

Intestinal Parasitic Infection among Primary School Pupils in Osogbo Nigeria.

¹*Oyeniran O. A., ²Ojurongbe O., ³Oladipo E.K., ³Afolabi A.Y., ⁴Ajayi O.O.
⁵Oloke A.A.

¹Department of Medical Microbiology & Parasitology, Ladoke Akintola University of Technology Teaching Hospital, P.M.B. 5000, Osogbo, Osun State, Nigeria.

²Department of Medical Microbiology & Parasitology, College of Health Sciences, Ladoke Akintola University of Technology, P.M.B. 5000, Osogbo, Osun State, Nigeria.

³Department of Pure and Applied Biology (Microbiology/ Virology Unit), Ladoke Akintola University of Technology, P.M.B. 4000, Ogbomosho, Oyo State, Nigeria.

⁴Department of Biological Sciences Joseph Ayo Babalola University Ikeji-Arakeji, Osun State, Nigeria

⁵Department of Histopathology, Ladoke Akintola University of Technology Teaching Hospital, PMB 5000, Osogbo, Osun State, Nigeria.

Abstract: Parasitic infestation caused by intestinal parasites continues to take their toll on mankind. The symptoms commonly associated with parasitic infestation can be severe, acute or chronic. The prevalence of intestinal parasitic infestation was carried out over a period of three months (January to March 2008) among 505 primary school children between 6-12 years of age in AUD Primary School A and B Sabo, St. Michael School A and B Ago-wande and L.A. Adenle Primary School Ayetoro in Olorunda Local Government with headquarter in Osogbo. Direct smear was used for analyzing faecal samples for the parasites. Diagnosis was based on identification of the characteristic protozoan cysts and helminthes ova with a compound microscope. The prevalence for *Ascaris lumbricoides*, *Entamoeba histolytica*, Hookworm, *Trichuris trichuria* were 68.9%, 8.3% and 5.5% respectively. Parasitic infections between the male and female showed a significant difference in both sexes ($P < 0.01$). The percentage prevalence of *Ascaris lumbricoides* was high in between 6-7 years and ≥ 12 years. No specific age relationship was established for other intestinal parasites among the pupils. From the findings of this study, it is hereby recommended that deworming and health education should necessarily be a component of the primary health care programme with a focus on school children. This study showed low standard of sanitation among the pupils.

Keywords: *Ascaris*, *Entamoeba*, *Trichuris*, Infections, Osogbo, Parasites, Pupils.

I. Introduction

Parasitic infestations are common in Nigeria especially in rural areas. One fact is that these infections have been associated with low standard of sanitation and between 500 million and 1 billion people are estimated to be infected annually worldwide (WHO, 1992; Taiwo and Agbolade, 2000; Adeyeba and Akinlabi, 2002).

It is recognized that certain factors play important roles which include: the strain and number of the parasites, age and level of immunity at the time of infestation, immune responses to the infestations, presence of co-existing diseases or conditions which reduce immune responses, malnutritional undertone due to iron deficiency, folic acid and protein deficiency. This could occur singly or in combination with other causative agents (McGregor *et al.*, 1996).

Intestinal parasites are parasites that populate the gastro-intestinal tract. In humans, they are often spread by poor hygiene related to faeces, contact with animals or poorly cooked food containing parasites. The major groups of parasites include protozoans (organisms having only one cell) and parasitic worms (Helminthes) of these, Protozoans, including *Cryptosporidium*, *Micropodium* and *Isospora* are most common in HIV-infected persons. Other are *Entamoeba histolytica*, *Balantidium coli*, *Giardia lamblia* etc, each of these parasites can infect the digestive tract, and sometimes two or more can cause infection at the same time.

Human intestinal helminthic parasites are worms that inhabit the body lumen of the gut (Agbolade *et al.*, 2004), they are among the most common infection occurring throughout the developing world. Intestinal parasites are regarded as important public health problem in tropical Africa (Odutane *et al.*, 1974). These parasites are amongst the most prevalent human infections affecting approximately one quarter of the world's populations, mainly school children due to their poor hygienic nature or poor sanitary conditions coupled with their voracious eating habits (WHO, 2002).

