PREVALENCE OF INTESTINAL PARASITES AMONG PRIMARY SCHOOL CHILDREN IN ILARO, YEWA SOUTH LOCAL GOVERNMENT AREA, OGUN STATE

Johnson A. T. & Adetula O. A.
Department of Nutrition and Dietetics, Federal Polytechnic Ilaro, Ogun State
***Corresponding author: adetulaoluwole@gmail.com .**

Abstract

Intestinal parasitic infections are common public health problems among school age-children in Nigeria. This study assessed the prevalence of intestinal parasites among primary school children aged 6-12 years in Yewa South Local Government Area, Ogun State. Three hundred and fifty six (356) respondents were selected using stratified sampling technique. A structured questionnaire was used to obtain information on socio-demographic characteristic of the respondents. Stool samples were analyzed for intestinal parasites using cellophane thick smear method. Personal hygiene of the children and sanitation condition of their schools were also assessed using on site observation checklists. Data obtained were analyzed using descriptive statistics while Pearson Product Moment Correlation (PPMC) was used to establish relationship among variables. Result showed that females were 50.6% while males were 49.4%. Prevalence of intestinal parasites was 10.2% for Ascaris lumbricoide, 4.2% for hookworm, 0.6% for Hymenolepis nana, 1.8% for Trichuris trichiuria, 0.6% for Schistosoma mansoni and 0.6% for Strongyloides stercoralis. Personal hygiene condition revealed that 87.1% had acceptable general grooming. Majority (74.4%) washed fruits and vegetable before consumption. About 58.0% of the respondents had clean hands and nail beds. The practice of handwashing after defecation was observed by 84.6%. The study established the presence of intestinal parasite (Ascaris lumbricoides, hookworm and Trichuris trichuria) among the children in the study location. There is need for school management to collaborate with health officers on intestinal parasite control programmes.

Key words: Prevalence, Intestinal parasite, School children.

1. INTRODUCTION

Intestinal parasitic infections still constitute one of the major causes of public health problems in the world, particularly in developing countries (Ekpenyong, 2008). Intestinal parasites have been described as constituting the greatest single worldwide cause of illness and disease. Numerous studies have shown that the incidence of intestinal parasites may approach 99% in developing countries (Jon, 2010). Intestinal parasites are organisms that invade the digestive system with the potential for stealing important nutrients and harming tissue. Less common in civilized countries, intestinal parasites can enter the body by eating uncooked or unwashed foods or contacting faeces (Barbara, 2012).

Helminths or worm infestations refer to worms that live as parasites in the human body and are a fundamental cause of disease associated with health and nutrition problems beyond gastrointestinal tract disturbances (Jamaiah and Rohela, 2003). Globally, over 3.5 billion people are infected with intestinal worms, of who 1.47 billion are infected with roundworm, 1.3 billion people with hookworm and 1.05 billion with whipworm (Ekpenyong, 2008).

About 400 million school-age children around the world are infected with roundworm, whipworm and hookworm (Luong, 2003). Intestinal parasitic infections are most common among school age- children and tend to be of high intensity in age group (Sharma *et al*., 2004). Children are among the most vulnerable to environmental threats as they are in a dynamic state of growth with their cells multiplying fast and their organ systems developing at a rapid rate (WHO, 2003). The highest infection rate and worm burden were found among school children aged 5-15 years and were attributed to poverty, illiteracy, poor sanitary conditions, unhygienic practices, absence/ lack of access to potable water, poor housing, hot and humid tropical climate (WHO, 1991; Sehgal *et al*., 2010). These can affect child development; educational achievement, reproductive health, and social and economic development (Nematian, 2008).

These parasites consume nutrients from the children they infect, thus retarding their physical development. They destroy tissues and organs, cause abdominal pain, diarrhoea, intestinal obstruction, anaemia, ulcers and other health problems. All of the consequences of infection can slow cognitive development and thus impair learning. It produces

nutritional deficiencies and anaemia in children, especially when hookworm infestation is present (Adeyeba and Akinlabi, 2002; Ahmed *et al*., 2003).

As children are most at risk at an age when they are both growing and learning, intestinal parasitic infections potentially threatens a child's overall physical and psychological development and may cause or aggravate malnutrition (Stephenson *et al*., 2000).The study aimed at determining the prevalence of intestinal parasite and investigate the hygienic conditions as well as describe the sanitary conditions of students in the schools investigated.

