# Epidemiology of Intestine Polyparasitism among Primary School Pupils in Awe, Awe Local Government Area, Nasarawa State, Nigeria


## ABSTRACT

Fecal samples were collected from 494 school children 200 (76.92%) boys and 189 (80.76%) girls and examined by using direct smear, formalin-ether administration techniques socio-economic personal hygiene, environmental and demographic information were collected by using pre-tested questionnaire. In the overall 78.74 of the children were found to be infected by at least one parasite species of these 12.24% had multiple parasites the overall prevalence infection were *Trichuris trachiura* (0.20%), *Ascaris lumbricoides* (48.58%), Hookworm (5.26%), *Entamoeba histolytica* (6.27%), *Entamoeba coli* (5.66%) and *Ascaria lumbricoides* + *E. histolytica* (7.48%) respectively. Parasitic infections between male and females showed significant different in all the sexes ($P<0.01$). The percentage prevalence of *Ascaris lumbricoides* was high in between 7 – 8 years and >12 years for other intestinal parasites, no specific age relationship was established among the children. Findings from this study showed that using an unsafe water supply as a source for drinking water, presence of other family members infected with intestinal parasitic infections (IPI), not washing vegetables before competition, absence of toilet in the house, not wearing shoes when outside, not cutting nails periodically and not washing hands before eating were significant risk factors associated with intestinal multiple parasites among these pupils.



**Keywords**: Intestinal parasites infection, Primary school children, Awe.


## INTRODUCTION

Parasitic infestation greatly affects the health and socio-economic status of individuals and communities. They weaken the individuals and infestations. Furthermore, anaemic persons are more likely to respond slowly to treatment, develop serious disease and eventually become poor mothers and child, since they are generally weak.

In humans, intestinal parasites 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 and parasitic worms (Helminthes) of these protozoans including *Cryptosporidium*, *microsporidium* and *Isospora*, *Entamoeba histolytica*, *Balatidium coli*, *Giardia lambiae* etc, each of these parasites can cause, infection at the same time. Intestinal helminthic parasite, are worms that are found in the body lumens of the gut (Agbolade *et al.,* 2004). These intestinal 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).

Human, get the parasites through the mouth from uncooked or unwashed hand, food, contaminated water or hands or by skin contact with larva infection soil. There is general acceptance that severe intestinal parasite are likely to result in failure and poor growth in children (Crompton and Nesheim, 2002), vitamin A deficiency (Al-Mekhlafi *et al.*, 2010), iron deficiency anemia (Faustini, *et al.*, 2006) and poor educational performance (Haque *et al.*, 2003). Recent studies highlighted the impact of polyparasitism on the host immunity and showed that intestinal parasites are associated with higher infections relative to infection with a single parasite (Shokhana, *et al.*, 2004, Gibson *et al.*, 2011).

In some persons, intestinal parasites do not cause any symptom or the symptoms may come and go common signs and complaints include cramping, abdominal pain, coughing bloating and diarrhea. In more serious cases skin-itching, fever, nausea, vomiting or bloody stools may occur. However, because many parasitic infections especially those of helminthes are usually asymptomatic or produce only mild symptoms, they are often neglected until serious complications or chromic clinical symptoms appear (WHO, 2002).

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). Because of the negative socio-economic impact of these parasitic infections on infected humans, efforts would be made to reduce their epidemiological state among pupils. The study was, therefore, carried out to determine the prevalence of the intestinal parasitic infections and to investigate its associated risk factors among Awe school children.

## MATERIALS AND METHODS

### Study Area

This research was carried out in Awe Local Government Area of Nasarawa State Nigeria. Awe is located in the sourthern part of Nasarawa State on latitude $8^{o}$ $31^{o}$ N and longitude $7^{o}$ $31^{o}$ E. Its location linked Awe and Keana Local Government Area in the East and West respectively. The mean monthly Temperature in this area ranges between $30^{o}$C in March and $25^{o}$C December. The mean annual rainfall is about 1270 – 1540mm received over six to seven months (April – October) of rain season, with five months of dry season. The main socio-economic activities of the people are farming, trading and some are in public services.


**Figure 1**: Map of Nasarawa State showing study area

### Ethical Clearance

The protocol for this study was approved by the local education authority and the primary schools intended to be used. The approval was on agreement that participants anonymity must be

maintained and good laboratory practices quality control ensured and every findings would be treated with utmost confidentiality and for the purpose of this research only. Participants were fully informed on their right to with draw without any constraints.

**Study Design**

The study on intestinal polyparasitism was carried out over a period of four months (February to May 2018) among 494 primary school children between 6 – 13 years of age in Awe west, Awe east, Awe central and Isilamiyya primary school of Awe Local Government Area, from which we randomly selected 123 children per school. The 494 children (247 boys and 247 girls) they were all given registration number on a card which the enclosed with their stool samples in disposable polythene bags supplied to them. The fresh feacal samples were immediately moved to the general hospital laboratory in Awe.

**Microscopy Examination of Stool Sample**

Freshly voided stool samples were examined for blood, colour, consistency and mucus. Direct smear were used for analysis of the faecal sample for parasites. Diagnosis was based on identification of the characteristics protozoan cysts and helminthes ova with a compound microscope using $x_{10}$ and $x_{40}$ objective (Cheesbrough, 1992).

The fecal samples that were negative for direct smear were washed prior the concentration procedure saline and iodine preparation were made from the deposite on a clean grease free slide and examined for cysts and helminthes ova with compound microscope using $x_{10}$ and $x_{40}$ objectives.

