

PREVALENCE OF INTESTINAL HELMINTHS INFECTION AND EFFICACY OF ANTIHELMINTIC DRUG (MOROANTEL) AMONG PRIMARY SCHOOL PUPIL IN ITU LOCAL GOVERNMENT AREA, AKWA IBOM STATE, NIGERIA

**USIP, LAWRENCE Patrick. Esiet^{*} ;
AFFIA Udeme U.; OKORO, MARY FRIDAY**

**¹DEPARTMENT OF ANIMAL AND ENVIRONMENTAL BIOLOGY
UNIVERSITY OF UYO, UYO**

***Corresponding Author: usiplaw01@gmail.com**

Abstract

Prevalence of intestinal helminths infection and efficacy of antihelmintic drug (moroantel) among primary school pupil of Government primary school, Ibiaku Itam 2 and Christ church school, Ikot Esia, Mbak Itu in Itu Local Government Area, Akwa Ibom state, Nigeria was carried out between January to march 2014. A total of 216 primary school pupil stool samples was collected by random sampling and examination of faeces 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 216 pupils examined 98(45.4%) were infected with the intestinal helminths parasite and the prevalence of helminth species were *Ascaris lumbricoides* 66(30.5%), *Ancylostoma duodenale* 27(12.5%) and *Trichiuria trichuris* 5(2.3%). There was no significant different ($p > 0.05$) between prevalence of infection in male and female. Age specific prevalence varies with sex and parasite species. A single dose of morantel Antihelmintic drug shows a remarkable reduction in worm burden but was resistant to *Tricuris trichiura*. The morantel drug was more sensiiy to *Ascaris lumbricoides* 30(71.4%) followed by *Ancylostoma duodenale* 15(83.3%). 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, Morantel, Efficacy

{ **Citation:** Usip, Lawrence Patrick Esiet; Affia Udeme U.; Okoro, Mary Friday. Prevalence of intestinal helminths infection and efficacy of antihelmintic drug (moroantel) among primary school pupil in Itu local government area, Akwa Ibom State, Nigeria. American Journal of Research Communication, 2017, 5(6): 102-117 } www.usa-journals.com, ISSN: 2325-4076.

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 *Ascaris lumbricoides* and 347 million with *Trichuris Trichiura* in the world. Between 500 million and one billion people are estimated to be infected annually. In Nigeria, the occurrence of human intestinal helminthiasis is increasingly high (Nwosu, 1981; Obiamiwe and Nworsi, 1991; Uneke *et al.*, 2007 and Odu *et al.*, 2013).

Intestinal worm infections thrive in communities without better housing, sanitation, water supplies, health care, education and low income (Worknel *et 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 behaviours (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 (Albonico *et al.*, 2002).

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

Transmission within a local community is directly related to human behaviour 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 (Ating *et al.*, 2013).

In terms of efficacy of anthelmintic drugs, effective drugs such as levamisole, morantel and pyrantel have been known to aid in reduction of the parasites. Broad spectrum anthelmintics are effective against parasitic worms and Nematodes. However, the majority of drugs are more limited in their actions (Chuveran *et al.*, 2006).

Usip and Nwosu, (2013), in Abak Local Government Area of Akwa Ibom State, Nigeria conducted a study on the prevalence of human intestinal helminthes and the efficacy of anthelmintic (levamisole) drug in primary school children. The result showed that out of 242 pupils, 143(59.1%) had infections, with hookworm being the dominant and *Taenia spp*, 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 females 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 children in Nigeria, particularly in Itu Local Government Area (L.G.A) of Akwa Ibom State, which is largely, unresearched and unreported and this motivated our interest in the study. The major objective of this study was to investigate the prevalence of intestinal helminthes infection and efficacy of antihelminthic (morantel) drug among primary school children in Itu Local Government Area.

Materials and Methods

Akwa Ibom State lies between latitude $4^{\circ} 32'$ and $5^{\circ} 53'$ North and longitude $7^{\circ} 25'$ and $8^{\circ} 25'$ East with total land area of 8,412km², approximately, 60km from coast of the Atlantic Ocean South and 47km from Calabar North. Itu local Government Area is situated at 5.2° North latitude, 7.89° East longitude and 94 meters elevation above the sea level (Fig 1).

