Statistical Analysis and Health Implications of Geohelminth Ova in Selected Households' Backyards in Okitipupa Local Government Area of Ondo State, Nigeria

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Abstract: **- This study investigated the prevalence and health implications of geohelminth ova in selected households' backyards in Okitipupa Local Government Area of Ondo State.**

A total of 500soil samples were obtained from tendifferent streets, and examined for geohelminth ova using zinc sulphate flotation technique.

The results showed that 67.2% of the soil sampled were positive for different species of the parasites.

Four different species of soil-transmitted helminths were encountered from the sampled soil, namely, *Ascarislumbricoides* (30%), *Acylostomaduodenale*(17.2%), *Trichuiristrichiura* (12.4%) and *Strongyloidesstercoralis* (7.6%). Soil sampled from Okeloro street was the most contaminated (80%), while the lowest (60%) were found among Government Reserved Area (G.R.A.), New-garage and Old-garage streets.

The distributions of geohelminths ova among the streets revealed that three streets were significantly different from others. The study indicated high rate of helminths contamination of the environments in the study area. There is therefore a need to enlighten the general public on the contamination of environment with faecal matters in order to prevent Soil-transmitted helminth infections.

Key words: **Geohelminth ova, Household backyard, Soil and Street**

I. INTRODUCTION

Geohelminths are group nematode parasites with an essential phase of their asexual life cycle in the soil and there is a period persistence in the soil during which the infective stages are protected and preserved.

Goehelminths infections, in a poor and developing countries of the world, represent a major public health problem and have constituted universal burden which does not depend on regional ecological conditions but also on local standard of social and economic development of the people (Baker et al., 2013 and Ukpai and Ugwu, 2003).

Infection of geohelminths are most prevalent in area, where adequate water and good sanitations are lacking. Recent estimates suggest that *Ascarislumbricoides* infect over 1 billion people, 770 million with *Trichuristrichuira* and also 800 million with hookworms (*Necatoramericanus* and *Ancylostomaduodenale* (WHO,2013). The global burden of soil transmitted helminthes (STHs) infection according to Murray et al.,(2013) is estimated to be 79 million disability adjusted life years.

The public health importance of STH infections ranked highest in morbidity rate among children who often present much heavy worm infections because of their vulnerability to nutritional deficiency and close contact with soil (Bethony etal., 2006).

It is well established that indiscriminate disposal of human and animals'faeces, poor personal hygiene and inadequate water supply contribute to high levels of soil transmitted helminth infection.The existence of viable geohelminth eggs insuperficial layer of soil presents a potential public health hazard, especially that these eggs are extremely resistant to adverse weather and chemical agents. Thus, soil contamination seems to be the most direct indicator of the risk of STH infection among human population.

The area of this study is faced with the dilemma of inadequate disposal of excreta related to human waste discharged into the environment thereby given a stable soil contamination with STHs eggs. Therefore, this study was undertaken to assess the prevalence and health implications of geohelminths ova in selected households' backyard in ten different streets, in Okitipupa Local Government Area of Ondo state.

II. MATERIALS AND METHODS

Study area and Sampling sites

The research was conducted from May to July 2017 in ten selected streets in Okitipupa Local Government Area of Ondo State of 6.547974 and 4.698937 geographical coordinates (Figure1). The climate of the area is typically tropical, with a

characteristic dry season of about 5 months (November–March) and a wet season of about 7 months (April–October). The vegetation of the area is tropical rainforest, characterized by large and tall trees. The inhabitants are predominantly Yoruba speaking people of the Southwest with a mixture of people from different ethnic groups in Nigeria.These areas were selected because they support high population of inhabitants and their proximity to bush environment which were frequently patronized as toilet.

Collections of Samples

Samples were collectedfrom 20households' backyards per street which were randomly selected based on the proximity between the main buildings and the backyards. A total of 500 soil samples were collected and was taken from at least 2cm deep into the soil using a hand trowel sterilized by cleaning with 95% ethanol.Soil samples were placed into labeled screw caped bottles and transported to Parasitology laboratory of The State University of Science and Technology and they were analyzed for the presence of human intestinal geohelminth ova.