**RESULTS**

A total of 494 fresh fecal samples were collected between the ages of 6 – 13 years, which consist of 260 boys and 234 girls from the four primary schools in Awe town out of the total samples, 389 (78.74%) were infected, 200 (76.92%) boys and 189 (80.76%) girls were infected. Table 1 shows occurrence of intestinal helminthes infection according to sex, being higher in girls than boys.

Table 2 states the prevalence rate of infection based on age with the percentage prevalence of infection was high with (82.03%) in pupils between 8 – 9 years of age and decreased with (74.59%) in pupils between ≥12 years of age.

Table 3 showed the prevalence rate of *Entamoeba histohytica* 31 (6.27%), *Entamoeba coli* 28 (5.66%), *Ascaris lumbricoide* 240 (48.58%), trichiuristrichuria 1(0.20%), hookworm 26 (5.26%), and mixed infection are *Ascaris lumbricoides* and *Entamoeba histolytica* recorded 37 (7.48%) in the study. The pupils t test analysis of the parasitic infection between the boys and girls recorded a significant difference between the sexes ($P<0.01$).

**Table 1: Prevalence of intestinal parasite according to sex**

| **Schools** | **Male** | | | **Female** | | | **Total** | | |
|---|---|---|---|---|---|---|---|---|---|
| | **No. examine** | **No. infection** | **% prevalence** | **No. examine** | **No. infection** | **% prevalence** | **No. examine** | **No. infection** | **% prevalence** |
| Awe central pri. sch. | 102 | 93 | 91.17% | 90 | 88 | 97.77 | 192 | 18 | 94.27 |
| Awe south pri. Sch. | 54 | 39 | 70.32% | 52 | 43 | 82.69 | 106 | 82 | 77.35 |
| Sangari pri. Sch. | 52 | 37 | 71.15% | 48 | 37 | 77.08 | 100 | 74 | 74 |
| Emirs palace pri sch. | 52 | 31 | 59.61% | 44 | 21 | 47.72 | 96 | 52 | 54.16 |
| Total | 260 | 200 | 76.92 | 234 | 189 | 80.76 | 494 | 389 | 78.74 |

**Table 2: Prevalence of intestinal parasite infection among primary school pupils by age**

| Age (years) | No examine | No infected | % prevalence |
|---|---|---|---|
| 6 – 7 | 124 | 101 | 81.45% |
| 8 – 9 | 128 | 105 | 82.03% |
| 10 – 11 | 120 | 92 | 76.66% |
| >12 | 122 | 91 | 74.59% |
| Total | 494 | 389 | 78.74% |

**Table 3: Frequency of species of intestinal parasites among pupils**

| Species | No. examine | No. positive | % positive |
|---|---|---|---|
| *Entamoeba histolytica* | 494 | 31 | 6.27% |
| *Entamoeba coli* | 494 | 28 | 5.66% |
| *Ascaris lumbricoides* | 494 | 240 | 48.58% |
| *Trichuris trichuria* | 494 | 1 | 0.20% |
| Hookworm | 494 | 26 | 5.26% |
| Co-infection | | | |
| *Ascaris lumbricoides + Entamoeba lustolytica* | 494 | 37 | 7.48% |
| Total | 2964 | 363 | 12.24% |

## DISCUSSION

Intestinal parasitic infestation remain major health problems globally particularly among rural children in developing nations. The common intestinal parasites recorded in this research include hookworm, *Trichuris trichuria*, *Ascaris lumbricoides*, *Entamoeba histolytica*. The infection rate of the intestinal parasites in primary school in Awe town showed that there was consistently higher infection among the 494 school children examined. The participating children were positive for at least one parasite species with *Ascaris lumbricoides* infection being the most common (48.58%) in these children, followed by Entamoeba lustolytica (6.27%), E. coli (5.66%) and hookworm (5.26%) infection, which was in contrast to the findings made among school children in a study by World Health organization (WHO, 2002). On the other hand, the prevalence in this study was higher compared to the findings of (Chukwuma, *et al*., 2009) who showed a prevalence of 13 (5.9%) among primary school children in Ebenebe town, Enambra state, Nigeria, this was due to poor hygienic conditions of the school environment. The result of this study is also in agreement with the prevalence recorded by (Omah, *et al.*, 2014) who showed a prevalence of 286 (29.24%).

This study has revealed that parasitic infestation increased progressively with age pupils aged between 6 – 7 had (81.45%), 8 – 9 (82.03%), 10 – 11 (76.66%) and >12 (74.59%), this could be due to random selection of pupils for treatment of parasitic infection. The infestation of hookworm was 5.26%, this could be due to the poor toilet facilities. The pupils were found defecating in their backy and bases around the school premises thereby littering the environment with faecal matters which were likely to contains intestinal parasites including hookworm ova. The children most often move bare footed in their environment exposing themselves to infect with infective hookworm larva.

Generally this prevalence has been attributed by several authors to improper hygiene, poor sanitation and agricultural habits, physical and chemical composition of the soil and degree of human exposure (Ugbomoiko, *et al.,* 2006). In this research, female had the highest prevalence of (97.77%) compare to their male counterpart with about (91.17%). There was no significant difference observed in infection among the gender group (P>0.05). The risk of eating soil (geophagy), licking of fingers and drinking well or tank water were significantly high risks for *A. lumbricoides* and *T. trichiura* infection and hookworm which was only associated with walking bare footed.

## CONCLUSION/RECOMMENDATION

The findings from this research revealed that *Entamoeba histolytica, Ascaris lumbricoides, Trichuris trichiura*, Hookworm were more common in Awe, Nasarawa State, Nigeria. This was due to the poor state of hygiene and high rate of carriers among the school children. Screening, deworming and improved sanitation by provision of modern toilet facilities, health education by enlightenment campaigns, school-based health programme would go a long way in reducing infections.

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