

## Prevalence of Ascariasis among Secondary School Students in Akwanga, Central Nigeria.

Mamman, A.S.<sup>1\*</sup> and Maikenti, J.<sup>2</sup>

<sup>1\*</sup>Department of Zoology, University of Jos, Nigeria

<sup>2</sup>Department of Biological Sciences, Bingham University Karu, Nigeria

Corresponding Author: [mammanshadrak@gmail.com](mailto:mammanshadrak@gmail.com)

### ABSTRACT

Ascariasis has a worldwide distribution. It causes death, impairs the physical, mental and intellectual development thereby exerting tremendous, impact on productivity of individuals especially the future leaders of tomorrow. This study is to determine the prevalence of Ascariasis among secondary school students in Akwanga, Central Nigeria. Two hundred and fourthy three (243) stool samples were examined for parasitic infections using the direct smear and formal-ether concentration techniques. 15 (6.17%) of the students were found to be positive for the parasites. The highest prevalence of 11.54% was recorded among students from Government secondary school Akwanga south. There was no significant difference ( $P>0.05$ ) between the prevalence of Ascariasis among students examined from various schools. Public schools has high infection rate (6.61%) as compares to private school (5.74%). Students within the age groups 11-13 and 14-16 had high infection rate of 6.38% and 6.47% respectively. Females were more infected (7.97%) than males (3.81%). The overall occurrence of other parasites was 10.69% with *Entamoeba histolytica* having the highest occurrence (7.82%) followed by *Ancylostoma duodenale* and *Schistosoma mansoni* both having 1.23% occurrence each. *Taenia* species has the least occurrence (0.41%). Improved sanitation, personal hygiene deliberate policy for regular deworming of students by the government will decrease the rate of intestinal parasitic infections.

**Keywords:** Ascariasis, Prevalence, Infections and hygiene

### INTRODUCTION

Ascariasis is a condition due to the infection by helminthes parasite *Ascaris lumbricoides*. One billion people or 25% of the world's population harbour *A. lumbricoides*, making it the most prevalent helminthiasis of humans. It is usually a mild disease with relatively low morbidity and mortality rates. The high global prevalence of *Ascaris* ultimately results in 20,000 deaths per year, mainly due to intestinal obstruction (Chijoke *et al.*, 2011).

Ascariasis is a common infection in children of tropical countries due to poor sanitation. It is, however, rare in adults. Infection is acquired via faecal-oral transmission through ingestion of food, water, or soil contaminated with embryonated eggs (Gaash, 2004).

*A. lumbricoides* can caused a myriad of complications in the abdomen. The most common complications of *Ascaris* are intestinal obstruction caused by a worm bolus, which may present as acute or sub acute intestinal obstruction or alternatively intussusceptions. Perforation and gangrene of the small bowel (Refeidi, 2007). Other areas where adult worms could lodge are in the appendix, causing acute appendicitis and appendicular perforation, or in the billiary and pan creatic ducts, causing hepato pancreatic ascariasis.

In Nigeria, several literatures exist on the prevalence of Ascariasis (Mafiana, 1993; Nmorsi *et al.*, 1996). These reports gave the estimates of endemicities and epidemiological picture of this parasitic infection in different parts of the country using the microscopic examination of ova in faeces.

Studies have shown that intestinal Ascariasis is quite common in Enugu (Onwasigwe, 1999). In Calabar, it was found to be the commonest worm infestation among pre-school children with prevalence as high as 64.4%, followed by hookworm (10.4%) and *Trichuris trichiura* (1.1%) (Anah MU, *eta al*, 2008). Low socio-economic standard tends to affect the border of Ascariasis as the prevailing conditions favour the transmission of *A. lumbricoides* as well as other geo-helminths. Akogum, 1998, stated that transmission of helminths is sometimes influenced by difference in environment local population and socio-cultural habits; such that prevalence and intensity in two or more adjacent and ecologically similar communities differ especially among school- aged population.