2.0 MATERIALS AND METHODS

Study sites

The research was conducted in Ilaro, Yewa South Local government in Ogun State. The study was descriptive and cross sectional covering government public and approved private primary schools in Ilaro. The study was carried out in 2018/2019 academic session. There are 72 government-owned primary schools and 73 approved private primary schools in the LGA. According to record obtained from Zonal office of Ministry of Education, Science & Technology, there are 50 primary schools in Ilaro, 16 public primary schools and 34 private primary schools. Twenty percent (20%) of the total population of number of primary schools in Ilaro was used as representative which is 10 schools altogether. Sampling proportional to size was used to select the number of public and private primary school to use. Stratified random sampling methods were used to select subject for the survey. The samples for this study were drawn from both public and private primary schools within Ilaro. A structured pretested questionnaires designed in English was used to obtain information from three hundred and fifty six (356) respondents.

Personal Hygiene Practices of the School Children

The personal hygienic practices of the primary school children were assessed specifically by asking them question to obtain information on their perspectives on personal hygiene and physically rate them whether they are in good condition or not. Questions on general hygiene/grooming, cleanliness of hand and nail beds, hand washing after defecation, sharing of underwear with other sibling and washing of vegetables / fruits by the pupil himself or herself were asked.

Sanitary Conditions of Schools

The schools' sanitary conditions were assessed specifically by using some observational sanitation spot checks measures such as: type of water supply, condition of water supply, type of toilets facility, number of toilets, adequacy of toilet for school population, usage of toilets, toilets /latrine condition of cleanliness, availability of soap for hand washing, and presence of garbage piles around the school compounds.

Examination of Faecal Sample for Ova/Egg of Intestinal Parasite

Each eligible child was asked to provide a fresh faecal sample in cleaned and dried specimen bottles provided. A specimen bottle marked with identification number, name, sex, and age of child was given to each pupil. One stool sample was collected from each pupil. Faecal samples were collected monthly for a period of four months. On collection of the faecal samples, they were taken to the laboratory for examination. Stool samples were examined within 12 hour by concentration method for eggs of intestinal parasites (Cheesebrough, 1992).

The concentration method procedure goes thus:

1. At the laboratory, a drop of fresh physiological saline was placed on a slide. Using a piece of clean stick, a small amount of faecal sample was mixed with the saline.
2. In order to concentrate the parasites in the faeces; formol-ether concentration technique was employed. Using a stick, about 1g of the faeces was mixed with physiological saline and was put in a screw-cap bottle containing 4ml of 10 % formol water.
3. The plastic was capped and mixed by shaking for about 20 seconds. Thereafter, the faeces were sieved, and the sieve suspension collected in a beaker. The suspension was then transferred to a tube and 3 ml of ether was added. The tube was stoppered and mixed by shaking for one minute. Thereafter, the stopper was removed and centrifuged immediately at 3000 rpm for one minute

4. After centrifuging, four layers were evident; the top layer of ether, thin layer of debris, formalin, and sediment in bottom with parasites. An applicator stick was used to loose the layer of faecal debris from the side of the tube. The ether, debris and formalin were then carefully poured off.
5. The sediment was mixed, transferred to a slide and covered with a cover slip.
6. The slide was examined under the microscope using first, the 10x objective, followed by 40x objective to identify the eggs of intestinal parasites (Ash and Orihel, 2003).

The number of pupils who tested positive with intestinal parasite, and the type of intestinal parasite observed was recorded.The diagnosis of intestinal parasite was based on identification of helminth ova and protozoan cysts/egg in the faeces sample during microscopic analysis .A child was considered to have intestinal parasite (s) when ova or egg/cysts of one or more of the following under listed species of intestinal parasites were present in his or her faeces.

