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*Full Length Research*

# Helminth Infections in children in Anza-Ihugh, Vandeikya Local Government Area of Benue State, Central Nigeria

**Okeke, P.[1], Luka, J.[2], Ombugadu, A.[2] and Yina, G. I.[3]***

[1]Facultyof Natural and Applied Sciences, Godfrey Okoye University, Enugu, P.M.B 01014, Thinkers Corner, Enugu, Nigeria.
[2]Department of Zoology, Faculty of Science, Federal University of Lafia, P. M. B. 146, Nasarawa State, Nigeria.
[3]Department of Zoology, Faculty of Natural Sciences, University of Jos, P. M. B 2084, Plateau State, Nigeria.

*Corresponding author. Email: grivik2000@yahoo.co.uk



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**ABSTRACT:** This study was carried out to examine the prevalence of helminth infection among children in Anza-Ihugh village in Vandeikya Local Government Area of Benue State, Nigeria. A total of two hundred and fifty (250) faecal samples were collected, 128 of the samples were from primary school children while the remaining 122 samples were from children not attending school through a systematic sampling. The collected samples were examined for the presence of helminth infection. Out of the 250 samples examined for helminths, 67(26.8%) had helminth infection. 39(15.6%) of the samples were positive for *Necator americanus*, 11(4.4%) for *Ascaris lumbricoides*, 3(1.2%) for *Schistosoma mansoni*, 2(0.8%) for *Taenia saginata*, 2(0.8%) for *Trichuris trichiura* and 10(4.0%) for *Strongyloides stercoralis*. There was no significant difference in the rate of infection ($\chi$ = 0.59, df =1, p>0.05) between children attending school and those not attending school. Similarly, there was no significant difference ($\chi$ = 0.86, df =1, p>0.05) between male and female subjects which implied that both sexes have equal chances of being infected by helminth species that were found in the area. The prevalence of hookworms in the study area was attributed to the exposure and environmental factors since most of the children usually play with sand and sit on the floor, these are areas that are conducive for egg and larvae to flourish. It is therefore recommended that mass drug administration should be employed to control and eliminate the disease together with other measures which are purely environmental to interrupt reinfections.

**Keywords:** Helminth infection, preliminary, pre-school.

## INTRODUCTION

Helminth infections are mostly common in areas of extreme poverty and poor hygiene and are among the most widespread of human chronic infections (McSorley, 2012). It has been estimated by the WHO that over 1.5 billion people (24% of the world's population) are affected worldwide (WHO, 2018; McSorley, 2012, Drake and Bundy, 2001) with disability adjusted life years (DALYs) for *A. lumbricoides* to be between 596000-1290000, *T. trichiura* (120000-354000) and hookworms infection (510000-1340000) (Kyu et al., 2018). Helminth infections are prevalent in tropical and subtropical areas, with the greatest numbers occurring in sub-Saharan Africa, the Americas, China and East Asia. They are transmitted by eggs that are passed in the faeces of infected. Adult worms live in the intestine where they produce thousands of eggs each day. In the areas that lack sanitation, these eggs contaminate the soil and are attached to vegetables where they are ingested with undercooked, unwashed vegetables, contaminated water or are ingested by children who play in the contaminated soil and then put their hands in the mouth without washing them. Helminth infections are most common in growing children in areas

of poor hygiene. These children stand a greater risk of infection and repeated re-infection. Over 267 million preschool age children and 568 million school age children live in areas where these parasites are intensively transmitted and are in need of treatment and preventive interventions (WHO, 2020).

More than 1.5 billion people, or 24% of the world's population are infected with helminths worldwide although there has been a global reduction on helminth infection rate in the Americas and Asia but in Sub-saharan Africa, the infection has been stable (WHO, 2020, Pulllan et al, 2014). In Nigeria, helminth infection is still on the high side hence works conducted by Karshima, 2018 revealed over 54.8% rate in 19 states (Karshima, 2018). Benue state is one of the states in Nigeria with high burden of tropical diseases, especially helminth infections (Tyoalumun et al., 2016, Amuta et al., 2017; Zakki et al., 2019)

Helminth infections have negative impacts on child development, malnutrition and retained cognitive function and learning ability. It also results to anaemic conditions. These negative consequences of helminth infections in children makes individuals harbouring such infections to suffer exacerbated morbidity making these children more vulnerable (Nokes and Bundy, 1994).

Chemotherapy through Mass Drug Administration (MDA) has been put in place by various stakeholders and agencies but the frequency and duration are not well spelt out making the effective control and possible elimination a great challenge (Anderson et al., 2014; Truscott et al., 2014). Thus, this study was aimed to examine the prevalence of helminth infection among children in Anza-Ihugh village in Vandeikya Local Government Area of Benue State, Nigeria and also provide some information that will support the planning and implementation of mass drug administration in the state.

