Survey of Intestinal Helminth Infection amongst School Children in Rural Communities of Ebonyi State Nigeria

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Abstract- The study on the survey of intestinal helminth infections amongst school children in rural communities of Ebonyi State was conducted in a cross section of ten (10) primary schools in Afikpo North LGA of Ebonyi State in 2013 to determine the prevalence of infection amongst the scholar population in public schools. Stool samples were randomly collected from five hundred (500) children and microscopically examined using modified direct smear method. The ages and toilet facilities used by pupils were also considered for risk factors indicators. The overall prevalence 389 (77.8%) were infected with eggs, cyst and larvae of intestinal helminth such as *Ascaris lumbicoides* (46%), Hookworm (28.8%), *Strongyloides stercoralis* (8%), and *Trichuris trichiura* (13.4%). Thus, multiple infections of *A. lumbricoides* and Hookworm (3.8%) were also observed. Sex was observed to be a strong factor influencing their prevalence with a significant difference (P>0.05) between the males (46.4%) and females (53.21%). It was also observed that prevalence was high amongst age group 5-8years (55.3%) and 9-12years (28.3%) and low in 13-16years (16.4%) which was statistically significant (P>0.05). Children who used bushed method/Eliliogo (87.5%) as their toilet had higher prevalence than their counterparts with pit toilet (Ohoro-Oko-Mkpume) (61.7%). The study suggests that the use of "ellili-ogo" and "Ohoro-ogo" in the name of toilets exposes them for infection and re-infection. Thus, there is an urgent need for mass deworming and health education in all public primary schools examined as control measures.

Index Terms- prevalence, helminth, infection, children, Ebonyi State.

I. INTRODUCTION

Intestinal helminthes are living organisms that are worm-like in shape which receive nutrient and protection from their host thereby disrupting the internal activities of the host thereby causing diseases and weaknesses (Maizels and Yazdanbakhsh, 2003). They are also called soil-transmitted helminths because their infections are specifically through coming in contact with the soil, which are contaminated with faecal matter. There are different parasitic worms that live in children's body where they cause various types of sicknesses and diseases. Human becomes infected by ingesting infective eggs of the parasite or by infective larvae penetrating the skin before becoming adult that later migrate through the hearts and lungs for about ten (10) days (Adikankwu et al., 2012). Hence, the disease burden depends on the condition of the ecological area, including the standard of the locality and the social and economic development of the inhabitant according to Ukpai and Ugwu, (2003). Children are the group with the highest prevalence of helminthes infection since they are the most vulnerable to the factors that causes it (Saathoff *et al*., 2004). Furthermore, there are different types of lifestyles such as playing on sand, licking of fingers etc which are common to those infected with variety of helminthes infections, resulted in very widespread of parasitism, thus, eating habits that involve the consumption of unwashed raw vegetables, sand etc also allow the transmission of helminthes infections (Montressor *et al*., 2002). Since the infection occurs by the contamination of human food or water by agents such as fly from fecal matter which are common in tropical or subtropical nations thus, said to be the commonest infection within such region (Awolaju and Morenikeji, 2009; Jimenez–Gonzalez *et al.*, 2009). Parasitic helminth infections are of serious problem to the health of the public, especially among the people with low nutritional status and in areas where there is low environmental quality. Various studies carried out in Nigeria have been used to estimate the situation of the infection rate of intestinal helminth to escalate and persist in communities without better housing, sanitation, water supplies, health care, education and low income (Oyewole *et al*., 2007; Awolaja and Morenikeji, 2009; Osazuwa *et al*., 2011). Most of the worms spend part of their life cycles in either animals, rodents or human beings and cause infections such as vomiting, anemia, fever, intestinal obstruction, malnutrition dysentery, dehydration, colitis and other impairments (Barons, 2003). These different types of worm infections, if untreated or controlled may cause adverse effect on the children's cognitive development, learning abilities, nutritional status and result into other health problems (Montessor *et al.*, 2002).