1. *Ascaris lumbricoides*

2. Trichuris trichiuria

3. Taenia species

4. Hymenolepis nana

5. Hookworm

6. Gardia lamblia

7. Schistosoma mansoni

8. Strongyloides stercoralis

3.0 RESULTS

Table 1 shows the prevalence of intestinal parasites among primary school. The results showed that 4.8 % and 5.4% of the male and female children were positive to Ascaris *lumbricoides while* 1.8% only female children were positive to *Trichuris triciuria respectively and 0.6% of male children were positive to Hymenolepsis nana. Also the prevalence of* Hookworm was 1.8% (male) and 2.4% (female) while 0.6% of only male and 0.6 % of only female were positive to *Schistosoma mansoni and Strongyloides stercoralis respectively***.**

Table 1: Prevalence of Intestinal Parasite among Primary School Children

Parasite	Male N (%)	Female N (%)	Total N (%)
Ascaris lumbricoides			
Positive	8(4.8)	9(5.4)	17(10.20)
Negative	-	-	150(89.80)
Trichuris triciuria			
Positive	-	3(1.8)	3(1.8)
Negative	-	-	164(98.2)
Hymenolepsis nana			
Positive	1(0.6)	-	1(0.6)
Negative	-	-	166(99.4)
Hookworm			
Positive	3(1.8)	4(2.4)	7(4.20)
Negative	-	-	160(95.80)
Schistosoma mansoni			
Positive	-	1.(0.6)	1(0.6)

Negative	-	-	166(99.4)
Strongyloides stercoralis			
Positive	1(0.6)	-	1(0.6)
Negative	-	-	166(99.4)
Taenia Species			
Positive	-	-	-
Negative	-	-	-
Giardia lamblia			
Positive	-	-	-
Negative	-	-	-

Table 2 shows the intensity of prevalence of intenstinal parasites among primary school children. It was observed that 4.2%of the children had high intensity of prevalence of *Ascaris lumbricoides, 1.8% had low intensity of prevalence of Trichuris trichiuria, while 0.6% showed moderate intensity to Strongyloides Stercoralis respectively.*

Table 2: Intensity of Prevalence of Intestinal Parasite among Primary School Children

Parasite	**Frequency(N)**	**Percentage (%)**
Ascaris lumbricoides		
Low	7	4.2
Moderate	2	1.2
High	8	4.8
Trichuris trichiuria		
Low	3	1.8
Moderate	-	-
High	-	-
Hymenolepsis nana		
Low	-	-
Moderate	1	0.6
High	-	-
Hookworm		
Low	4	2.4
Moderate	-	-
High	3	1.8

Schistosoma mansoni		
Low	1	0.6
Moderate	-	-
High	-	-
Strongyloides Stercoralis		
Low	-	-
Moderate	1	0.6
High	-	-

The table 4 below showed the description of sanitary conditions of schools investigated: it was observed that only two private schools were having tap water supply while all of the public schools were found to have well water. Also five of the schools were having water closets (convenience) while the rest had pit latrine. Toilet facilities were not adequate for the population of nearly all the schools

Schools	Sources of water supply	Type of toilet facility	Latrine lid	No of toilet	Adequacy of toilet for school population	Usage of toilet	Condition of toilets cleanliness	Availability of soap &water for hand washing	Garbage piles around school premises
1.Public	Well water	No toilet/latrine	Not applicable	0	Inadequate	Not applicable	Not applicable	Available	Absent
2. Public	Well water	Pit latrine	Present	2	Inadequate	In use	Clean	Available	Present
3.Private	Tap water	Water Closet	Not applicable	1	Inadequate	In use	Clean	Available	Absent
4. Private	Well water	Water Closet	Not applicable	8	Adequate	In use	Clean	Available	Absent
5. Private	Well water	Pit latrine	Present	3	Inadequate	In use	Clean	Available	Absent
6. Private	Well water	Pit latrine	Present	2	Inadequate	In use	Clean	Available	Present
7. Private	Well water	Water Closet	Not applicable	4	Adequate	In use	Clean	Available	Absent
8. Private	Tap water	Water Closet	Not applicable	8	Adequate	In use	Clean	Available	Absent
9. Public	Well water	Pit latrine	Absent	4	Inadequate	Abandoned	Dirty	Unavailable	Present
10. Private	Well water	Water Closet	Not applicable	3	Inadequate	In use	Clean	Available	Absent

4.0 DISCUSSION

Intestinal parasite among primary school children in Ilaro, Yewa South local government area of Ogun state was assessed in this study. Generally, intestinal parasitic infestation abounds in developing countries with school children carrying the heaviest burden of the associated morbidity (Opara and Udoidung, 2003). Abah and Arene (2006) recorded 42.7% prevalence with hookworm 16.0%, *Ascaris lumbricoides* (15.4%), *Trichuris trichiura* (8.0%), *Strongyloides stercoralis* (3.0%), and *Taenia saginata* (1.7%) in their work on intestinal helminthiasis among primary

school children in Akpor area of Port Harcourt, Rivers State. Ezenwaka *et al*. (2011) reported 18.5% prevalence among children in Ogbaru Local Government Area of Anambra State with *Ascaris lumbricoides* (9.5%), hookworm (7.5%), *Trichuris trichiura* (1.5%), *Enterobius vermicularis* (1%), and *Taenia species* (1%), while Ezeagwuna *et al*. (2011) reported 47% overall prevalence among school children in Umuukwu, Aram, in Anambra State in their work.