### MATERIALS AND METHODS

#### Study Area

Akwanga Local Government Area is the capital of Nasarawa North Senatorial district of Nassarawa State. The climate of the area is tropical and the vegetation characteristics is predominantly guinea savannah with an annual rainfall of about 1000mm. The temperature range between 21.7°C to 24.7°C and a maximum of 29.7°C to 33.7°C. There are two distinct seasons the wet and dry seasons. The former lasts between April and October while the latter from November to March. Apart from being farmers some of the inhabitants are civil servants and traders most of the people are employed on daily basis as field labourers. Animal's wastes are extensively used to enrich the soil by the indigenes.

### Selection of Schools

A cross sectional descriptive study was used to determine the status of *Ascaris* worms infections whose subjects were drawn from various back grounds. Proportional random sampling method to select Ten (10) schools out of the 35 public and private schools was used. And thirty students per school were randomly selected to participate in the study. The schools used for this study include:

- (1) St Peter's Secondary School
- (2) Glory Ultimate Academy
- (3) Baptist high school
- (4) Baptist model secondary school
- (5) Redeemer College Akwanga
- (6) Government secondary school Akwanga
- (7) Government secondary school Akwanga south
- (8) Government secondary school Akwanga north
- (9) Government junior secondary school Akwanga central
- (10) Government junior secondary school Akwanga north

### Consent

At the beginning of the study, permission was first taken from the school authority; the reasons for the surveys and procedure for stool sample collection were explained to the students.

### Survey and Sampling

The student survey forms include columns for each child's name, sex, age, school and parasitic status (Montessor, 1998). A plastic container marked with identification number and the name of the child was distributed to each students. Each of the students was instructed to supply the stool sample from their early morning stool the following day. Sample were received and taken to the laboratory.

### Laboratory Processing and Examination of Samples

The samples were transported to the laboratory and each was examined macroscopically and then microscopically using formal-ether concentration technique as described by (Cheesbrough, 1987).

### Macroscopic Examination of Samples

Each sample was examined macroscopically for the presence of adult worms, blood and mucus. Also the socio-demographic (age and sex) of each student in the study population were documented.

### Formal-Ether Concentration Method

One (1) gram of sample was placed in a test-tube and 5ml of normal saline was added and emulsified thoroughly, it was then centrifuged at 3000rpm for 3min and supernatant discarded. The process was repeated until the supernatant was clear, 7ml of 10% formal-saline was added to the deposit and was mixed thoroughly 3ml ether was added and covered with a rubber bank, and shaken vigorously and centrifuged at 3000rpm for 3min, the supernatant was discarded and deposit examined using X10 objectives respectively.

### Results

Out of the 243 samples examined, the results show the prevalence of Ascariasis to be 15(6.17%). Other parasite seen in the study include Hookworm 3(1.23%), *Entamoeba histolytica* 19(7.17%), *Schistosoma mansoni* 3(1.23%), and *Taenia* species 1(0.41%). The highest prevalence of (11.54%) was observed in GSS Akwanga South while Baptist high school has the prevalence of (0.00%) as shown in Table 1.

In the comparison between the public and private school according to Table 2(A and B) shows that private school schools has the prevalence rate of (5.74%) with Redeemer College having the highest prevalence of (10.71%) and Baptist Model College (8.69%), Baptist high school was the least with (0.00%). The overall prevalence rate among the public school is (6.61%), with GSS Akwanga south having the highest prevalence of (11.54%), the least was GSS Akwanga with (3.57%). With respect to gender, females had the highest prevalence rate of (7.97%) while males had the prevalence rate of (3.81%) respectively as shown in Table 3. The distribution of the prevalence of infection among the various age groups showed the correspondence between the age group of 11-13 and 14-16 which had the prevalence of (6.38%) and (6.47%) respectively, while the least prevalence rate of (4.54%) was observed in ages of 17-19 as shown in Table 4.

On the basis of other parasitic infections among the students, it shows a total of 26 samples were positive for 4 different species of other intestinal parasites. *Entamoeba histolytica* with the highest rate of (7.82%) followed by Hookworm and *Schistosoma mansoni* both having (1.23%), the *Taenia* species with (0.41%) Table 5.