II. METHODS AND MATERIALS

Area of the Study

The study area is Amasiri Dev. Centre and its environs, which is among the seventeen clans in the old Afikpo division of Eastern Nigeria, and is still one of the regions in Ebonyi South of Ebonyi State. It is found on both sides of Afikpo-Okigwe Road. It covers a total area of 270sqkm (Oko, 1993) and is bounded on the North by Okposi, on the South by Edda, on the East by Afikpo, on the West by Akaeze and on the North-East by Akpoha. Amasiri also lies between latitudes $5^0$50'N and $5^0$55'N, longitude $7^0$52'E and $7^0$55'E on the South-Eastern region and it is about 350 feet above sea level. Hence, the 1991 census

projected Amasiri as having 49000 inhabitants and is made up of three (3) autonomous communities, ie Amasiri, Ndukwe and Opi (Omaka and Anthony, 2012). According to Oko (1993), it is a traditional zone of rolling plain between open grassland tropical rainforest with an annual rainfall of 197cm. In Amasiri Dev. Centre there is common unhygienic pit toilet system, which that of the men is known as "Ohoro Ogo" and that of the women is known as "Ohoro Usuho" but most people do open toilet system in the farm or "Elili" or drainages within the communities. Hence, above 70% engage in agricultural activities and they all speak the same language. Most of the houses have electricity and pipe borne water (borehole).

Study Design

The study area was chosen as a result of human anthropogenic activities; poor environmental health awareness and the low level of personal hygiene. Also due to the nasty rampant method of sewage and refuse disposal within the community.

Study Population

Sample populations of about 500 pupils were selected from ten (10) schools selected at random. 50 samples were collected from each school among pupils that were willing with the aid of class teachers who understood the effect or importance on the health of public when the work is executed decided to participate as the part of the body of researchers and approval from health authority of the locality, including that of parents of the wards were collected.

Selection Of Schools

It is logistically simple to organized surveys in schools. All the primary schools in Amasiri community in Afikpo North L.G.A, both private and government owned (public) were listed, and then 10 schools were selected at random with the help of random number table.

Sample Materials And Tools

The materials used for the practical were wide- mouth plastic containers, microscope, glass slide, cover slip, woody spatula, forceps, flat bottom jar with lid, absorbent tissue, normal saline, weighty balance measuring scale, formalin and solution.

Collection And Procedure

A total of 500 stool samples were collected from children attending primary schools in Amasiri community of Afikpo North Local Government Area. A stratified multistage cluster sampling technique was used to obtain the sample for this study. There are ten (10) selected different primary schools in Amasiri community, which are evenly distributed. The participant were selected for study based on the information gotten from a history of either their being sick and/ or been on drugs within a period of one month and some were rejected as they reported to have been ill or being on drugs. A minimum of 50 pupils were selected from each school for the study.

This number of pupils were obtained from each of the classes, stating from primary 1 to 5 presented ten (10) pupils each, which were randomly selected from the pupils who's their parent gave consent and are willing to participate. The names of all the willing and approved pupils from each class were written and put in separate boxes and shook thoroughly before picking, that was done blindly by the class teachers.

Inclusion And Exclusion Criteria

All selected primary school children who were having no history of being clinically ill and used drug within a period of one month before the study and those whose parents and guardians gave their consent were included. Primary school children who were having a history of being clinically ill and used drug within a period of one month before the study and those not included were children whose guardians and parents refused to sign a written consent form for the study.

Recruitment And Training Of Research Assistant

As to ensure high degree of accuracy two research assistants working in Amasiri general Health centre and a renowned private laboratory within Amasiri were recruited to assists in the collection of height, weight and recollection of specimen bottle from the pupils.

Stool Specimen Collection

There were critical explanation of the benefits of the research a day before collection of stool specimen, to the selected pupils and the teachers from each of the schools involve. All the selected persons were provided with a clean plastic container free from dirt particles and were labeled for easy identification, including a piece of applicator stick, a plain paper and a consent form. The plastic containers had a code number; which tallied with that of the pupil in the register who took that particular container so as to avoid the incidental exchange of specimens among children. More so, children were instructed to give the consent form to their respective parents or guardians as soon as they got home, for them to read and then agree or disagree to allow them to participate in the study. The children were then instructed that anyone who will participate willing after the approval of the parent/gaudiance should defecate on the piece of paper provided in the morning of the next day, to avoid contamination from the toilet environment, thus, used an applicator stick, and pick up a portion of the stool from the piece of paper and bring it to school after putting it into the covered clean plastic container provided. The following day a list of names with their corresponding code numbers were used to called the children one after the other for the collection of their stool sample, with a comparison of the number on the container with the number recorded when they were provided with the container to check if it was the right container for the child, then 10% formalin was added to the stool sample to preserve the morphology of the eggs before examination.