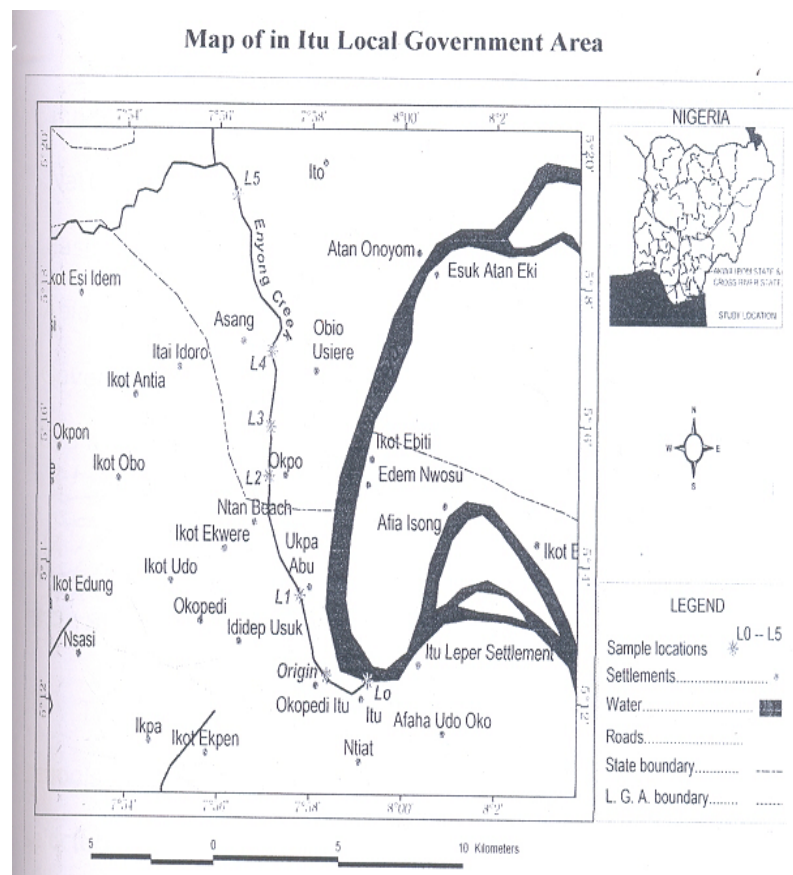


Figure 1: Map of Itu Local Government Area.

Itu is a small city in Nigeria, having about 127,033 inhabitants, 67,566 males and 59,467 females (2006, National Census). It is bounded in the North and North-East by Odukpani in Cross-River State and Arochukwu in Abia State, in West by Ibiono Ibom and Ikono Local Government Areas, in the South and South-east by Uyo and Uruan Local Government Areas respectively.

Ethical Consideration

Ethical clearance was obtained from the ethical committee of the Akwa Ibom State Ministry of Health. Communication with the head of school and pupil parents and guardians was met through formal letter obtained from the Department of Animal and Environmental Biology, University of Uyo. Verbal consent was obtained from each participant's parent or guardian, information collected and results were treated confidentially, participation was voluntary.

Study Design and Sampling Method

A cross sectional study to determine the prevalence of intestinal helminthes infestation and efficacy of Antihelminthic drug was employed. A stratified systematic random sampling technique was used.

Two schools were used for this study. The schools selected for this study were Government Primary School, Ibiaku Itam 2, Itu and Christ Church (special) school, Ikot Esia Mbak, Itu. Table of random numbers was used for the random sampling.

From each of the two schools selected, 108 school pupils were selected. Table of random sampling was again used for random sampling. Six pupils were selected from each class (classes 1-6) to make up a total of 36 pupils per school per month. A total of 216 pupils were sampled at

the end of three months. Another three months was used for treatment of those with infection and re-sampling and re-examination of their faecal sample.

Samples Collection

Sample bottles were given to the selected volunteers with their identification number attached to them. And the children were told to get their early morning sample faces while coming to school the following day. Pupils were advised to use the specific method by World Health Organisation. (The stool was to be passed on a clean paper first before scooping a little scrap of it into the sample bottle using dry stick and the bottle was well tightened).

Laboratory Investigation and Testing for Drug Efficacy

On collection of the faecal samples, they were taken to the laboratory for examination. Two methods were used alternatively, they include simple sedimentation and saline wet mount method.

The results of the analysis were taken to the schools after thorough examination of the samples, in a company of a medical officer together with Anthelmintic drug for those with helminthic infections.

Orientation was given to the teachers and children on the dosage and method of drug administration by the nursing officer. A dose of the drug was given to be taken in the morning before meal. After 2 weeks, a follow-up test was conducted on the infected pupils to check for the efficacy of anthelmintic drug.

