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Asymptomatic Intestinal Parasites in School Children at Ota, Ogun State

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ABSTRACT: A total of 394 stool samples was examined from apparently healthy school children in 2 primary schools (public and private) within the age group 2-16 years at Ota, Ogun state, Nigeria between March and August, 2007 in order to determine the prevalence of intestinal parasitic infection in these asymptomatic school children. One hundred and sixty-four (41.6%) of these pupils harboured various species of intestinal parasites, there was mixed infections in twenty one pupils which gave total intestinal parasites as 46.9%. *Giardia lamblia* (11.92%) and *Entamoeba histolytica* (10.15%) were found to be more prevalent, while the least prevalent organisms were *Trichuris trichiuria* (1.01%) and *Strongyloides stercoralis* (1.01%). The prevalence of asymptomatic intestinal parasites was significantly higher in children attending the public school ($P = 0.0028$; $P < 0.05$) than those attending the private school. There was no significant difference between the socio-economic status of the parents and the rate of infection of their children ($P = 0.08$; $P > 0.05$). This study thus advocates routine periodic screening even of the healthy pupils for intestinal parasitosis to minimize morbidity and mortality and improve infrastructure in our school especially the public ones.

Key Words: intestinal parasites, *Giardia lamblia, Entamoeba histolytica, School, Nigeria*

INTRODUCTION

Intestinal parasites are parasites that populate the gastrointestinal tract. They infect internal organs of the host and affect the gastrointestinal system. There are mainly 2 types of intestinal parasites; helminthes and protozoa. Intestinal parasitic infections are among the most common infections worldwide, it is estimated that some 3.5 billion people are affected and that 450 million are ill as a result of these infections, majority being children (WHO, 1998).

Childhood intestinal parasite is global, though endemic in the tropics and subtropics for reasons attributable mainly to environmental conditions and poor hygiene (Patel, 2004). Children are more susceptible to waterborne and food-borne infections because their immune systems are not fully developed and their playing and hygiene practices put them at greater risk of infection than other age groups (Miguel *et al.*, 2003). The consequence of infection may interfere with their growth and development and may limit their school achievement. The health effect of infection includes; iron deficiency anaemia, growth retardation and reduction, mental deficit, malnutrition (Hendrickse, 1991); protein losing enteropathy, malabsorption, rectal prolapse, chronic and recurrent abdominal pain and intestinal obstruction (Miguel *et al.*, 2003). Symptoms of intestinal parasites include diarrhoea, nausea or vomiting, gas or bloating,

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dysentery, itching around the rectum or vulva, stomach pain or tenderness, tiredness, weight loss and worms may be passed in the stool.

Several recent studies have revealed absence of clinical symptoms in certain cases of intestinal parasitic infection (Islam, 1990; Farthing *et al.,* 1996; Reed, 2001; Okeniyi *et al.,* 2005). The presence or absence of symptoms has been related to the strain of the infecting parasite (Muller and Gottstein, 1998), to the severity of the infection (Levinson and Nastro, 1978) or to the immune status of the host (Soliman *et al.,* 1998).

The potential consequences of asymptomatic parasitic infection are particularly important where many children carry these parasites and can constitute an immense reservoir, it is therefore essential to evaluate the prevalence of asymptomatic intestinal parasitosis among apparently healthy children in this community where such data is lacking. The study therefore set out to evaluate the prevalence, intensity and aetiologies of asymptomatic intestinal parasites among apparently healthy school children in Ota, Ogun state.

MATERIALS AND METHODS

Study population

The study was carried out at Ota, a semi-urban town in Ogun State, Nigeria between March and August, 2007. Two primary schools (private and public) were selected. A total of 394 stool samples were collected from the pupils; 138 from Heritage school (private) and 256 from Oba Moshood Alani Community School (public). The children's ages ranged between 2 and 16 years.

Sample Collection

Children with symptoms of parasitic infections (e.g. abdominal pain, diarrhoea, etc) and those who had recently taken antiparasitic drugs were excluded. Stool samples contaminated with water or urine were also rejected. Only apparently healthy children were included in the study. The age, gender of the pupils, occupation and education of their parents were documented using questionnaire.

Stool Analysis

All specimens were examined microscopically for colour, consistency, presence of mucus or blood and presence of adult worms or segments of tapeworm. Microscopically, they were examined for the presence of ova or larvae, cysts and trophozoites of parasites using saline, Lugol's iodine and eosin preparations, respectively. Samples without parasites were further examined using floatation and formol ether concentration (Cheesbrough, 2004; Ogbolu *et al.,* 2008).

