

Prevalence of Intestinal Helminths Infection among pupils in Njiwaji, Abbari and Nayi-nawa Government Primary School in Damaturu Local Government Area, Yobe State, Nigeria

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ABSTRACT

Prevalence of intestinal helminths infection among pupils in Njiwaji, abbari and nayi-nawa Government primary school in Damaturu Local Government was carried out. A total of 210 primary school pupil stool samples were collected by random sampling and examination of stool was done by direct wet mount and sedimentation methods in other to test for intestinal helminthes. The prevalence of these intestinal helminthes varied significantly among the age groups and the result of this research shows that intestinal helminthiasis was prevalent in the study area. Out of 210 pupils examined 133(53.3%) were infected with the intestinal helminths parasite and of the seven (7) parasites observed *Ascaris lumbricoides* had the highest prevalence of 42 (20.0%) infected, followed by Hookworm 35(16.7%), *Taenia* species 24(11.4%), *Schistosoma mansoni* 16(7.6%), *Hymenolepis nana* 6(2.9%), *Esherichia coli* 3(1.4%) and *Fasciola* species 1(0.5%) respectively. There were significant different ($p > 0.05$) between prevalence of infection in male and female. Solutions towards preventing this deadly intestinal parasite should be encouraged among public and private entities, especially children. Necessary steps to follow in controlling these infections are drinking of clean water, health education, improved personal hygiene, and environmental condition.

Keywords: Prevalence, Intestinal Helminthes, *Ascarislubricoides*, Hookworm, *Taenia* species, *Schistsomamamsoni*, *Hymenolepsis nana*, *Esherichia coli* and *Fasciola* species.

INTRODUCTION

Intestinal helminthes infections are among the most common infections occurring throughout the developing world (Usip and Ita 2017). There are an estimated 280 million children infected with hookworm, 478 million with *Ascarislumbricoides* and 347 million with *Trichuris Trichiura* in the world. Between 500 million and one billion people are estimated to be infected annually. *Ascarislumbricoides* and *Entrobivirusvermicularis* are two of the most prevalent intestinal helminthes in school-age children (Bethonyet al., 2006). Worldwide, 320 million school-age children are infected with *A. lumbricoides* (WHO, 2001). In Nigeria, the occurrence of human intestinal *helminthiasis* is increasingly high (Nwosu, 1981; Obiamiwe and Nworsi, 1991; Unekeet al., 2007 and Oduet al., 2013).

Intestinal worm infections thrive in communities without better housing, sanitation, water supplies, health care, education and low income (Worknelet al., 2014). Intestinal helminthes infections have continued to prevail because of low levels of living standards, poor environmental sanitations, and ignorance of simple

health promoting behaviors (Usip and Matthew, 2015).

The burden of associated worm disease is enormous, school children between the age of (0-15 years of age) harbour heavy intestinal parasites and thus are a good study groups; they are the groups that are grossly responsible for the contamination of the environment and transmitting deadly infections (Albonicoet *al.*, 2002).

Two principal factors in maintaining endemicity of intestinal helminthes infections are favorable condition of the soil and frequent contamination of the environment by wastes or faeces (Emmy – Igbeet *al.*, 2011).

Transmission within a local community is directly related to human behavior with regards to defecation, eating habit, cleanliness and level of literacy (Usip and Matthew 2015).

Water supply and other environmental factors for domestic and personal hygiene, housing, conditions such as demographic, socio-economic and health related habits are known to influence these infections (Attinget *al.*, 2013).

Usip and Nwosu, (2014), in Abak Local Government Area of AkwaIbom State, Nigeria conducted a study on the prevalence of human intestinal helminthes in primary school children. The result showed that out of 242 pupils, 143(59.1%) had infections, with hookworm being the dominant and *Taeniaspp*, having low count in the research. The study also reveals that the prevalence of helminthes with respect to sex and age indicates that males recorded higher prevalence 80(67.8%) than a female which was 63(50.8%).