Studies conducted on the prevalence of intestinal parasites among school children in Northwest Ethiopia was in the range of 55.6% to 72% (Mengistu *et al.,* 2010; Worku *et al*., 2009). The present study showed a relatively low prevalence of intestinal parasites: *Ascaris lumbricoides* (10.2%), *Trichuris trichiura* (1.8.%), Hookworm (4.20%), *Hymenolepsis nana* (0.6%), *Schistosoma mansoni* (0.6%), *Strongyloides stercoralis* (0.6%), and *Taenia saginata* (0%) comparable to the above report and report from the study conducted in Babile town, eastern Ethiopia (Tadesse, 2005). The difference could be due to variability in the prevalence of these infections, low sensitivity of the diagnostics method, the use of single stool sample and environmental contamination could partly explain the observed difference. Although the prevalence rates of individual parasites vary considerably among the primary school children, *Ascaris lumbricoides*, *Trichuris trichuria* and hookworm were found to be the most prevalent parasites in this study .

This finding was in agreement with reports of previous studies conducted in Ethiopia (Yami, 2011).The three species are cosmopolitan; *Ascaris lumbricoides*, *Trichuris trichuria* are transmitted by the faecal–oral route, while hookworms actively penetrate exposed skin. Presence of Ascaris specie and *Trichuris* specie indicates that food and water are contaminated with infective eggs of these parasites by any of a number of routes, or that hand to mouth transmission may occur (Ekpo *et al*., 2008). The reasons for this prevalence may be attributed to poor environmental conditions and personal hygiene, an inadequate supply of drinking water, and a waste disposal system which does not correspond to approved standards (Ukpai and Ugwu, 2003; Banke *et al*., 2006). Food and drinking water handling equipment may be contaminated if there are no safe and secured human waste disposal methods or adequate hand-washing facilities as it is the case in some public owned schools where pupils defecate around school compounds and are unable to wash their hands because there is no soap and only infrequent water (Ekpo *et al* ., 2008).

The presence of hookworm infestation in this study may be as a result of school children who do not wear shoe when they are playing within and outside school premises as hookworm penetrates the exposed skin (UNICEF, 2001). The use of excreta as manure by peasants' farmers might also be acting as a veritable source of infection since children and their mothers often go to the farm to tender the vegetables (Opara, 2003).

This study indicates that the prevalence of intestinal parasite was more among the female respondents. This trend might result from the fact that females are more exposed to infection because of their attachment to their mother, they tend to accompany them to their farmland or backyard farmland or to their shops where they play with soil. Also it could be due to their unconcern attitude towards hygiene, as some see adherence to hygiene practices as a burden. Garbage's piles were accumulated around some schools and school children were seen digging and playing on them. Thus, the children may have been exposed to an additional risk for the transmission of intestinal infestation more than children from privately owned schools. Lapses in hygienic practices by few pupils, poor sanitary condition of some of the schools investigated might have contributed to the presence of intestinal parasites like *Hymenolepis nana* and *Schistosoma mansoni* (Yami, 2011).

The study observed that sanitary facilities in the public owned primary schools investigated were inadequate and this is of epidemiological significance considering the number of hours pupils spend in schools (Ibrahium, 2011). The ratio of toilets to number of students far exceeded the recommended ratio as stated by Banke *et al*. (2006). However, the sanitary condition of the private school was better. Garbage piles were accumulated around public owned schools and school children were seen playing very close to some of these. Thus, the children may have been exposed to the risk of intestinal infestation as pupils defecated in those garbage piles after schools hours due to inadequacy of toilets and when there was no water to clean the toilets as stated by some pupils. Provision of adequate toilet facilities that children are trained to use and are happy to use will certainly discourage indiscriminate defecation elsewhere. The provision of adequate sanitary facilities could interrupt transmission of faecal oral pathogens (Ibrahium, 2011).