Parasites can get into the intestine through the mouth from uncooked or unwashed food, contaminated water or hands or by skin contact with larva infection soil. People can also become infected with intestinal

parasites if they have mouth contact with the genital or rectal area of a sexual partner who is infected (e.g. oral sex or anal-oral contact). When the organisms are swallowed, they move into the intestine, where they reproduce and cause disease.

In some people, intestinal parasites do not cause any symptoms or the symptoms may come and go. Common signs and complaints include coughing, cramping, abdominal pain, bloating, flatulence and diarrhea. In more serious diminished sex drive, skin-itching, fever, nausea, vomiting or bloody stools may occur. Some parasites also cause low red blood count (anemia) and some travel from the lungs to the intestinal or vice versa and other parts of the body. Therefore, laboratory test are necessary to determine their cause.

However, because many parasitic infections especially those of helminthes origin are usually asymptomatic or produce only mild symptoms, they are often neglected until serious complications or chronic clinical pictures appear (WHO,2002).The presence of these parasites in asymptomatic carriers has been a major source of infection to susceptible hosts, hence compounding the problem.

In endemic countries, gastro-intestinal infections are most prevalent in rural communities, peri-urban settings and urban slums (Fashyiet *al.*, 1999). Although, intestinal parasites could be considered as major problem in rural settlements in Nigeria due to their poor socio-economic status and lack of basic amenities such as water, toilets facilities etc. the problems of these infections are also increasing in the urban areas due to similar deficiencies.

In Nigeria, many intervention schemes which were attempted to control these infections did not yield much successes, many are still heavily infected particularly children (Ijagbone and Olagunju,2006). In view of the negative socio-economic impact of these parasitic infections on infected humans, efforts would be made to elucidate their epidemiological state among pupils. Therefore the study was carried out to know the prevalence and types of intestinal parasites infection among the children, the intensity of infection and to draw the attention of the local authority to the rate of infection so as to eradicate the problem among the children.

II. Materials and Methods

Study Group

The prevalence of intestinal parasite was carried out over a period of three months (January to March 2008) among 505 primary school children between 6-12 years of age in AUD Primary School A and B Sabo, St. Michael School A and B Ago-wande and L.A. Adenle Primary School Ayetoro in Olorunda Local Government with headquarter in Osogbo.

Stool Collection

About 10g of Stool samples were collected into clean wide mouth specimen bottled randomly from all the 505 children. The examination was made without delay (within 24 hours of passage of the stool). The method used to diagnose intestinal helminthiasis was light microscopy (Jeffrey and Leach, 1975).

Macroscopy Examination of Stool Samples.

Freshly voided stool samples were examined for bloody, colour, consistency and mucus.

Direct Faecal Smear

Direct smear were used for analysis of the faecalsamples for parasites. Diagnosis was based on identification of the characteristic protozoan cysts and helminthes ova with a compound microscope using x10 and x40 objectives (Cheesbrough,1992).

Formol Ether Concentration Method.

The faecal samples that are negative for direct smear were washed prior the concentration procedure. Saline and iodine preparation were made from the deposit on a clean grease free slide and examined for cysts and helminth ova with a compound microscope using x10 and x40 objectives.

Data Analysis.

The percentage prevalence was calculated as:

$$\text{Prevalence (\%)} = \frac{\text{No of pupils infected}}{\text{Total number of pupils examined}} \times 100\%$$

Total number of pupils examined.

Data analysis was done using chi-square X^2 and student T test to test the level of significant between variables.

III. Results

A total of 505 freshly voided stool samples were collected between the ages of 6 to 12 years, which consists of 275 males and 230 females from three primary schools in Osogbo metropolis. Out of the total samples, 373 (71.9%) were infected, 216 (59.5%) male and 147 (40.5%) females were infected. Table 1 shows the prevalence of intestinal helminthes infection according to gender, being higher in male than in females. Table 2 reveals the prevalence rate of *Ascarislumbricoides* (68.9%), hookworm (5.5%), *Entamoebahistolytica* (8.3%), *Trichuristrichuria* (0.4%) and *Entamoebacoli* (6.3%) which is non-pathogenic in man. Mixed infection of *Ascarislumbricoides* and *Entamoebahistolytica* was recorded among 31 (8.5%) and *Ascarislumbricoides* and Hookworm (0.4%) in the study. The student t test analysis of the parasitic infection between the males and females showed a significant difference between the sexes ($P < 0.01$)

The percentage prevalence of *Ascarislumbricoides* was high in pupils between ≥ 12 years of age and progressively decreased in pupils between 8-9 years. Apart from *Ascarislumbricoides* where prevalence increases with increasing age, there was no particular pattern with respect to age in the prevalence of other intestinal parasite among pupils.

