)	13 (40.63)	4 (12.5)
	Total	312	151 (48.40)	122 (39.10)	29 (9.29)

Table 3. Prevalence of gastro-intestinal parasites in the different schools in Ilesa West LGA.

School	Name of School	Number examined	Total number Infected (%)	Prevalence of parasites (%)	
				A. lumbricoides	*E. histolytica*
Primary School	AUD Pry School	30	14 (46.67)	11 (36.67)	3 (10.00)
	Africa Jehovah Nissi Pry School	30	13 (43.33)	10 (33.33)	3 (10.00)
	African Church Jubilee Pry School	30	15 (50.00)	11 (36.67)	4 (13.33)
	Methodist Pry School	30	14 (46.67)	12 (40.00)	2 (6.67)
	Total	120	56 (46.7)	44 (36.7)	12 (10)
Post Primary School	African Church Gram. School	48	24 (50.00)	19 (39.58)	5 (10.42)
	Methodist High School	48	21 (43.75)	18 (37.50)	3 (6.25)
	Ife-Oluwa C & S Comm. High School	48	27 (56.25)	22 (45.83)	5 (10.42)
	Ogedengbe School of Science	48	23 (47.92)	19 (39.58)	4 (8.33)
	Total	192	95 (49.47)	78 (40.62)	17 (8.85)
Overall total		312	151 (48.40)	122 (39.10)	29 (9.29)

Table 4. Intensity of *A. lumbricoides* expressed as egg/gram faeces in school children in Ilesa West Local Government.

Type of School	Primary school					Secondary school				Total
Age	2 - 4	5–7	8-10	11-13	14-16	10-12	13-15	16-18	19-21	
Total number examined	3	20	53	33	11	21	85	54	32	312
Number infected	1	10	18	10	5	8	37	20	13	122
*epg	100-200	1000-2000	2000-3000	1000-2000	1000-2000	1000-2000	5000-6000	2000-3000	1000-2000	
Class of intensity	Light	Light	Light	Light	Light	Light	Mode-rate	Light	Light	

* egg per gram faeces.

Table 5. Prevalence of intestinal parasites in study locations in Ilesa West LGA.

Study location	Number examined	Number infected (%)	No infected with *A. lumbricoides* (%)	No infected with *E. histolytica* (%)
Ilaje	126	64 (50.80)	52 (41.27)	12 (9.52)
Ikoyi	30	15 (50.00)	11 (36.67)	4 (13.33)
Aragan (Araromi)	30	13 (43.33)	10 (33.33)	3 (10.00)
Cappa	78	35 (44.87)	30 (38.46)	5 (6.41)
Oke – Omiru	48	24 (50.00)	19 (39.58)	5 (10.42)
Total	312	151 (48.40)	122 (39.10)	29 (9.29)

There was no significant difference between the infection rates in males and females. Results reported by Adeyeba and Akinlabi (2002) and Baldo et al. (2004) showed that infection rates for intestinal parasites were higher in males than females. However, Agbolade et al. (2004), Mafiana et al. (1998) and Taiwo and Agbolade (2000) showed from their results that helminthic infections were not sex dependent.

Age group 2-4 years consisted of three children of class teachers, only one of them was found infected. Age range 5-7 years had the highest infection rate (50.00%) among the primary school children. In post-primary schools, age group 16-18 years recorded the lowest infection rate (40.74%) while age range 13-15 years recorded the highest infection rate (54.12%). Infection rates recorded in both primary and post-primary schools may be due to their non-compliance with certain rules of hygiene. Most of these school children were seen eating food and snacks wrapped with papers and nylons got from doubtful sources and which might be contaminated. There is a high level of contamination of objects that frequently change hands by these helminths and this is a reflection of poor local level of environmental sanitation and personal hygiene. This is typical of most tropical and subtropical regions of the world where up to 15% of host population harbor approximately 70% of the worm population and serve as major source of environmental contamination.

A. lumbricoides infection occurred with the highest frequency. The possible reason for this is not far fetched. It is well established that the infective stages of *A. lumbricoides*, the embryonated eggs have enormous capacity for withstanding the environmental extremes of urban environments. Furthermore, *Ascaris* eggs are coated with a mucopolysaccharide that renders them adhesive to a wide variety of environmental surfaces; this feature accounts for their adhesiveness to everything from door handles, dust, fruits and vegetables, paper money and coins.

The differences recorded in the prevalence of intestinal parasites in the study locations are attributable to the level of sanitation prevailing in these areas. However, there was light intensity of ascariasis among the school children in Ilesa

West Local Government Area. There is need for more effort to further reduce worm burden in school children in the study area.

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