The outcome of this study suggests the urgent need for provision and improvement of sanitary facilities in schools. Regularly emptied garbage cans are needed in public owned schools. Epidemiological evidence suggests that improvement of sanitation and community hygiene, along with improvements in water supply, have a considerable impact in reducing communicable diseases (Minvielle *et al*., 2004; Graczyk *et al*., 2005). The absence of drinking water in schools may drive pupils to other unhygienic sources thereby increasing the risk of communicable diseases

(Ibrahium, 2011). The spot check personal hygiene practices of the majority of the respondents, was adequate in terms of cleanliness of school uniform. This might be due to constant oral education on personal hygiene, its importance to an individual health and regular checking of pupils' neatness culture which is practiced in all schools. Also, the hygiene practices in terms of washing of fruits and vegetables and handwashing after defecation were quite impressive for all respondents from public and privately owned schools. This may be due to the fact that bowl for water and soap were conspicuously placed in locations where pupils could easily assess them on their way to and back from the toilets. Hands are vectors that can transport disease agents from person to person directly or indirectly via surfaces. Hands that have been in contact with faeces, nasal excretions and other bodily fluids, and not subsequently adequately washed, can vehicle large numbers of viruses, bacteria and possibly other parasites (Bloomfield and Scott, 2003). Many pupils shared underwear with their siblings in which was of epidemiological significance in terms of health as there could be transfer of parasite invasion from a carrier within the siblings of respondents to another and this may constitute a health hazard.

The prevalence of these intestinal parasites among the school children is of great concern. Hookworm is known to cause systemic secondary effects related to iron deficiency, anaemia and therefore inducing malnutrition. Ascariasis causes vitamin A and carotenes deficiencies and possibly malnutrition as secondary effects. Trichuris in the same way causes iron deficiencies, anaemia which may also lead to malnutrition (Amuta *et al*., 2004).

5.0 CONCLUSIONS AND RECOMMENDATION

Ascaris lumbricoides, Hookworm and *Trichuri trichuria* were the three major intestinal parasites identified among the children. The observed personal hygienic practices of respondents were high, while the sanitation conditions of some schools investigated were poor. The study established the presence of intestinal parasite (Ascaris lumbricoides, hookworm and Trichuris trichuria) among the children in the study location. There is need for school management to collaborate with health officers on intestinal parasite control programmes.

REFERENCES

Andersen, R., Gleich, D.F., and Mirrokni, V. (2012). Overlapping clusters for distributed computation. In *Proceedings of the fifth ACM international conference on Web search and data mining* (pp. 273-282).

Adebambo, O. A. 2006. Agricultural development and food production: imperatives for a successful school feeding programme in Nigeria. Proceedings of 37th Conference of Nutrition Society of Nigeria 5: 16 -21

Adamu, A., Adjei, N. G. and Kubuga, C. K. 2012. Effects of dietary patterns on the nutritional status of primary school children in Tamale Metropolis. *Pakistan Journal of Nutrition,* **11 (7):** 591 – 609**.**

Adedoyin, M. A., Awogun, I. A. and Juergensen, T. (1990). Prevalence of intestinal parasitoses in relationship to diarrhoea among children in Ilorin. *West African Journal of Medicine*. **9**: 83-88.

Adegoke, S. A., Olowu, W. A., Adeodu, O. O., Elusiyan, J. B. and Dedeke, I. O. 2009. Prevalence of overweight and obesity among children in Ile Ife, South Western Nigeria. *West Africa Journal of Medicine,* **28(4):** 216-221.

Adeyeba, O. A. and Akinlabi, A. M. (2002). Intestinal parasitic infection among school children in a rural community, South West Nigeria. *Nigerian Journal of Parasitology* 23: 11-80

Administrative Committee on Coordination / Sub Committee on Nutrition (1989). Report of the 15th session of the ACC / SCN, New York pp1-15.

Ahmed, A.K., Malik, B. and Shaheen, B. (2003). Frequency of intestinal parasitic infestation in children of 5 -12 years of age in Abbottabad. *Journal of Ayub Medical College Abbottabad*. **15:** 28-30.

Ajayi, E. O. and Akinyinka, O. O. (1999). Evaluation of the nutritional status of first year school children in Ibadan, South West. (*Africa Journal of Medical Sciences*, 59-63).