In view of the negative socio-economic impact of these parasites infections on children, there is a need for the development of good preventive and control measures adaptable for the tropics. This cannot be done effectively without baseline data on the occurrence of parasitic infection in a particular area. The occurrence of the intestinal helminth, infections among primary school pupils in Nigeria, particularly in Damaturu Local Government is mostly unreported and this motivated our interest in the study. The major objective of this study was to investigate the prevalence of the infection, relationship between sex and infection as well as relationship between gender and infection among the selected primary school pupils in Damaturu Local Government Area.

MATERIALS AND METHOD

Study area. The study was carried out in 3 primary schools in damaturu Local Government Area of Yobe State, north east Nigeria. Damaturu consist of eleven (11) wards namely bindigari/fawari, damakasu, damaturu central, gabir/maduri, kalallawa/gabai, kukareta/ warsala, maisandari/waziri Ibrahim estate, murfa kalam, nayi nawa, njiwaji/gwange, and sasawa/kabaru. Damaturu Local Government council came into existence sequel to the creation of the state in the country by the defunct Ibrahim Babangida administration.

The geographical coordinates are Lat. 11°44'40"N – 11°57'40"E and long 11.7°44'44"N – 11.9°61'11"E. It has an area of 2,366 km² (914 sq. mil) and a population of 88,014 with 48,361 males and 39,345 females. The climate of the area is considered to be a local steppe climate with little rainfall. It experiences a moderate rainfall; with an annual rainfall of 649mm which has is a difference of 223mm of precipitation between the driest and wettest months. The annual temperature average of 29.7°c is recorded where May is the warmest month of the year with an averages of 29.7°c, and the lowest average temperature in the year occur in January when it is around 20.6°c with a variation of 9.1°c throughout the year. It also experiences two varying seasons of wet and dry season. The greatest amount of precipitation occurs in August, with an average of 223mm. while the driest month is January, with 0 mm of rain. The major occupation of the people is farming and this is still done at the subsistence level. Some of the people also embraced small scale trading and fishing. Corns remains the major staple food of the people, they also produce good quantity of vegetable.

Generally the sanitary condition of the area is below average, there are poor drainage and sewage system, hence indiscriminate sewage disposal, and the area is not uncommon with the prevalence of intestinal parasites as most children are seen playing on bare foot and defecating indiscriminately without the knowledge of the damaging effects it poses to them. This is also reflected in the sanitary condition of some schools mostly the public schools as their pupils were seen urinating indiscriminating around some building within the school due to bad condition of their toilet facilities which is left very un- kept and dirty. Most of the primary schools have become dumping grounds for feces because some of the wall and fences have fallen down and people have access of the premises of the school. Consequently people do defecates around the premises and even around the classes. All these environmental factors provide suitable conditions for the development and survival of gastro intestinal parasitic nematodes.

Study Population

The study population consists of 3 Primary Schools with a sample size of 210 Pupils. The sample populations were apparently pupils who have been attending school regularly as confirmed by their various head mistress/head masters.

Ethical Consideration

Ethical clearance was obtained from the ethical committee. Communication with the head of school and pupils parents and guardians was done through formal letter obtained from the Department of zoology, moddibboadama University of technology Yola. Verbal consent was obtained from each participant’s parent or guardian, information’s collected and results were treated confidentially, so also participation was voluntary.

Specimen Collection

Prior to the day of specimen collection, dates were previously arranged with the head master/ head mistresses. Sterilized plastic bottles container with information such as school, name and age was written at the back of the container were distributed to all the selected pupils for stool collection. The pupils were instructed in the classroom on how to use the specimen bottles. The stool sample of 210 pupil aged between 5 and 13 were examined. After collection, the stool were preserved with 5% formalin and transported to Laboratory for further processing.

Processing and Examination of Specimens

Stool samples were processed using two parasitological techniques which included direct wet preparation and concentration techniques (Cheesbrough, 2008).