Statistical Analysis

The test of significance of results obtained was determined statistically using the Chi square method, where the difference was considered to be statistically significant when the P value obtained was less than 0.05 ($P < 0.05$).

RESULTS

Prevalence of Intestinal Parasites

The total prevalence of asymptomatic intestinal parasites is 46.94%, asymptomatic intestinal parasites was significantly higher in public school than in private school **($p < 0.05$; $P = 0.0028$)**. *Giardia lamblia* had the highest prevalence rate of 11.9% while both *Trichuris trichiuria* and *Strongyloides stercoralis* had the least prevalence of 1.0% each (Table 1).

Intestinal Parasites and Sex

One hundred and sixty-four (41.6%) harboured various species of intestinal parasites. Twenty-one of these pupils had mixed infections (not shown in the table). The prevalence of intestinal parasites in male and female pupils were 41.2% and 41.9% respectively, no significant statistical difference; **P=0.931** (Table 2).

Table 1:
Prevalence of Intestinal Parasites

ORGANISMS	O.M.A.C. (256)		G.H.S (138)		TOTAL (394)	
	n	%	n	%	n	%
Ascaris Lumbricoides	34	13.28	3	2.17	37	9.39
Hookworm	28	10.93	0	0	28	7.11
Stronglyoides Stercoralis	4	1.56	0	0	4	1.01
Trichuris Trichiuria	4	1.56	0	0	4	1.01
Entamoeba Histolytica	28	10.94	12	8.69	40	10.15
Giardia Lamblia	38	14.84	9	6.52	47	11.92
Entamoeba Coli	16	6.25	9	6.52	25	6.35
Total	152	59.37	33	23.91	185	46.94
X^2 =	19.92					
P =	0.0028					

Key: n =Number of parasites isolated
%=Percentage Isolated
( ) =Number in Parenthesis is no of samples

O.M.A.C=Oba Moshood Alani Community School (PUBLIC SCHOOL)
G.H.S.= Golden Heritage School (PRIVATE SCHOOL)

Intestinal Parasites and Age

Pupils with the age group 14-16 years had the highest prevalence rate of asymptomatic intestinal infection of 66.67% as shown in Table 3, followed by age group 11-13 years (62.27%) while age group 2-4 years had the lowest prevalence (27.54%).

Intestinal Parasites and Socio-economic Status

The socio-economic status of the pupils was determined using the occupation of their parents. No significant difference was found in the prevalence rate of asymptomatic intestinal parasites and the socio-economic status **(P=0.08)**. Although, pupils whose parents are Civil servants showed a lower prevalence of 26.83% compared to Artisans and Traders with prevalence of 48.8% and 47.62%, respectively

DISCUSSION

The findings in this study show that childhood intestinal parasitosis is still a major health problem in developing countries such as Nigeria. More than a third, 46.94% of the pupils had identifiable asymptomatic intestinal parasites. This conforms to the study of Okeniyi *et al*. who reported 33.1% asymptomatic intestinal parasitosis among children in Ilesha, Osun state (Okeniyi *et al.,* 2005). Two decades ago, a remarkably higher prevalence of childhood intestinal parasitosis of 70.8% and 85.1% were reported from community based survey in Ilorin and Lagos by Awogun, (1984); Fagbenro and Oyerinde, (1987), respectively. The lower prevalence in the present study could be as a result of increased awareness of the effect of parasitic infection in form of health education programmes and the prevalent culture of self medication in this area. However, it is still believed that the prevalence of 46.94% is still on the high side. And this is attributable to the lack of sufficient sanitation, environmental or personal hygiene and children's habit of playing in groups on contaminated areas and soils.

Table 2:
Intestinal Parasites and Sex

SEX	O.M.A.C.			G.H.S			TOTAL		
	n	x	%	n	x	%	n	X	%
MALE	114	64	56.1	63	9	14.0	177	73	41.2
FEMALE	142	70	49.3	75	21	28.0	217	91	41.9
TOTAL	256	134	52.3	138	30	21.0	394	164	41.6

X^2 = 0.01
P = 0.013

Key:
O.M.A.C= Oba Moshood Alani Community School (PUBLIC SCHOOL)
G.H.S.= Golden Heritage School (PRIVATE SCHOOL
n = Number Examined
X = Number Positive

Okyay *et al.* reported that the improper cleaning practice of washing the anal area by hand with tap water also contributes to high prevalence of intestinal parasites among school children (Okyay *et al.,* 2004). These children constitute an immense reservoir and a source of infection to other healthy children with no intestinal parasites. Other health consequence in children includes growth retardation and reduction, mental deficit, malnutrition, which limit school achievement (Hendrickse, 1991). The infected child is predisposed to secondary infection or other superinfection. Vital organs of the body can also be affected when parasites wander to abnormal sites.