The weight and height related prevalence of intestinal parasite infection among primary school pupils is shown in table 4. All parasites seen in this study, their relationship with weight and height is significant i.e statistical analysis by chi-square X^2 test revealed that there is significant difference of those that had parasitic infection and those that had no infection.

Table 1: Occurrence of Intestinal Parasites According to Gender

SCHOOLS	MALE		FEMALE		TOTAL	
	No Examined	No (%) Infected	No Examined	No (%) Infected	No Examined	No (%) Infected
AUD Primary School A Sabo, Osogbo.	106	91 (85.8)	94	85 (90.4)	200	176 (88)
AUD Primary School B Sabo, Osogbo.	60	43 (71.7)	42	24 (57.1)	102	67 (65.7)
St. Micheal School A and B Ago-wande, Osogbo.	53	35 (66.0)	50	30 (60.0)	103	65 (63.1)
L.A Adenle School Ayetoro, Osogbo.	56	31 (55.4)	44	24 (54.5)	100	55 (55)
TOTAL	275	200 (69.7)	230	163 (52.1)	505	363 (38.7)

Table 2: Frequency of Species of Intestinal Parasites among School Pupils.

Species	No Examined	No Positive	% Positive
<i>Ascaris lumbricoides</i>	505	250	49.6
Hookworm	505	25	5.0
<i>Trichuris trichuria</i>	505	2	0.4
<i>Entamoeba histolytica</i>	505	30	5.9
<i>Entamoeba coli</i>	505	23	4.6
Mixed Infections			
<i>Ascaris lumbricoides</i> and Hookworm	505	2	0.4
<i>Ascaris lumbricoides</i> and <i>Entamoeba histolytica</i> .	505	31	6.1

Table 3: Age Prevalence of Intestinal Parasites among Pupils

Age (years)	No Examined	No Infected	% Infected
6-7	132	87	65.9
8-9	115	79	68.7
10-11	114	93	81.6
≥ 12	144	104	72.2

Table 4. Weight and Height Related Prevalence of Intestinal Parasitic Infection among Primary School Pupils.

SCHOOLS	PARAMETER	UNINFECTED MEAN Wg (Kg) W ₁	INFECTED MEAN Wg (Kg) W ₂	Wg Difference (W ₁ - W ₂)	UNINFECTED MEAN H (cm) H ₁	INFECTED MEAN H (cm) H ₂	H Difference (H ₁ - H ₂)
School A AUD Primary School Sabo, Osogbo	Male	29.07	22.58	6.49	1.27	1.12	0.15
	Female	29.78	23.36	6.42	1.31	1.18	0.13
School B AUD Primary School Sabo, Osogbo.	Male	25.35	23.83	1.52	1.18	1.16	0.02
	Female	27.22	24.38	2.84	1.21	1.11	0.10
St. Michael School A & B Ago-Wande Osogbo.	Male	27.67	24.14	3.53	1.23	1.18	0.05
	Female	26.00	23.77	2.23	1.15	1.00	0.15
L.A. Adenle Primary School Ayetoro, Osogbo	Male	28.20	23.52	4.68	1.22	1.20	0.02
	Female	29.70	23.38	6.32	1.26	1.13	0.13

IV. Discussion and Conclusion

Despite much action from all quarters including WHO (1992) the global problem of tropical disease however has grown tremendously in the last decade. The gravity and magnitude of the problem posed by parasitic infection is very high in Nigeria, especially among school children both in rural and urban areas.

The common intestinal parasites recorded in this study include *Ascarislumbricoides*, *Entamoebahistolytica*, hookworm and *Trichuristrichuria*. The study of the prevalence rate of the intestinal parasites in primary schools in Osogbo metropolis indicated that there was consistently higher infection among school children.