Results

The observed intestinal helminth parasites were *Trichuris*, *trichiura*, *Ascaris lumbricoides* and *Ancylostoma duodenale*. Out of 216 primary school children examined for intestinal parasites. 66(30.5%) were infected with *A. lumbricoides*, 27(12.5%) with *Ancylostoma duodenale* and 5(2.3%) with *T. trichiuria*. On the whole, out of 216 pupils examined, 98(45.4%) were infected with helminth parasites (table 1).

The result as shown in Table 1 and Fig 2 indicates the number of males and females pupils infected with various age groups. In the 4 to 6 years, 13(44.8%) males and 15(100%) females were infected. In the 7 to 9 years, 13(32.5%) males and 14(27.5%) females were infected. In the 10 – 12 years, 15(50.0%) males and 15(44.1%) females were infected while in the 13 – 15 years, 7(70.0%) males and 6(85.7%) females were infected.

Table 1: Prevalence of Intestinal Helminthes Infections among School Children in Itu Local Government Area

Helminthes	No. Examined	No. of Infected	% of Infected (Prevalence)
<i>Ancylostoma duodenale</i>	216	27	12.5
<i>Ascaris lumbricoides</i>	216	66	30.5
<i>Trichuris Trichiura</i>	216	5	2.3
Total	216	98	45.4

The analysis of the interaction of sex, age group and the prevalence of parasites showed that females of age (4-6 years) had the highest prevalence of *A. lumbricoides* infections (73.3%), females of age (13-15 years) had the highest in *Ancylostoma duodenale* (42.9%), while females of age (4-6 years) had the highest prevalence of *T. trichiura* infection (13.3%).

Table 2: Interaction between Sex, Age Group and Prevalence of Intestinal Helminthes Infection among Primary School Children

Sex	Age Groups	Numbers Examined	Numbers Infected (%)	<i>Ascaris lumbricoides</i> %	<i>Ancylostoma duodenale</i> %	<i>T. trichiura</i> %
Male	4-6	29	13(44.8%)	10(34.4)	2(6.8)	1(3.4)
	7-9	40	13(32.5%)	7(17.5)	6(15)	0(0)
	10-12	30	15(50.0%)	11(36.7)	4(13.3)	0(0)
	13-15	10	7(70.0%)	3(30.0)	3(30.0)	1(10)
Female	4-6	15	15(100%)	11(73.3)	2(3.3)	2(13.3)
	7-9	51	14(27.5%)	9(17.6)	6(15)	0(0)
	10-12	34	15(44.1%)	10(29.4)	4(13.3)	1(2.9)
	13-15	7	6(85.7%)	5(71.4)	3(42.9)	0(0)
Total		216	98(45.4)	66(30.5)	27(12.5)	5(2.3)

Out of 216 school children sampled, 109 were males and 107 were females, out of the males examined 31(28.4%) had *A. lumbricoides* infections, 15(13.7%) had *Ancylostoma duodenale* infections and 2(1.8%) had *T. trichiura* infections (Tables 3).

Table 3: Sex Distribution and Prevalence of Intestinal Helminth Infection among Primary School Children

Sex	Number Examined	Number Infected (%)	<i>Ascaris lumbricoides</i>	<i>Ancylostoma duodenale</i>	<i>T. trichiura</i>
Male	109	48(44.0)	31(28.4)	15(13.7)	2(1.8)
Female	107	50(46.7)	35(32.7)	12(11.2)	3(2.8)

Out of the 107 females examined, 35(32.7%) had *A. lumbricoides* infections, 12(11.2%) *Ancylostoma duodenale* infections and 3(2.8%) had *T. trichiura* infections (Table 3), it can be observed that females had the highest prevalence of *A. lumbricoides* (32.7%) and *T. trichiura* (2.8) infections, we also observed that males had the highest prevalence in hookworm (13.7%). This research also reveals that *A. lumbricoides* is high in both male and female in the study areas.

The result in Table 4 shows the efficacy of morantel anthelmintic drugs with respect to sex and various age groups. Out of infected 61 children who received the anthelmintic drug treatment in order to check the potency of the drugs, 45(73.7%) were cleared of parasitic helminthes, while 16(23.2%) retained their infection.