Detection of helminthic eggs in the soil

Zinc sulphate flotation technique of Ogboluet al., (2011) was used to examine the soil samples. Each soil sample was sieved to remove debris and coarse particles. About 5grams of the soil was mixed thoroughly with 10mls of distilled water, strained into test tube and centrifuged at 2500 rpm for 3minutes. The supernatant was decanted and the sediment was mixed with 10mls zinc sulphate solution of 33% weight per volume (1.18-1.20 specific gravity). This was added to the brim of the test tube and allowed to stand for few minutes with a cover slip placed on the tube to collect floating ova. The cover slip was carefully removed and placed faced down on a clean glass slide for examination under x40 objective lens. Any observed geohelminth ova was identify by comparing with standard images of ova using Muller (1975)Arora and Arora (2006).

Data Analysis

Data analysis was performed using SPSS version 20. Pearson's Chi square test was used to test the prevalence and distribution of geohelminths ova among the streets at P values <0.05.

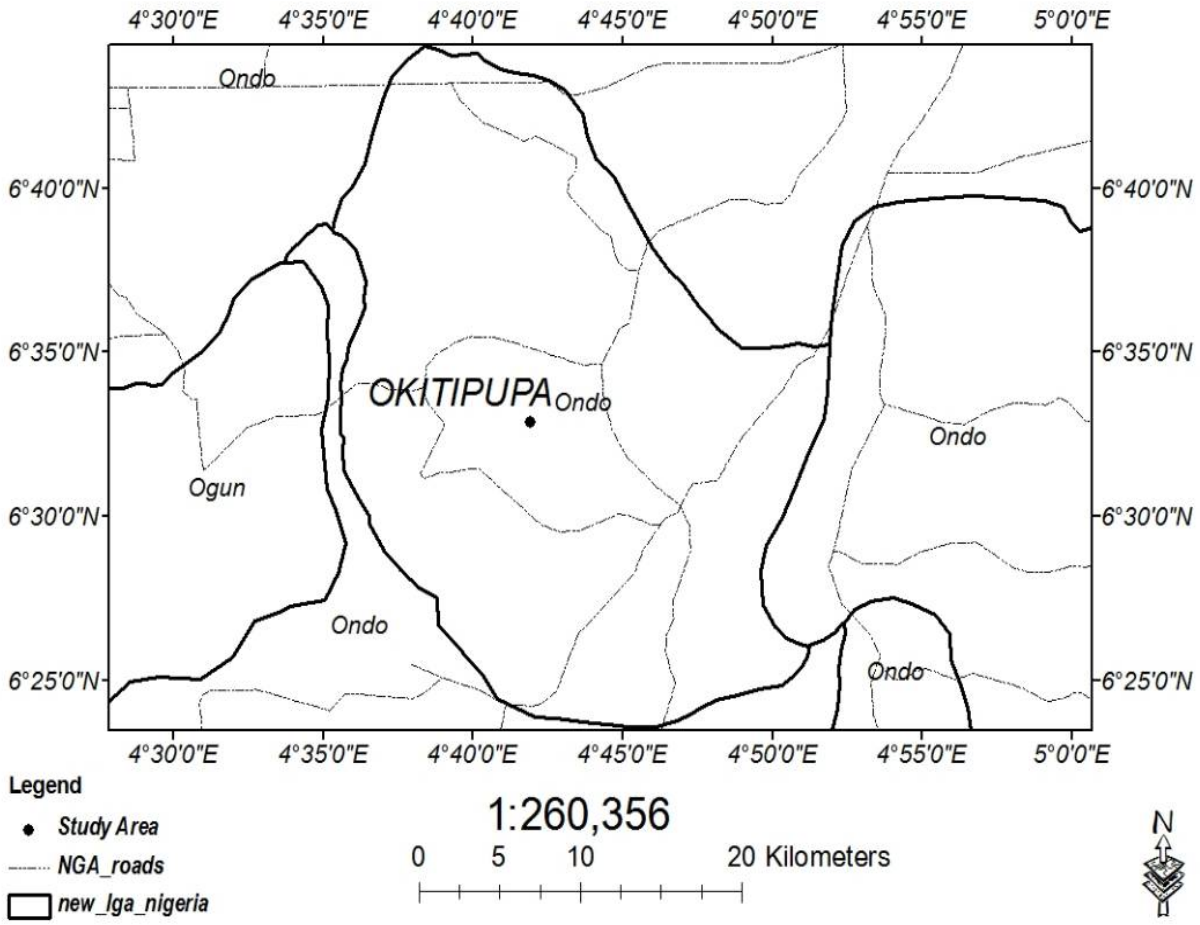

Figure 1Map of part of Ondo State in Nigeria, showing Okitipupa town

III. RESULTS AND DISCUSSION

The results of the study showed an overall prevalence of geohelminth species of 67.2% out of 500 soil samples screened for parasites ova from different specific streets in Okitipupa(Table 1).