Measurement Of Height And Body Weight

After the collection of stool specimen, children were called one after the other, then the code number of the children and the name were recorded in a questionnaire form, then the children's height were measured using a height scale, weight was measured by using a weighing scale and each child was asked of his/her age.

Questionnaire Distribution

A questionnaire of primary school based were administered to the pupils which were to be filled with the aid of their teachers to determine the sex, age, height, weight, name, socio-economic background and sanitation situation in their schools and homes.

Analysis in the Laboratory

Both microscopic and macroscopic examinations of the specimen were done with a direct smear method for easy identification of eggs of intestinal helminths under microscopic examination based on the method described by Cheesbrough (2004).

Macroscopic Samples of Stool Examination

Macroscopic examination of samples were carried out in the laboratory which registered the presence of blood, mucus, consistency and adult worms. Based on description of the appearance of the stool samples, consistency or physical appearance such as colour, was to know whether the stool was formed, semi-formed, uniform or watery, presence of blood/mucus or pus as to aid in the identification of the species of worm. That is, when a stool sample is semiformed and black, hookwoom disease was suspected. Schistosomiasis is also suspected when there is mucus in the stool including uniformed with blood. However, there were a lot of appearance of faecal sample such as blood, diarrhea or rice water stools with mucus flakes etc. Akingbade *et al.,* (2013) said *Ascaris lumbricoides* could be occasionally seen on the surface or in a stool in it adult form with stain of blood on the stools of someone suffering from ulceration, haemorrhoides, or tumours of the intestinal tract. When a stool sample appears semi-formed or formed and brown in adult it is said to be normal stool while that of infants appears semi-formed and yellowish-green when normal. In this work the samples with different appearance were observed such as formed or semi-formed, black and semi-formed, including watery stool that appeared brown.

The Microscopic Stool Samples Examination

During the microscopic analysis, the physiological saline was place on a labeled glass slide containing emulsified feacal sample collected from a wide mouthed bottle, about 0.10gm with an applicator stick. A cleaned cover slip was flattened on it after it has been smear sufficiently to be thin so as to avoid air bubble and was placed under the microscope for the examination of the presence of eggs of intestinal helminth with x10 and x40 objectives lenses (Arora and Arora, 2006). The identification of intestinal helminths eggs with the used of direct smear method was also described by Cheesbrough (2004) that showed a positive indicating specimens on the basis of microscope with the use of standard methods according to CDC (2007). Furthermore, a microscopic confirmation of the slide containing the stool specimens was done with the assistance of a trained scientist managing the laboratory in Amasiri health centre. There were also several characteristics employed for the recognition of the worms: for example round, ova, with rough membrane was used to identify fertilize eggs or a bit elongated with ova membrane was for unfertilized eggs of *Ascaris lumbricodes.* While transparent barrel shaped eggs with mucoid polar plug at either sides were for the recognition of *Trichuris trichiura*. *Ancylostoma duodenale* and *Necator americanus* which are common species of hookworm have the almost the same structure of egg. Their eggs show a clear difference between the embryo and the eggs shell with an oval or elliptical brave coiled within according to Odu *et al*.,(2013).

Ethical Approval

The study was granted approval by the department of Applied Biology through the supervisor of the work and the stake-holders of the various schools used for the work. The approval was given after a brief meetings with school personnel and potential parents of the wards in a Parents and Teachers Association (PTA) gathering which was carried out in order to explain the purpose and protocol of the study. A written participation consent form was issued out to the school officials and parents so as to authenticate their approval of allowing their wards to co-operate.

Data Analysis

The data collected were represented in percentage while differences in the prevalence of infection between ages and sex were evaluated using the Chi-square test from the contingency tables. Statistical significance was achieved ($P > 0.05$).

RESULT

The study involved a total of 500 school children of which 389 persons are infected with variance in the infection across the schools in Amasiri Dev. Centre used as sampled schools such as Ezeke Primary School I and II, Amasiri Central School I and II, Opi Primary School, Ndukwe Primary School I and II, Ogube Primary School, Akanto Primary School and Ozaraokangwu Primary School as shown in Table1.