Table1. Prevalence of Intestinal Helminths Infection among the Selected Primary School

Number Infected (%)									
Primary Schools	Number Examined	AL	HW	TS	SM	HN	EC	FS	Total
Njiwaji	70	14(20.0%)	9(12.9%)	12(17.1%)	6(8.6%)	—	1(1.4%)	—	42(60.0%)
Abbari	70	12(17.1%)	13(18.6%)	6(8.6%)	8(10.5%)	6(8.6%)	2(2.9%)	—	47(67.1%)
Nayi-nawa	70	15(21.4%)	18(25.7%)	4(5.7%)	6(8.6%)	—	—	1(1.4%)	44(62.9%)
Total	210	42(20.0%)	35(16.7%)	24(11.4%)	16(7.6%)	6(2.9%)	3(1.4%)	1(0.5%)	133(63.3%)

Keys: AL: *Ascarislubricoides*, HK: *Hookworm*, TS: *Taenia species*, SM: *Schistsomamamsoni*, HN: *Hymenolepis nana*, EC: *Esherichia coli* and FS: *Fasciola spp.*

Table 2: Prevalence of Intestinal Helminths among the Selected Primary Schools in Relation to Gender of Pupils

Gender				
Primary Schools	Number Examined	Number Infected (%) of Male	Number Infected (%) of Female	Total Infected
Njiwaji	70	31(44.3%)	11(15.7%)	42(60%)
Abbari	70	37(52.9%)	10(14.3%)	47(67.1%)
Nayi-nawa	70	29(41.4%)	15(21.4%)	44(62.9%)
Total	210	89(42.4%)	38(18.1%)	133(63.3%)

Table 3: Prevalence of Intestinal Helminths among the Selected Primary Schools in Relation to Age Group of Pupils

Age group		5-7	8-10	11-13	
Primary Schools	Number Examined	Number Infected (%)	Number Infected (%)	Number Infected (%)	Total Infected (%)
Njiwaji	70	10(14.3%)	17(24.3%)	15(21.4%)	42(60.0%)
Abbari	70	12(17.1%)	10(14.3%)	25(35.7%)	47(67.1%)
Nayi-nawa	70	14(20.0%)	20(28.6%)	10(14.3%)	44(62.8%)
Total	210	36(17.1%)	47(22.4%)	50(23.8%)	133(63.3%)

RESULTS

The observed intestinal helminth parasites among the selected primary school pupils were *Ascarislubricoides*, *Hookworm*, *Taenia species*, *Schistsomamamsoni*, *Hymenolepis nana*, *Esherichia coli* and *Fasciola spp.* Out of 210 pupils examined for intestinal parasites. 42(20.0%) were infected with *Ascarislumbricoides*, 35(16.7%) *Hookworm*, 24(11.4%) *Taenia species*, 16(7.6%) *Schistsomamansoni*, 6(2.9%) *Hymenolepis nana*, 3(1.4%) *Esherichia coli* and 1(0.5%) with *Fasciolaspp*, On the whole, out of 210 pupils examined, 133(63.3%) pupils were infected with helminth parasites (Table 1). Also from the table, out of 133 pupils infected with intestinal helminthes parasites, **abbari** primary school has the highest total number of 47(67.1%) pupils infected followed by **nayi-nawa** and **Njiwaji** primary school with 44(62.9%) and 42(60.0%) number of pupils infected respectively.

Table 2 shows a prevalence of intestinal helminths among the selected Primary school pupils in damaturu local government area of yobe state in relation to gender. From the results male has the highest rate of 89(42.4%) pupils infected when compared to 38(18.1%) female infected. The results also shows that **abbari** primary school has the highest number of 37(52.9%) male infected followed by **Njiwaji** and **nayi-nawa** primary school with 31(44.3%) and 29(41.4%) number of male infected. But in contrast with female, nayi-nawa primary school has the highest number of 15(21.4%) female infected followed by Njiwaji and abbari primary school with 11(15.7%) and 10(14.3%) number infested respectively.