Table 4: Prevalence of various Intestinal Helminth with age and sex with respect to the efficacy of antihelminthic drug (Morantel)

Sex	Age (yrs)	Number Examined	Number Infected %	Number Treated	<i>Acaris lumbricoides</i>		<i>Ancylostoma duodenale</i>		<i>T. trichiura</i>	
					Before	After	Before	After	Before	After
Male	4-6	29	13(44.8)	10(76.9)	7	2	2	0	1	1
	7-9	40	13(32.5)	10(76.9)	5	1	5	1	0	0
	10-12	30	15(50)	11(73.3)	9	3	2	0	0	0
	13-14	10	7(70)	4(57.1)	1	0	3	0	0	0
Female	4-6	15	15(100)	6(40)	5	2	1	0	0	0
	7-9	51	14(27.4)	10(71.4)	7	2	3	1	0	0
	10-12	34	15(44.1)	7(46.6)	5	1	2	0	0	0
	13-14	7	6(85.7)	3(50)	3	1	0	0	0	0
Total		216	98	26	42(41.5)	12(28.5)	18(17.8)	3(16.6)	1(0.9)	1(100)

Out of 35 males who received treatment, 24(68.6%) male children were worm free after the treatment, while out of 26 females treated against helminth, 19(73.1%) lost their worms burden. The drug was more sensitive to *A. lumbricoides* 30(71.4) followed by *Ancylostoma duodenale* 15(83.3%) and *T. trichiura* was not sensitive.

On the efficacy of anthelmintic drug administration, the results shows that after 2 weeks in which the drug (morantel) was administered, both sex showed significant response to the drugs. The males of 13-14 years were worm free after treatment with morantel drug, while those in other age group shows remarkable reduction in worm burden. The females in all the age group shows remarkable reduction in their worm burden after morantel drug treatment Table 5/Fig 3.

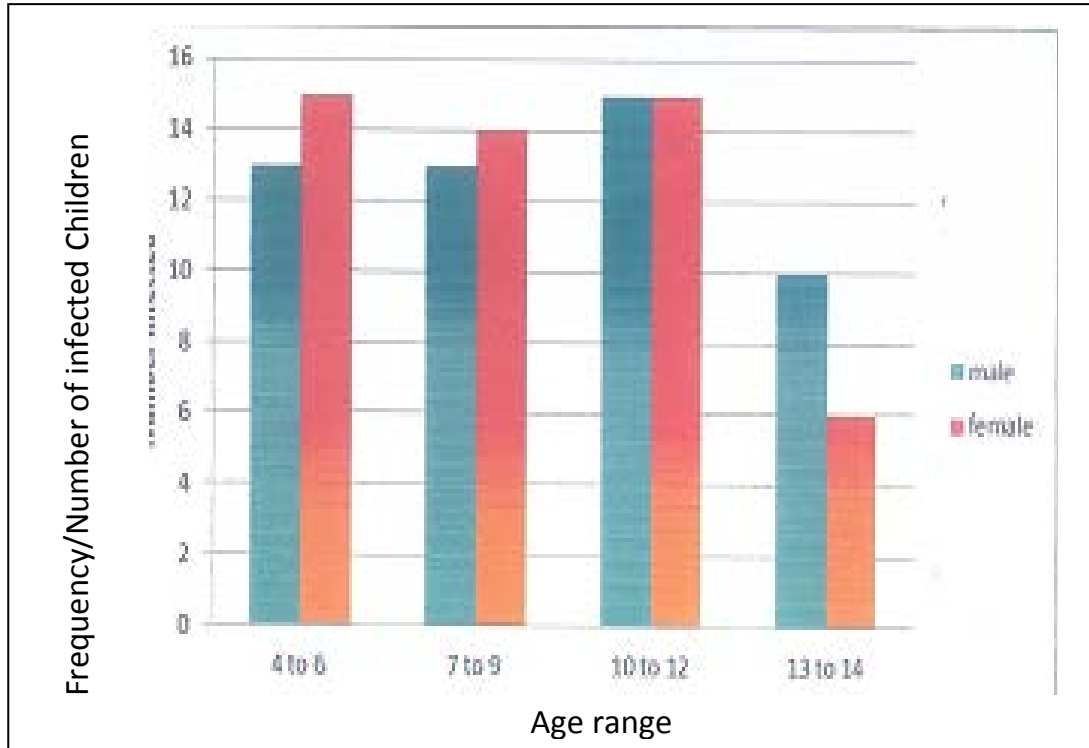


Figure 2: Chart showing prevalence of infection by sex

Table 5: Prevalence of infection with age before and after Morantel Drug Administration
Prevalence of Infection

Age group	Before (male)	After (male)	Before (female)	After (female)
4-6yrs	10	3	6	2
7-9yrs	10	2	10	3
10-12yrs	11	3	7	1
13-14yrs	4	0	3	1