The male participants were more than the female participants in number, 284 (56.8%) and 216 (43.2%) respectively, as shown in Table 2. It also shows that infection rate is higher in females, 84.3% than male with 72.8%.

From the study majority of the participant (43.4%) were of the age group 5-8years, followed by 9-12years age group (30.6%) while 13-16 age group contains the lowest proportion (26.6%) of the study participant according to table 3.

The prevalence based on types of toilet shows that, toilet could be suspected as the region were the pupils acquired intestinal helminth infections as 5 pupils used water closet system with no infection recorded, 321 pupil used bush method/ “Elili” with 281(87.5%) infections and 175 pupils used pit toilet (Ohoro Oko Mkpume) with 108 (61.7%) infections respectively, as shown in table 4.

Out of the 500 stool samples examined, 389 (77.8%) were observed to be infected with various intestinal helminth parasites and some pupils suffered with mixed infections thus, four parasites species were encountered in the study. This is distributed as follows: *Ascaris lumbricoides 179(46%), Strongyliodes stercoralis* 31(8.0%), *Trichuris trichiura* 52(13.4%) and a multiple infections of *Ascaris lumbricoides* and Hookworm of 15(3.8%) (Table 5). The prevalence is significant with $P>0.05$.

The result also shows how the parasite species is distributed across the age grade.

It was observed that *Ascaris lumbricoides* accounted for 82 (21.1), 51 (13.1) and 46 (11.8) for age group 5 – 8, 9 – 12 and 13 – 16 respectively being the highest. The lowest being multiple infection with 8 (2.1), 4 (1.0) and 3 (0.8) for age group 5 – 8, 9 – 12 and 13 – 16 respectively as shown in table 6.

The human lifestyles are seen as factors that encourage the prevalence of intestinal helminth infections. The regular eating of sand (Ukwaka), licking of fingers/biting of nails and walking barefoot has 277, 315 and 271 respectively which shows that it is the highest with occasionally having 173, 123 and 82. While I don't having the least with 50, 62 and 47 respectively as shown in the table 7.

The prevalence of intestinal helminthes based on Age–related habit shows that the various habits could be considered as encouraging factors toward the acquiring of intestinal helminth infections as shown in the table 8 and fig. 1.

Table 1: Schools Examined for the Presence of Intestinal Helminth Infection.

S/N	SCHOOL	NO. EXAMINED	NO. INFECTED	% INFECTED
1.	Ezeke Primary School I	50	35	70
2.	Ezeke Primary School II	50	34	68
3.	Amasiri Central School I	50	31	62
4.	Amasiri Central School II	50	32	64
5.	Ndukwe Primary School I	50	41	82
6.	Ndukwe Primary School II	50	39	78
7.	Opi Primary School I	50	38	76
8.	Ogbube Primary School	50	46	92
9.	Akanto Primary School	50	45	90
10.	Ozaraokangwu Primary School	50	48	96
	TOTAL	500	389	77.8