Table 3:
Intestinal Parasites and Age Groups

Age (yr)	n	*Ascaris lumbricoides*		*Hookworm*		*Strongyloids stercorali*		*Trichuris trichiuria*		*Entamoeba histolytica*		*Giandia lamblia*		*Entamoeba coli*		Total +ve	% +ve
		N	%	N	%	n	%	n	%	N	%	n	%	n	%		
2-4	29	0	0	0	0	0	0	0	0	2	6.90	4	13.79	2	6.90	8	27.59
5-7	98	7	7.14	4	4.08	0	0	2	2.04	13	13.27	13	13.37	7	7.14	46	46.94
8-10	159	16	10.06	14	8.81	2	1.26	2	2.26	15	9.43	8	5.03	6	3.77	63	39.62
11-13	90	12	13.33	8	8.89	2	2.22	0	0	10	11.11	14	15.56	10	11.11	56	62.22
14-16	18	2	11.11	2	11.1	0	0	0	0	0	0	8	44.44	0	0	12	66.67
Total	394	37	9.39	28	7.11	4	1.02	4		40		47	11.93	25	6.35	185	46.95

Table 4:
Intestinal Parasites and Socio–Economic Status

Parents Occupation	No Examined	No Positive	% Positive
Civil Servant	123	33	26.83
Artisan	166	81	48.80
Trader	105	50	47.62
Total	394	164	41.6

χ^2 = 5.00; P = 0.08

Giardia lamblia was the most prevalent aetiology in asymptomatic intestinal parasite in this community followed by *Entamoeba histolytica*. These aetiologies support the study of Al-wah-aid in 1997 who reported *Giardia lamblia* (64%) and *E. histolytica* (29%) as the most prevalent among children infected with intestinal parasites (Al-wah-aid, 1997). Okyay *et al.* also reported *Giardia lamblia* as one of the most common intestinal parasites followed by *E. coli* in their study (Okyay *et al.,* 2004). These organisms can be transmitted orally and are environmental contaminants of water supplies. Contamination of municipal water supplies with human waste has led to several large outbreaks of giardiasis (Wilson, 1998). Drinking water contaminated with *Giardia* species has been recognized over the past 10 years as a cause of waterborne disease in humans (Zuckerman *et al.,* 1999). Thus the low quality of municipal water supply and faulty sewage lines, habit of defaecating in the open due to poor toilet facilities at home and in school could be responsible for the high prevalence of *Giardia lamblia* in this study. The practice of self medication with antihelminths which do not affect protozoans could also be a contributing factor. The low incidence of *Strongyloides stercoralis* (2.16%) supports the work of Tellez *et al., (*1997). No data on *Enterobius vermicularis* was given in this study because samples with cellulose tape slides were not taken due to rejection of this method by the parents of the pupils in order to ensure minimal contact with them.

Children attending private schools were found to have a lower rate of parasites than pupils in public school. This could be attributed to improved toilet facility in the school, cleaner school environment and also owing to the fact that majority of the pupils attending private schools are believed to be from parents with better education. Carrera *et al.(1984)* and Nematian *et al. (2004)*showed that the better the economic score of the family, the lower the prevalence of parasitic infection. The practice of sale of food to school children by food vendors whose personal hygiene is doubtful also contribute to a higher prevalence of intestinal parasites in public school.

The socio-economic status of the pupils, determined using the occupation of their parents and the rate of isolation of intestinal parasites shows that no significant difference was observed. This agrees with the findings of Quihui *et al.,* 2006. Although those of Civil servants showed a lower incidence of 26.83%, this may probably due to a higher level of education compared to those of the Artisans and Traders. However, it is noteworthy that despite the higher level of education among the Civil servant class, lack of good drinking water supply, lack of good toilet facilities, improper sewage disposal method, overcrowded household and poor environmental hygiene still remains a problem which cut across the various economic status. Also, a great number of mothers in this community are unemployed and uneducated. Wamani *et al. (2004)* stated that mother's education was the best predictor of health nutrition inequalities among children in rural Uganda. Similarly, Nematian *et al.* (2004) also showed that the better the educational level of the mothers, the lower the isolation of parasites in the children.

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