Table 2 showed the prevalence of geohelminths ova encountered in relations to the household backyards per streets where one street has the highest prevalence rate of 80% while three streets had the least prevalence rate of 60% each.

The distribution of different species of geohelminths ova in examined soil samples taken from different household backyard is shown in Table3, out of which three streets shows significantly difference from others. The occurrence of geohelminth ova in the soil sampled is a potential threat of public health significance, most especially to the numerous efforts and resources channeled towards combating soil transmitted helminth infections (WHO,2013).

The overall prevalence of 67.2% reported in this study for geohelminth ova in household's backyards calls for the need of stringent hygienic measures in all the households and its environments in areas such as that of the present study.

Meanwhile, the overall prevalence reported in this study is considerably higher than the findings of Dada and Egbunu(2016) who screened soil samples from selected refuse dumpsites in Igbara-oke. These inconsistences in findings might be attributed to varying environmental conditions and hygienic practices of the study area.

The most frequent geohelminth ova encountered among the 336 positive samples is *A. lumbricoides* (30%), which may be as a results of their viability of the eggs in the soil for months and being the commonest parasite in the tropics (Stephenson, 1987). This result corroborated the work of Dada and Egbunu(2016) where he reported 13.5% for *A. lumbricoides*.

Infection of soils in different street shows that Okeloro had the highest percentage (80%) while the least (60%) infected soil were found in G.R.A, New garage and Old garage.

The differences in the rate of contamination of soil among the ten streets sampled could be attributed to the level of hygienic practices among the inhabitants.

Table 1 Overall prevalence of geohelminth ova in Okitipupa town

Geohelminth	Frequency of geohelminth species ova	Prevalence(%)	P value
Ascarislumbricoides	150	30	*<0.001
Acylostomaduodenale	86	17.2	*<0.001
Trichiuristrichuira	62	12.4	*0.001
S. stercoralis	38	7.6	*0.01
Total	336	67.2	

$$\chi^2_{cal} = 53.783 > \chi^2_3 = 7.815$$

Table 2 Prevalence of geohelminths ova per streets in Okitipupa town

Locations	Number of soil sample infected with geohelminth ova	Prevalence %
Apata	36	72
Ebute	32	64
Government Reserved Area (G.R.A)	30	60
Idepe	34	68
Iretolu	32	64
Lebi	34	68
Maryland	38	76
New garage	30	60
Okeloro	40	80
Old garage	30	60
Total	336	67.2

$$\chi^2_{cal} = 3.2858 < \chi^2_9 = 16.92 \text{ (P>0.05)}$$

Table 3 Distribution of geohelminths ova per streets in Okitipupa town

Streets	No of soil sampled	Species of geohelminth ova				Total	P value
		Ascaris	*Acylostoma*	*T. trichuira*	*Strongyloides*		
Apata	50	18	8	6	4	36	0.30
Ebute	50	14	6	6	6	32	0.10
G.R.A.	50	12	10	4	4	30	*0.025
Idepe	50	14	8	6	6	34	0.20
Iretolu	50	12	8	8	4	32	0.10
Lebi	50	16	8	6	4	34	0.20
Maryland	50	18	10	8	2	38	0.50
New garage	50	14	8	6	2	30	*0.025
Oke-loro	50	20	12	6	2	40	0.50
Old garage	50	12	8	6	4	30	*0.025

IV. CONCLUSION

This study has shown the potential health implication of contracting intestinal helminth parasites in the soil of household backyards.

Reduction of the risk of human of intestinal parasites associated with soil can be better achieved through mounting public enlighten campaign on media and control of faecal pollution in the immediate surroundings.

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