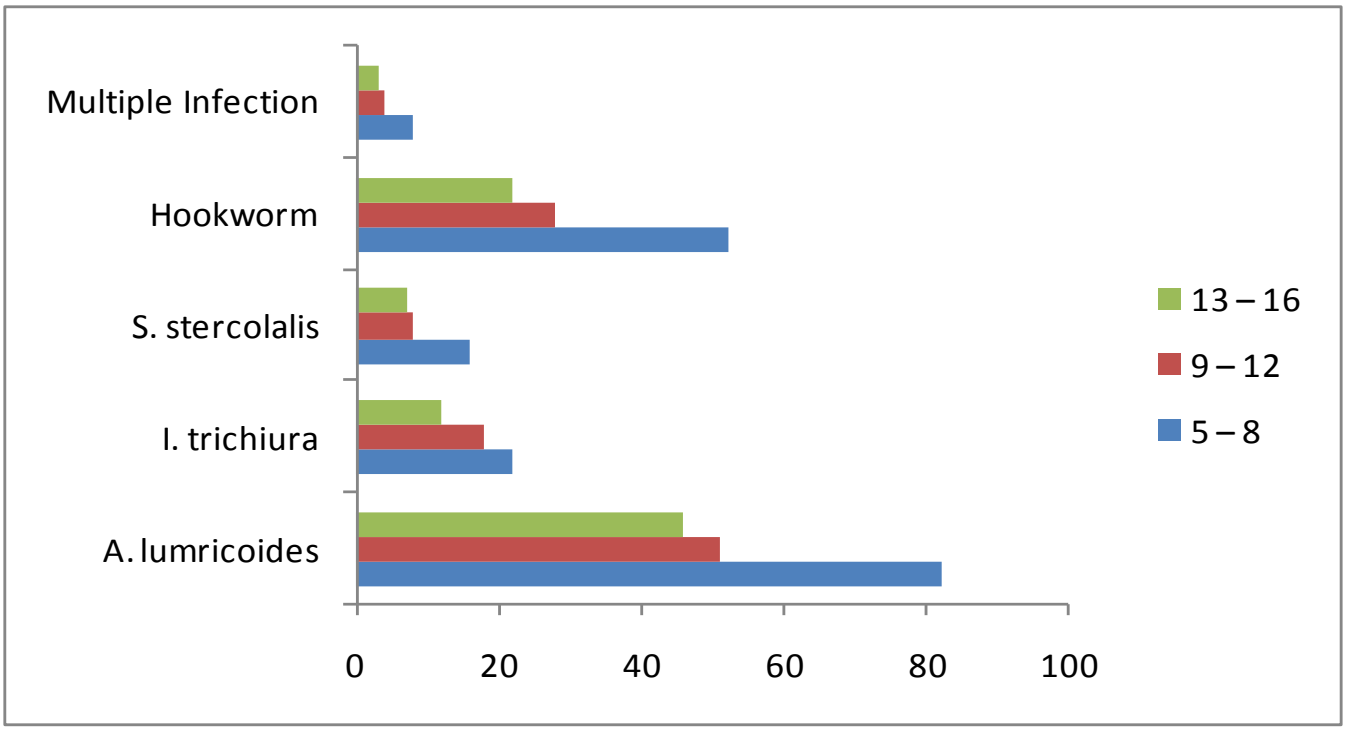

Fig. I
Y= axis prevalence of intestinal helminthes based on Age–related habit
X= axis percentage prevalence

Table 2 Distribution Of Parasite Based On Sex

SEX	TOTAL POPULATION	NUMBER INFECTED	% INFECTED
Female	216	182 (46.8)	84.3
Male	284	207 (53.2)	72.8
TOTAL	500	389	77.8

X^2 =3.841, which stand as the P-statistical value

Table 3 Age Range And Percentage Prevalence Of Intestinal Helminth Infection

AGE	NO. EXAMINED	NO. INFECTED
5 – 8	217	215 (55.3%)
9 – 12	153	110 (28.3%)
13 – 16	130	64 (16.4%)
TOTAL	500	389

X^2 = 15.9, P = 0.778

Table 4. Distribution of Parasite Species based on Types of Toilet

S/N	TOILET TYPE	TOTAL NO. EXAMINED	TOTAL NO. INFECTED	% AGE INFECTION
1.	Water closet	5	0	0
2.	Bush method/Elili	321	281	87.5
3.	Pit Toilet (Ohoro Oko Mkpume)	175	108	61.7
	TOTAL	500	389	77.8

Table 5: Prevalence Based On Types Of Parasite

Parasite	No. Examined	No. Infected (%)
Ascaris lumbricoides	500	179 (46)
Hookworm	500	112 (28.8)
Strongyloides stercoralis	500	31 (8)
Trichuris trichiura	500	52 (13.4)
Multiple infection	500	15 (3.8)
TOTAL	500	389 (77.8)

Z-Score =0.8144 or 0.7416, P=0.778

AGE	No. Examined	*Ascaris lumbricoides*	*Trichuris trichuria*	*S. stercoralis*	Hookworm	Multiple infection
5 – 8	217	82 (21.1)	22 (5.6)	16 (4.1)	52 (13.4)	8 (2.1)
9 – 12	153	51(13.1)	18 (4.6)	8 (2.1)	38 (9.8)	4 (1.0)
13 – 16	130	46 (11.8)	12 (3.1)	7 (1.7)	22 (5.6)	3 (0.8)
TOTAL	500	179 (46.0)	52 (13.3)	31 (7.9)	112 (28.8)	15 (3.9)

Table 7: Habit Or Life Style Of Different Pupils

S/N	Life Style	I Don't	Regularly	Occasionally	Total
1.	Eat Sand (Ukwaka)	50	277	173	500
2.	Lick finger/bite nails	62	315	123	500
3.	Walk barefoot	47	371	82	500
	TOTAL	150	963	378	500