Table 3: shows the prevalence of intestinal helminths among the selected primary school in damaturu local government area in relation to age. From the results pupils of age group 11-13 has the total highest rate of 50(23.8%) pupils infected followed by 8-10 and 5-7 pupils of age group which has a total of 42(22.4%) and

36(17.1%) number of pupils infected respectively. Also from the table, in **abbari** primary school, age group 11-13 has the highest number of 25(35.7%) pupils infected followed by age group 5-7 and 8-10 with 12(17.1%) and 10(14.3%) pupils infected respectively. While In **njiwaji** primary school, age group 8-10 has the highest number of 17(24.3%) pupils infected followed by age group 11-13 and 5-7 with 15(21.4%) and 10(14.3%) number of pupils infected. But In **nayi-nawa** primary school, age group 5-7 has the highest number of 14(20.0%) pupils infected followed by age group 8-10 and 11-13 with 20(28.6%) and 10(14.3%) number of pupils infected.

DISCUSSION

The prevalence of Helminthes infection observed among the selected school pupils in this study is relatively low when compared to the result obtained by Churevanet *et al.*, (2006) who recorded a prevalence of 75.1% in Thailand, and 83.4% recorded by Worknelet, *al* (2014) in Ethiopia, but is similar to the reports of Usip and Matthew (2015). The relatively lower prevalence of parasitic infections observed in this study may have been due to better environment, sanitation and access to health services for those schools.

In this report, **nayi-nawa** primary school had the highest prevalence of intestinal helminths in males followed by **Njiwaji** and **abbari** primary school respectively. This may be linked to immature level of their immune system. Also, infection is considered to be higher among males compared with females regardless of age (Gimba and Dawan 2015).

Age group 11-13 years old had the highest prevalence of infections. This is because they are more active and plays fasted in the fields and frequently use the farmland for defecation. The spread of intestinal parasitic infections is generally associated with water supply and sanitation beside other factors as reported by (Gimba and Dawan 2015). The schools make use of few unhygienic pit latrines with large areas of field in which when the children over crowd in the toilet during break time for defecation. Some pupils, who are pressed, resort to defecating in the neighboring field. This maybe so because of their reinfection as a result of continuous exposure of the pupils to the nearby stream that is close to their environment which the pupils use for swimming on daily basis. This stream increase moisture contents of the soil which is very important factor for the development of hookworm embryos as observed by Suresh *et al.*, (2014). Hookworm infection is said to be on an increase as a person advances in life as was observed by Wosu and Onyeabor (2014). There were no significant differences between the prevalence of parasitic infections and sex of those examined. This shows that the resultant prevalence of the intestinal helminthes was not sex-dependent, which is at variant with Okpalaet *al.*, (2014), and the differences may be related to level of exposure. Desta *et al.*, (2014) also found that poor hand washing and hygiene of nails are conducive environment for feco-oral transmission of intestinal parasites through their unwashed hand. It is similar to the finding of Gimba and Dawan (2015) who recorded a prevalence of but higher than the report of Suresh *et al.*, (2014) who recorded overall prevalence of 18.11% in Kasku Nepal, Opalaet *al.*, (2014) with overall prevalence of 13.8% among children in day care centre in Esan West Local Government Area of Edo State and Destaet *al.*, (2014) with an overall prevalence of 27.7% any school children in Arba Minch town in Southern Ethiopia.

CONCLUSION AND RECOMMENDATION

This research has shown that intestinal helminthes infections are prevalent among the selected primary school pupils. Thus the Economic implication and public health necessities should not be overlooked. Even though child-targeted treatment can never be more effective than treatment of the total population, Guyatt *et al.*, (1995) found in a follow-up analysis, that because children tend to have higher intensities of infections, child-targeted treatment can be more cost-effective than population treatment in reducing the number of disease cases. Improvement in habitation, sanitation access the health services and appropriate available health infrastructure are also important factors for decreasing the prevalence of parasitic infections despite the de-worming programme.

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