## MATERIALS AND METHODS

### Study area

This study was carried out in Anza-Ihugh village in Vandeikya Local Government Area of Benue state, Central Nigeria. Vandeikya Local Government area is located between latitude 7°5' and 7°15' north of the equator and longitude 9° and 9°6' east of Greenwich with a land mass of 183.939 square meters (0.7sq miles) with a population of over 80,288. It is dominated by undulating terrain with much of the area being below 183 m (600ft) above sea level. It also has a good surface drainage, all the rivers are seasonal (river Aya and Be) (NPC, 2016; NBS, 2016).

Anza-Ihugh is a small village in Vandeikya Local Government Area which is about 40 km away from the local government headquarters. Vandeikya has a tropical sub humid climate with the mean annual rainfall of between 1200 and 2000 mm (47 and 79 inches) averaging seven months in a year, while the mean annual temperature is 32.5°C (90°F). The wet season last from April to October or November and dry season is from November to March. Vandeikya is in the South Eastern part of Benue State and shares boundaries with Obudu and Bekwarra in Cross River State to the East, Ushongo to the North and Konshisha LGA to the West.

The indigenous community is the Tiv people who speak the Tiv language. The people are very hospitable and predominantly Christians with a few Traditionalists. Agriculture is the mainstay of the people with arable land for sheep, goats, and cattle rearing. Over 80% of the population engage in peasant farming of virtually all major food crops with concentration on rice, sweet potatoes, cassava, citrus, spices, pepper, ground nut and Bambara nuts.

### Sample collection

At the beginning of the study, the reasons and procedure for stool collection was explained to all participants and their parents whose informed consent was obtained. A total of 250 faecal samples were collected using sterile bottles from children aged 0 to 5years. 128 samples were collected from children attending school and the remaining 122 samples were collected from children not attending school through a systematic sampling (house to house). There was only one school in the village. Each child was provided with a container narked with an identification number and the name of the subject under the guidance of the parents and teachers. Each subject gave one stool sample. Questionnaire with information on sex, tribe, age, type of latrines, type of house, source of drinking water and water contact activities were designed and presented before the administration of RCM primary school, Anza village with the help of two research assistants.

### Laboratory procedure

Stool samples collected were taken to the laboratory at Akperan Orshi College of Agriculture, Yandev where they were preserved in 10% formation sub samples from each specimen which was later strained through a tea strainer and centrifuged at 2000 rpm and resuspension in 0.9% saline until supernatant was clear. Three thick smears of the washed sediments were examined microscopically for the presence of eggs and larvae under ×10 objective and confirmed with ×40 objective. The number of eggs and larvae in 1 g of stool were counted from slide to know the intensity of helminth infection. This was done using the standard procedure as described Cheesbrough (1992). SAS software was used with Chi square test to analyse the data obtained from the study.

## RESULTS

Out of a total of 250 subjects examined for helminths, 67(26.8%) had helminth infection. A breakdown of the

**Table 1.** The prevalence of helminth infection in children aged 0-5years in the study area.

| Helminth species | No of subjects with helminth infection | Percentage (%) |
|---|---|---|
| *Necator americanus* | 39 | 15.6 |
| *Ascaris lumbricoides* | 11 | 4.4 |
| *Schistosoma mansoni* | 3 | 1.2 |
| *Taenia saginata* | 2 | 0.8 |
| *Trichuris trichiura* | 2 | 0.8 |
| *Strongyloides stercoralis* | 10 | 4.0 |
| Total | 67 | 26.8 |

**Table 2.** The occurrence of helminth infections in children attending school and those not attending school.

| Helminth infection | Children attending school (%) | Children not attending school (%) |
|---|---|---|
| *N. americanus* | 20(15.6) | 19(15.6) |
| *A. lumbricoides* | 8(6.3) | 3(2.5) |
| *S. mansoni* | 2(1.6) | 1(0.8) |
| *T. saginata* | 0(0.0) | 2(1.6) |
| *T. trichiura* | 0(0.0) | 2(1.6) |
| *S. stercoralis* | 7(5.5) | 3(2.5) |

$\chi 2 = 0.59$, df = 1, $p > 0.05$.