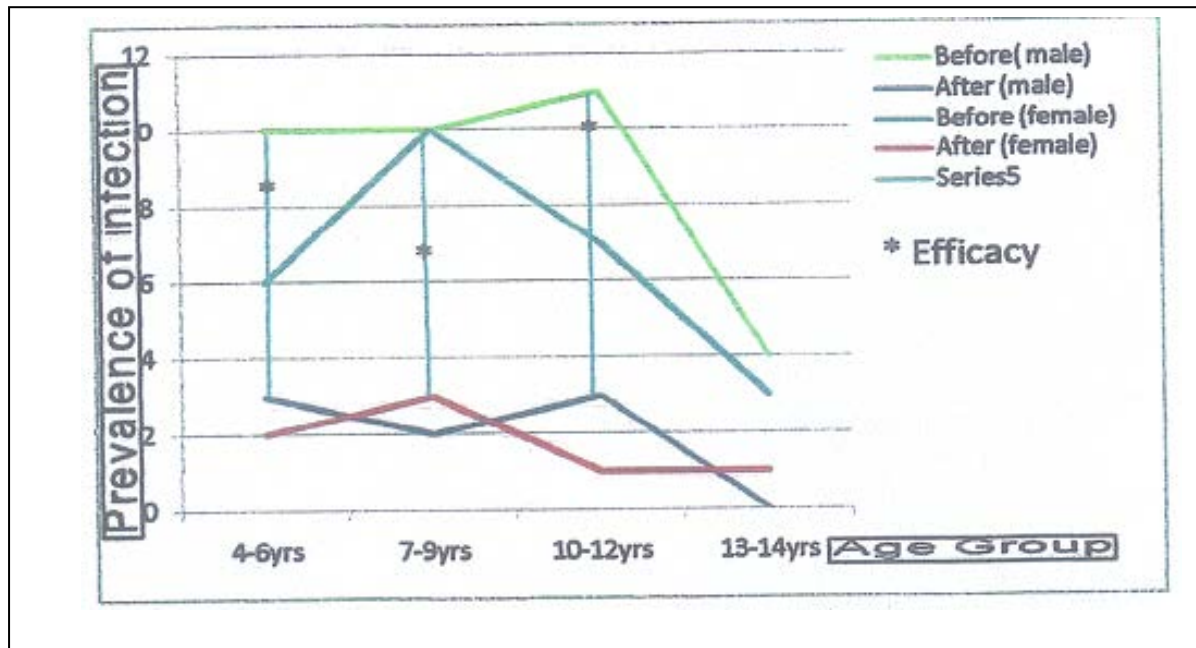


Figure 3: Graph showing the efficacy of anthelmintic drugs (morantel) after treatment.

Discussion

The prevalence of Helminthes infection observed among school children in this study is relatively low when compared to the result obtained by Churevan *et al* (2006) who recorded a prevalence of 75.1% in Thailand, and 83.4% recorded by Worknel *et 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 these schools. In this report, *A. lumbricodes* infection had the highest prevalence in females, ages 4-6 years. This may be linked to their immature level of their immune system. Also, *Ascaris* infection is considered to be higher among females compared with males regardless of age (Gimba and Dawan 2015).

Males of 7-9 years old had the highest prevalence of hookworm infections. The males of this age group 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 latrine with large areas of field/farmland 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 neighbouring farmland/bush. Males of 13 – 15 years old had the highest prevalence of *Ancylostoma duodenale* infection. This maybe so because of their reinfection as a result of continuous exposure of the boys to the nearby stream that is close to the school environment that the boys 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 was 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 Okpala *et al.*, (2014), and the differences maybe related to level of exposure. Desta *et al.*, (2014) also found that poor hand washing and hygiene of nails are conducive environment for fecoral transmission of intestinal parasites through their unwashed hand.

The result of the efficacy of Morantel Antihelmintic drug confirmed earlier report by Usip and Matthew (2015) that single dose of Antihelmintic drug may not clear the worm burden. 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, Opala *et al.*, (2014) with overall prevalence of 13.8% among children in day care centre in Esan West Local Government Area of Edo State and Desta *et 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 primary school children in Itu L.G.A. Akwa Ibom State. 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.

The result of the efficacy of Antihelmintic drug reveals that single dose treatment of pupils with morantel is inadequate for the treatment of intestinal helminthes infections. 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.