This study revealed that *Ascarislumbricoides* recorded a prevalence of 68.9% among school children in Osogbo, Nigeria. The high prevalence rate of *Ascarislumbricoides* among pupils in this area indicates high level of unhygienic practices which enhance transmission in the schools and unhygienic status of most food hawkers. This is corroborated by the fact that many of the students practice indiscriminate and open defaecation while over 40% indulged in fingernail, nibbling and finger sucking. These practices would have enhanced the presence of most helminthes practices encountered in this study especially *Ascarislumbricoides* and *Entamoebahistolytica*. This is in agreement with the findings of Ohaegbula *et al.*, (1996) and Okpala (1977).

This study has shown that parasitic infestation increased progressively with increasing age. Pupils aged between 6-7 had 23.9%, 8-9 (21.8%), 10-11 (25.6%) while ≥ 12 years had 28.7%, this could be due to random selection of the pupils by local government authority for the treatment of parasitic infection.

The prevalence of hookworm was 5.5%, this could be attributed to the poor toilet facilities. The children were found defaecating indiscriminately in their backyard and bushes around the school premises thereby littering the environment with faecal matters which were likely to contain intestinal parasites including hookworm ova. The children most often move barefooted in their environment predisposing themselves to infection with infective hookworm larvae. Another source of infection is the use of night soil as fertilizer by some agricultural practices.

Onubogu (1978) observed that hawking food in the open and unprotected from street dust, inability to wash fruits before eating are important factors that may promote infection and re-infection in children. In this course of study, indiscriminate and inadequate disposal of human waste around homes was frequently observed. Lack of water system toilets and inadequate water for washing hands after defaecation may be some of the factors directly related to the high prevalence of helminthes infection among the school pupils.

It is said that an adult hookworm ingests about 0.03ml to 0.2ml blood daily (Monical, 2002), this form deficiency anaemia usually result from a heavy hookworm burden which causes chronic blood loss coupled with other worm like *Ascarislumbricoides* infection, parasite like schistosoma species also cause significant blood loss, this is in agreement with observation of Agromea (Kaeni, 2003; Heyneman, 1991). Anaemia can be the cause of growth retardation (Angeles *et al.*, 1993) and heavy infection of *Ascarislumbricoides* is an important cause of anaemia worldwide.

The presence of emaciation, abdominal pain and dysentery syndrome in some of the subjects with double infection possibly indicates the severity of the combine influence of the two parasites. The debilitating effects of helminthiasis on school children include Kwariokor, emaciation, fatigue and mental dullness. These features were observed physically among some of the subjects.

An overall prevalence of parasitic infestation of 71.9% was observed in this study. This infection rate appears comparable to what has been observed in other parts of the country; Eastern Nigeria Nsukka 68.8% and Naka (69.5%) as reported by Onubogu, 1978 and Okpala 1977 and also Ejezie 1981 which found 69% as the prevalence of intestinal helminthiasis.

Parasitic infestation is still a major public Health problem in Nigeria children, the extent of the problem is indication of the quality of living standard, environmental sanitation as well as socio-economic factors like large family size, inadequate child care and poor dietary practices (Nokes and Budy, 1993).

Three strategies can also be adopted for the prevention of anaemia namely iron supplementation, fortification of a staple food with Iron and the control of helminthes infection studies in primary school (Palupi *et al.*, 1997) have shown that intermittent Iron supplementation is effective haemoglobin levels, similar to that of daily Iron supplementation which has been advocated by international health agencies.

The provision of Iron-deficient children improves growth (Lawless *et al.*, 1994). The severity of anaemia in Osogbo, Nigeria is higher and may be corrected by appropriate diet as long as the parents should have sufficient knowledge about which foods are of nutritional values and how to prepare them properly.

Intestinal parasite infection can be controlled with anti-helminthic drugs in conjunction with education (Evans and Stephenson, 1995). Most of the populations in Osogbo do not have access to appropriate sanitary conditions and health facilities and eradication through schools and houses is an option that could be considered (Magnussen *et al.*, 1977).

Based on the findings of this work, it is hereby recommended as follows: Screening, deworming and health education should necessarily be a component of the primary health care programme with a focus on school children; an extensive screening programme will make available baseline data for efficient health programming and disease surveillance. Intestinal helminthes control programme should embark more on health education, the need for proper disposal of faeces and good toilet facilities. The Federal and State governments should provide pipe-borne water to urban areas and anti-helminthic drug to the community at large.

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