**Table 1: Prevalence of Ascaris Infection Among Secondary School Students in Akwanga, Central Nigeria.**

S/N	NAME	NO. EXAMINED	NO. POSITIVE	PREVALENCE (%)
1.	St. Peter's Sec. Sch.	23	1	4.35
2.	Glory Ultimate Academy	25	1	4.00
3.	Redeemer College Akw.	28	3	10.71
4.	GSS Akwanga North	29	2	6.89
5.	GSS Akwanga South	26	3	11.54
6.	GSS Akwanga	28	1	3.57
7.	Baptist High School	23	0	0.00
8.	Baptist Model College	23	2	8.69
9.	GJSS Akwanga Central	13	1	7.69
10.	GJSS Akwanga North	25	1	4.00
<b>TOTAL</b>		<b>243</b>	<b>15</b>	<b>6.17</b>

**Legend:** GSS; Government Secondary School, GJSS; Government Junior Secondary School

**Table 2: Prevalence of Ascaris Infection Among the Public and Private Schools in Akwanga, Central Nigeria**

A. PRIVATE SCHOOLS				B. PUBLIC SCHOOLS			
Name of Schools	No Examined	No Positive	Prevalence (%)	Name of Schools	No Examined	No Positive	Prevalence (%)
1. St. Peter's Sec. Sch.	23	1	4.23	1. GSS Akw. North	29	2	6.89
2. Glory Ultimate Acad.	25	1	4.00	2. GSS Akw. South	26	3	11.54
3. Redeemer College	28	3	10.71	3. GSS Akwanga	28	1	3.57
4. Baptist High School	23	0	0.00	4. GJSS Akw. Central	13	1	7.69
5. Baptist Model College	23	2	8.69	5. GJSS Akw. North	25	1	4.00
<b>TOTAL</b>	<b>122</b>	<b>7</b>	<b>5.74</b>	<b>TOTAL</b>	<b>121</b>	<b>8</b>	<b>6.61</b>

**Table 3: Sex Distributions and Prevalence of Ascaris Infection among the Study Population**

SEX	NO. EXAMINED	NO. POSITIVE	PREVALENCE (%)
Male	105	4	3.81
Female	138	11	7.97
<b>TOTAL</b>	<b>243</b>	<b>15</b>	<b>6.17</b>

**Table 4: Age Distribution and Prevalence of Ascaris Infection Among the Study Population**

AGE GROUP	NO. EXAMINED	NO. POSITIVE	PREVALENCE (%)
11 – 13	47	3	6.38
14 – 16	139	9	6.47
17 – 19	44	2	4.54
20 -22	13	1	7.69
<b>TOTAL</b>	<b>243</b>	<b>15</b>	<b>6.17</b>

**TABLE 5: Occurrence of other Parasites**

OTHER PARASITES	NO. EXAMINED	NO. POSITIVE	PREVALENCE (%)
<i>Ancylostoma duodenale</i>	243	3	1.23
<i>Entamoeba histolytica</i>	243	19	7.82
<i>Schistosoma mansoni</i>	243	3	1.23
<i>Taenia species</i>	243	1	0.41
<b>TOTAL</b>	<b>243</b>	<b>26</b>	<b>10.69</b>

## DISCUSSION

The results obtained from this work showed that 15(6.17%) of the 243 students examined were positive for *Ascaris* infection. At least a good number of positive samples were obtained from all the schools. The prevalence of Ascariasis recorded in this study was quite higher than those obtained by some other researchers. A prevalence of 1(0.2%) among school age children was recorded in Vom, Plateau State, Nigeria by (Dangana *et al.*, 2012), Basir, 1998, recorded (1%) in Jos, Nigeria. It also disagrees with the findings of Itoe, 1996, and Damshark, 1998 who recorded (2.5%) and (2.0%) respectively in Plateau State, Nigeria.

The relatively high prevalence of Ascariasis recorded in public schools could be attributed to the presence of much garbage around school compounds and the unhealthy conditions of latrines as recorded by (Uwem *et al.*, 2008).

The prevalence of Ascariasis among gender shows that the female students were more parasitized (7.95%) than the male students (3.8%). This is not in consonance with Elekwa and Ikeh, 1996. The reasons for this variation might be due to the fact that the female students do more of the activities which necessitate more contact and exposure to the parasite such as sweeping the surroundings washing of toilets, fetching of water in streams both in schools and at home.