References

- Albonico, M., Ramsan, M., Wright, V., Jape, K. Haji, and Bickle, Q. (2002). Soil transmitted nematode infections and mebendasole treatment in mafia island school children. *Annals of tropical medicine and parasitology*, 96: 717-726.
- Atting, I. A., Ukpe, I. and Usip L. P. E. (2013). The prevalence of excreta-related soil transmitted helminthiasis and the role of sanitation in its control in primary school children in Uyo Metropolis, Akwa Ibom State, Nigeria. *Research Journal of Agriculture and Environmental Management*.
- Chuvevan, J., Sirichit, W., Weena, S., Sumart, L. Nantiya, M. Hathal, N. Suphalack, W. and Wey, C. (2006). The prevalence of intestinal parasitic infections among school children with annual ant, helminthic treatment in marayhiwat province. *Thailand Journal of Tropical Medicine and Parasitology*, 29: 45-50.
- Desta, H. Negusie O. and Eskzyiaw, A. (2014). Prevalence and determinant factors of intestinal parasites among school children in Arba Minch town Southern Ethiopia, *American Journal of Health Research* 2(5): 247-254.
- Gimba, U. N. And Dawan, N. N. (2015). Epidemiological status of Intestinal parasitic infection rates in children attending Quaqualada township Clinic, FCT Abuja, Nigeria. *American Journals of Research Communication*, 3(2): 97-110.
- Guyatt, H. L., Chan, M. S., Medley, G. F. and Bundy, D. A. O. (1995). Control of *Ascaris* infection by chemotherapy: which is the most cost-effective option. *Transactions of the royal society for tropical medicine and hygiene*, 89: 16-20.
- Nwosu, A. B. C. (1981). The community ecology of soil-transmitted helminth infections of humans in hyperendemic area of southern Nigeria. *Annals of tropical medicine and parasitology*, 75: 203.
- Obiamiwe, B. A. and Nworsi, P. (1991). Human gastro-intestine parasites in Bendel State, Nigeria. *Angrew parasitoloty*, 32: 177-183.
- Odu, N. U., Elechi, V. I. and Okonko, I. O. (2013). Epidemiological status of intestinal parasitic infection rates in children attending Guagwalada Township Clinic Federal Capital Territory, Abuja, Nigeria, *American Journal of Research Communication* 3(2): 97-110.

- Okpala, H. O., Josiah, S. J., Oranekwulu, M. U. and Ovic, E. G. (2014). Prevalence of intestinal parasites among children in Daycare Centres in Esan West Local Government Area, Edo State, Nigeria, *Asian Journal of Medical Sciences* 6(4): 34-39.
- Suresh, J., Dhaka, R. P., Bishna, R. T., Jay, P. S., Rablin, B. and Shraddha Upadhyaya (2014). Prevalence of intestinal parasite among school children of Bharalpokhori VDC Kashri Nepal, *British Microbiology Research Journal* 4(9): 1007 -1012.
- Uneke, I., Eze, O. O., Oyibe, R. G. and Azu, N. C. (2007). Soil transmitted helminthes infection in school children in south-eastern Nigeria. *The public health implication internet journal of third world medicine* 4(1): 1-12.
- Usip L. P. E and Mathew E. (2015). The Prevalence of Intestinal Helminths and the efficacy of Antihelminthic (pyrantel) drug among primary school children in Obot Akara, Obot Akara Local Government Area. Akwa Ibom State, Nigeria. *People Journal of Public Health and Management*, 3(3): 46-55.
- Usip, L. P. E. and Ita, Asari Edet (2017). Comparative prevalence of intestinal parasites among children in public and private schools in Calabar South, Calabar, Cross River State, Nigeria. *American Journal of Research Publication*. Vol 5(1) 80-97.
- Usip L. P. E. and Nwosu C. (2014). The Prevalence of Intestinal Helminths and the efficacy of Antihelminthic (Le Vanusol) drug among primary school children in Abak, Abak Local Government Area. Akwa Ibom State. *Basic Research Journal of Medicine and Clinical Science*, 2(5): 52-58.
- Worknel, T., Ahmed, E. and Mekonam, A. (2014). Prevalence of intestinal parasitic infections and associated factors among Debre Elias Primary School Children East Gojjam Zone, Anambra Region, North West Ethiopia. *Journal of Bacteriology and Parasitology*, 5: 1-1000181.
- Wosu, M. I. and Onyeabor, A. I. (2014). The prevalence of intestinal parasite infections among school children in a Tropical Rain Forest Community of Southern Nigeria, *Journal of Animal Science Advances* 4(8): 1004-1008.