Table 8: Prevalence Of Intestinal Helminthes Based On Age–Related Habit or Lifestyle

AGE GRADE	WALK BAREFOOT	LICK FINGER/BITE NAILS	EAT (UKWAKA) SOIL	*A. lumbricoides*	*I. trichiura*	*S. stercolalis*	Hookworm	Multiple Infection
5 – 8	261	222	231	82	22	16	52	8
9 – 12	126	113	122	51	18	8	28	4
13 – 16	66	103	97	46	12	7	22	3

III. DISCUSSION

Intestinal helminth infections remain high in rural communities in Amasiri Dev. Centre. The high prevalence of helminths recorded 389 (77.8%) in this study area could be attributed to exposure of the pupils to predisposing factors such as poor housing, poor system of sewage disposal, water sources that is unsafe, poor conditions sanitation and lack of information on the side of the parents and pupils (Simon–Oke *et al.*, 2014); Mordi *et al.*, (2011) and Ukpai and Ugwu (2003). This report also agreed with the report presented by Adikanku *et al*., (2012). The investigation revealed that prevalence rates were much higher in the schools that are situated at communities within farm settlement areas as shown in table 1. This could be attributed to

the location of the school and the level of awareness about personal hygiene of the parents and the pupils, (Elizabeth *et al*., 2013, Bethany *et al*., 2006 and Adikankwu *et al*., 2012). In this study the prevalence link between intestinal helminths infections with the category of children of school age used at the period of the present study may be said to be inversely proportional (Kalu *et al.*, 2013). According to table 2, the rate of intestinal helminth infections were high in the age bracket of 5-8 years (215(55.5%) , low in 9-12 age groups (110 (25.3%) and lower in age groups of 13-16 years 64 (16.4%) which could be seen as true that the age category that involve the youngest (5-8years) engages most with activities linking them to have high contact level with soil such as playing regularly with mud/sand (Kalu, *et al.*, 2013). Moreso this known group is observed with poor attitude to personal cleanliness which contribute most in the intestinal parasite infections. In fact the result of this work is in line with that done by (Uhuo, *et al.*, 2011) on incidence of helminth within an area stating that infection of intestinal helminth is more in age group that is lower as against the age bracket that is higher portraying a knowledge of self hygienic attitude that is advance which could come into play with advancement in education. Simon-Oke, *et al.*, (2014) attributed the children at the age of 5-8years little or no attention to personal and general hygiene such as walking barefooted, eating of sand (Ukwaka), dirty hands are used to share foods purchased from local food vendors; passing viable ova to one another. Also it may be because they eat snacks and food wrapped with papers from doubtful sources which may have been contaminated as suggested by (Chiojioke *et al*., 2004). Based on the report presented by (Ogbe *et al.*, 2003) that the highest prevalence of infection of intestinal helminth recorded across the groups between the ages 5-8years and decreases as age increases could be as a result of buildup of immunity as age increased which agrees with the result of this work. There was a significant difference (P>0.05) between infection rate and age groups.

Distribution of parasite based on sex shows that with 284 males examined 207 (53.2%) had infection and with 182 (46.8%) out of 216 female examined also had intestinal helminth infection see table 2. Although there was a significant difference (P>0.05) between prevalence in females and that of the males, thus, prevalence rate is higher in females (84.3%) than in males (72.8%). This can be attributed to female exposure levels to eating of sand (Ukwaka), playing on sand, licking of finger/biting of nails, walking barefooted why playing or going for an errand, hawking, use of unwashed hands to share food items and other domestic work. This result is in agreement with that of Simon-Oke *et al*., (2014) which said sex-related prevalence was higher in females than males. This result also agrees with that reported by Kalu *et al.*, (2013), which said female pupils were more infected in community primary school Umunoha than males as a result of the level of exposition to infected sand in the area which the school is situated. This result contradicts previous studies by Eze and Nzeako (2011), Odikammoro and Ike (2004), Ukpia and Ugwu (2003), Uhuo *et al.*, (2011) which stated that the children whose parents are peasant farmers often go to farm with their male children which were found frequently with barefoot and for that males are more vulnerable than females since they joined their parents to farm. Thus, this result could agree with the above persons when the reverse is considered, that is, within Amasiri females go to farm most with their mothers than the men with their fathers who will always stay at the village square.