**Table 3.** The occurrence of helminth infections between male and female children in Anza-Ihugh, Vandeikya LGA.

| Children | Male (%) | Female (%) | Total (%) |
|---|---|---|---|
| Attending school | 18(50) | 12(38.7) | 30(44.8) |
| Not attending school | 18(50) | 19(61.3) | 37(55.2) |
| Total | 36(53.7) | 31(46.3) | 67(100) |

$\chi 2 = 0.86$ df = 1, $p > 0.05$.

prevalence rate of each species of helminth encountered is represented in Table 1. The rate of infection between children attending school and those not attending school were also compared (Table 2). Children not attending had high infection rate (37(55.2%) than those attending school 30(44.8%).

There was no significance difference between the more prevalent species of helminth found in the study i.e *N. americanus* and the prevalence of other helminth species combined. Only 2 out of the 250 subjects representing 0.8% had dual infection (*N. americanus* and *S. stercoralis).*

Of the 67 subjects that had helminth infections, 36(53.7%) were males while the remaining 30(46.27%) were females. There was no significance difference ($\chi$=0.86, df =1, $p > 0.005$) in the rate of helminth infection between male and female sexes in the two sampled populations i.e children attending school and children not attending school as shown in (Table 3).

The source of water made available (stream) made no significant difference on the prevalence of helminth infection since all the villagers had the same source of water. As for toilet facilities, the subjects interviewed used pit latrines for children above 4 years and those below 4 years old use bushes behind their houses to defecate.

## DISCUSSION

Helminth infections are the major problems of health of most developing countries including Nigeria. Out of the population of children especially those found in rural areas are most affected group. The infection with helminth poses a serious threat in children of school age and prevalence and intensity is reduced in older children as from 8 years. An overall prevalence of 26.8% helminth infection indicates that the disease of public health importance in the area. Previous studies have also revealed that all types of helminths detected in Anza village among children in the northern part of Nigeria (Isaac et al., 2019).

In the present study, six (6) species of helminths were found among the children with *Necator americanus* recording the highest prevalence rate of 15.6% with *Taenia saginata* and *Trichuris trichiura* having the least prevalence each of 0.8% respectively (Table 1). This study agrees favourably with the previous studies by Karshima

(2018) in Benue state, Abe et al. (2019) in Nasarawa state, Auta et al. (2013) in Kaduna state, Ani et al. (2009) in Ebonyi state and Adefioye et al. (2011) in Osun state who worked on helminth infections in children with 54.8, 67.1, 27 and 52%, respectively reported cases of helminths encountered in their studies were also found in the present study. On the other hand, the present study did not report any case of *H. nana*, *E. vermicularis* and *F. hepatica* as reported in the above mentioned studies. Similar findings were also obtained from the result of another study in Makurdi, Benue State (Zakki et al, 2019).

Moreover, more males were affected with helminth infections in this study, this was at variance with studies conducted by Dakul et al. (2004) in Plateau State where more females were affected than the males.

*Nacator americanus* (hookworm) is a predominant species of the new world but is also indigenous in Africa, India, South East Asia, China and some Pacific Islands. They are classified as one of the most destructive of human helminth parasites with an estimated 900 million cases worldwide (WHO, 2018). Hookworms are described as disease of poverty, people especially children living in rural areas go about without foot wears hence they are exposed to the infection since the larvae penetrate through the skin.

The prevalence of hookworms in the study area was attributed to the exposure and differences in behaviour, agricultural practices, school and village sanitations and other cultural and environmental factors. The high occurrence of hookworm was found in children in the study area was suspected to be their exposure to the environmental conditions through playing with sand and sitting on the floor in their classrooms. These are areas that are conducive for egg and larvae to flourish. However, the lack of significance difference in the rate of infection ($\chi = 0.59$, df =1, $p>0.05$) between children attending school and those not attending school indicates that both groups of children were exposed to same type of helminth infested environment.

In a similar vein, the lack of significant difference ($\chi = 0.86$, df =1, $p>0.05$) between male and female subjects implied that both sexes have equal chances of been infected by helminth species that were found in the area. Dual infection has been reported by Oyewole et al. (2002) with *N. americanus* and *S. stercoralis* indicated dual infection in this study. The source of water made available (stream) made no significant difference on the prevalence of helminth infection since all the villagers had the same source of water. As for toilet facilities, the subjects interviewed used pit latrines for children above 4 years and those below 4 years old use bushes behind their houses to defecate.

## Conclusion

Helminth infections are now receiving unprecedented attention as evidence that highly cost effective community interventions can control and possibly eliminate many of these infections, and stimulate long term economic growth and development. But all efforts by relevant agencies focus on mass drug administration to control and eliminate the disease which is not possible without deploying other measures which are purely environmental to interrupt reinfections. It is therefore recommended that other environmental measures to interrupt infections be put in place together with Mass Drug Administration.

## CONFLICT OF INTERESTS

The authors declare no conflict of interest in this article.

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