The high prevalence of 6.38% and 6.47% was recorded among students within the age groups 11-16 and 14-16 respectively while the lowest prevalence (4.54%) was seen among age group 17-19. Students within the age group 17-19 tends to be more matured and educated on the mode of infection and ways of preventing the infection, hence very low prevalence was obtained in the survey.

The occurrence of other parasites among the students in this study shows that a total of 26 students were parasitized with four different species of other intestinal parasites. *Entamoeba histolytica* with the highest prevalence of 7.82% followed by *Ancylostoma duodenale* and *Schistosoma mansoni* both having (1.23%) each, the least was *Taenia* species having (0.41%).

The highest prevalence of *E. histolytica* recorded can be attributed to poor environmental/drainage system, unhygienic methods of disposing sewage, shortage of good water supply, indiscriminate defecations as well as low standard of personal hygiene in the study area and among school students. These enhanced the transmission of this parasite as the children mingle with one another since the transmission is mainly by faecal-oral route (Egbe, 2009).

#### CONCLUSION

The establishment of this parasite in these students may portend grave consequences on human health. There is therefore the need to introduce and intensify prevention and control measures. Proper intervention by the government by way of provision of clean environment, social amenities and provision of free medications. Coverage and periodicity of the deworming programme need to be comprehensive and intensified among public schools where the infections seem to be higher than in the private schools.

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#### REFERENCES

- Akogun, O.B., Badaki, J. (1998). Intestinal Helminthes infection in two communities along the Benue River valley Adamawa State. *Nig. J. parasitol.*, 19: 67-72.
- Anah, M.U., Ikpeme, O.E., Etuk, I.S., Yong, K.E., Ibanga, I., Asuquo, B.E. (2008). Worm infestation and anaemia among pre- school children of peasant farmers in calabar, Nigeria. *Nig. J. Clin. Pract.*, 11(3): 220-4.
- Basir, U.R. (1998). Prevalence of intestinal helminthes among school children in Vom and its environs Braid J.K 1986: Fatal human *Ascaris* following secondary massive infection. *Am. J. Trop. Med. Hyg.*, 35(2): 314-318.
- Cheesbrough M (1987). Medical laboratory manual for Tropical Countries Vol.1. *Ascaris lumbricoides* pg. 344-346.
- Chijioke, I.R., Ile, C., Ilechukwu, G.C.A., Okafor, C.I., Ekejindu, I.M. and Sridhar, M.K.C. (2011). A community based survey of the burden of *Ascaris lumbricoides* in Enugu. *Ann. Med. Health Sci.*, 1(2): 165-171.
- Crompton, D.W.T. (1999). How much Human helminthiasis is there in the world? *J. Parasitol.* 85: 397-403
- Dangana, A., Abayomi, R.O. and Way, G.D. (2012). Survey of *Ascaris lumbricoides* among pupils of Primary school in Jos South LGA of plateau state. *J. Med. Sci. Adv.*, 1(1): 21-26.
- Egbe, I.O. (2009). Studies on intestinal helminthes parasites in parts of Anambra State, Nigeria, PhD thesis, 1-2 and 99-106(2009).
- Gaash, B. (2004). *Ascaris lumbricoides*. *Indian J. Practising Doctor.* 1(3): 11-12.
- Mafiana, R.M., Ngwodo, P.O.A. (2007). A study of blood and gastrointestinal parasites in Edo states. *Afri. J. Biotech.*, 6(19): 2201-2207.
- Montessor, A., Crompton, D.W.T., Hall, A., Bundy, D.A.P., Savioli, L. (1998). Guidelines for the evaluation of soil transmitted helminthiasis and Schistosomiasis at community level. Geneva: World Health Organisation; 1998.WHO/CTC/SIP/98.
- Onwasigwe, C.N. (1999). Intestinal parasites in Enugu school children. *Orient J. Med.*, 11(1-4): 56-60.
- Refeidi, A. (2007). Live *Ascaris lumbricoides* in the peritoneal cavity. *Ann. Saudi med.*, 27(2): 118-121.
- Uwem, F.E., Simon, N.O.E., Chiedu, F.M. and Sammy, O.S. (2008). Helminthiasis and Hygiene conditions of schools in Ikenne Ogun State, Nigeria. *PLoS Negl. Trop. Dis.*, 2(1): e146.

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