Furthermore, the study on the analysis on the type of parasite indicated that *Ascaris lumbriocoides* (46%), Hookworm (28.8%), *Strongyloides stercoralis* (13.4%) and *Trichuris trichuira* (10.4%) were common in the sampled groups, multiple infection (3.8%) also occurred (table 5). This suggests that standard of living is low and awareness is also lacking on personal hygiene especially in handling of foods observed from feacal sampled. *A lumbricoides* was recorded with high prevalence 179 (46%) infection which shows the level of pollution of soil water and vegetable with ascariasis by those volunteers who defecated in the surrounding bushes or "elili" since *A. lumbricoides* were much common with ingestion of water and food contaminated with its eggs and occasionally via inhalation of contaminated dust (Adikankwu *et al.*, 2012). According to Naish *et al.*, (2004) which states that the Ova of *Ascaris lumbricoides* can survives prolonged period of 10years under a warm, shady and moist environmental condition which could be a reason for their long constant infection. Hookworm infection was also high with prevalence of 112(28.8%) which shows poor sanitary disposal of human feaces and indiscriminate defeacetion. In most tropical countries, intestinal helminth is seen as an occupational disease since; it is mostly prevalence in farming community (Simon-Oke *et al.*, 2014). This assertion is proved valid by this result where farming constitutes an important risk for intestinal helminthiasis, especially hookworm in the studied area. *Strongyloides steroralis* has the least prevalence 31 (8%) which buttress that fact that the level of personal hygiene is nothing to write home about within the community were this study was carried out. *Trichuris trichuria* was not left aside with prevalence of 52 (13.4%) as it is one of the three cosmopolitan intestinal parasite species as indicated by Odu *et al.*, (2013). The highest prevalence reported for *Ascaris lumbricoides* in this study agreed with same previous reports by (Adeyeba and Akinlabi, 2003; Agbolade *et al.*, 2004; Alli *et al*., in 2011. Infection by *Ascaris lumbricoides* is distributed through eggs that are swallowed along with the ingestion of contaminated soil or when various objects carrying the adherent eggs come in contact with the mouth. In addition, another source of infection could be by exposure to food particles or drinks are contaminated through methods of handling or dust particles from the environ. The ova of Ascaris could be spread through different food and coprophagous animals agents, and can thus be carried from the defecation site to other location far away as the case may be (Mordi and Ngwodo, 2007). Hence, in the intestine of the coprophagous animals the eggs/ova passed unaltered into the soil with a well-protected shell that can withstand hash environmental conditions and also survive a very long periods. Another major epidemiological factor that promote ascariasis is soil pollution (Mordi and Ngwodo, 2007). There have been report of intestinal helminths from various parts of Nigeria including Ebonyi State. Thus, the 46% prevalence value reported of *Ascaris lumbricoides* in this study was however, moderate when compared with previous reports from other areas in the state. The work done by Odikamnoro and Ikeh in 2004, showed 51.5% prevalence within the inhabitant of a community called Kpiri-kpiri in Abakaliki found in a state known as Ebonyi. Uhuo *et al*., in 2011 presented

a 20.0% prevalence among primary school children in one of the Local Government Areas in Ebonyi particularly Ezza North while Adikankwu *et al.,* (2012) reported a prevalence of 20.0% also in Ebonyi Local Government Area, Ebonyi State all in Nigeria.

T. trichiura commonly recognized with its whip like structure in adult stage as whipworm which distribution is cosmopolitan and can be prevalent in warm humid tropical region (Mordi and Ngwodo, 2007). In this study *T. trichuria* had a prevalence rate of 13.4% which is higher than that in other parts of the state. Odikankwu *et al*., (2012) reported a prevalence rate of 1.3%. at Ebonyi Local Government Area while_ Uhuo *et al*,. (2011) recorded prevalence rate of 1.3%. This could be as a result of poor sanitary habits of indiscriminate defecation which could lead to pollution of the soil with the Ova. Infections usually occur through ingestion of drinks. However, the penetration of human skin with hookworm L3 infective larva stage caused infections, which could be attributed to poor personal hygiene such as disposal of human faece with poor sanitary measure, walking barefooted in contaminated area, and defecating indiscriminately (Mordi and Ngwodo, 2007) as shown in table 5. Due to lack of the awareness on the effect of personal hygiene and appropriate education of individual on environmental sanitation are channel of contacting infection of intestinal helminth. It could be true in the present environment of study since most preferred with prevalence rate of 87.5% toilet method as shown in table 4.

This method which could lead to contamination of the soil, drink or food (raw vegetable) there-by escalate the prevalence of intestinal helminth infection. This result agreed with that presented by Adikankwu *et al*., (2012) which attributed infection of *Ascaris lumbricoides* to consumption of raw vegetable (Ighara) or drinking of contaminated water. It also corresponded with the work of Mordi and Ngwodo (2007) which said transmission of *T. trichura* infection in a community is due to indiscriminate poor sanitary defecation by human. It is noteworthy that several individuals in the age group have *strongyloides* infection. This nematode has the potential cause of serious life threatening infections in the immunocompromised and malnourished individuals. The extent of this complication occurring in Amasiri is unknown since there is no major surveillance that moves to schools for health education on methods of prevention and eradication of soil transmitted helminthes infection.

Moreso, the lifestyle or habit of the pupils also have influence over the rate of prevalence as shown in table 8, children who were under the bracket age of 5-8 years which walk barefoot, lick finger, and eat sand (Ukwaka) most have high prevalence rate across the observe intestinal helminthes such as 82, 22, 16, 52 and 8 percent for *A. lumbricoides, T. trichiura, S. starcolaris,* hookworm and multiple infections respectively. Followed by those within the age bracket of 9-12 years with prevalence rate of 4, 28, 51, and 18 percent for multiply infections, hookworm, *A. lumbricoides, T. trichiura,* and *S. starcolaris,* respectively, thus, low among those with age bracket 13-15 years with 22, 46, 12, 7, and 3 for hookworm, *A. lumbricoides, T. trichiura, S. starcolaris,* and multiple infections respectively. This may be attributed to their increased immunity and level knowledge regarding personal hygiene and environmental sanitation since transmission is majorly by consuming contaminated food/water in case of Ascaris, Trichuris and Strongyloides infections or coming in contact with soil containing the infective larvae that penetrate through the skin (Hookworm). This is in line with work reported by Bethony *et al*, 2006, which states that the liberation of eggs of Soil Transmitted Helminths along with faece of individuals infected into the surrounding thereby making it one of the intestinal essentially parasites. The infective stage of hookworm and *Ascaris* occur in the soil by the development of the larvae. More so, the consumption of soil contaminated fruits and vegetables with infested eggs larvae cause infection; or by the putting of dirt hands and fingers containing the eggs into the mouth. Nevertheless, hookworm eggs cannot infect human directly thus, would under some developmental stages before becoming an infective larva such as after hatching in the soil, the moveable released larvae penetrate the skin. For that, one can be infected accidentally through careless attitude that leads to having contact with the soil that is contaminated.

IV. CONLUSION AND RECOMMENDATIONS

Conclusion

The study showed that the prevalence of intestinal helminth infections among primary school children in Amasiri community is generally high compared to others reported within different parts of Ebonyi State Nigeria. The observed high prevalence of these intestinal helminth infections could partly be explained by the lack of mass chemotherapy or deworming exercise.

However, sensitization on environmental sanitation including good personal hygiene are not emphatically stated which are the remote means of transmission of infections of helminth in underdeveloped areas like this, as these diseases are distributed by the disposal of feace indiscriminately thereby contributing to auto-infections of intestinal helminthes. This study objective was achieved successfully according to the purpose why it was set, such as indicating the presence of four helminthes (*Ascaris lumbricoides*, Hookworm, *Trichuris trichiura*, and *Strongyliodes stercoralis*) were prevalent among primary school children in Amasiri community. The information on the age, sex, locations, type of toilet facilities used, source of water supply and occupational status for the control of useful parasite of such which are highly distributed in this area.

Recommendation

1) Based on the result obtained from this study, recommendation of routine examination of stool of all school children within Amasiri community would be necessary, thus, advocating for further studies by other researches.
2) This study revealed a high prevalence of intestinal helminths burden, a situation which is not too good for physical, mental and cognitive development of children. Thus, government across the levels should embark on measures to control the spread of helminthes infection among children in Amasiri community.

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