

## Intestinal Helminthiasis in Two Rural Communities in South-Eastern Nigeria

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### ABSTRACT

A study to establish the prevalence of intestinal helminthiasis among primary school children in two rural communities in Ebonyi State in South-Eastern Nigeria was conducted. Two hundred and two school children between 7 and 15 years of age selected from four (4) primary schools from Umuoghara and Umuezekoha communities were examined for intestinal helminths. 52 were selected from Community Primary School, Okposi Umuoghara, 48 from Udude Primary School, Umuoghara, 50 from Community Primary School, Omege-Umuezekoha and 52 were from Central Primary School, Umuezekoha. Standard parasitological diagnostic techniques were employed in the examination of the faecal specimens. Community Primary School, Okposi Umuoghara had the highest prevalence of 50% while Udude Primary School, Umuoghara had the least prevalence of 37.50%. Male children were more infected than females, with 48.57% and 39.18% prevalence respectively. Children who defecate in the bush were the most infected class while those that uses the water system was least infected with 54.01% and 10.55% respectively. With respect to parental occupation, children of the civil servants had the least infestation while farmers' children had the highest. Their respective prevalence was 14.82% and 56.82%.

**Keywords:** Helminthiasis, prevalence, primary school students.

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### INTRODUCTION

Intestinal helminths such as *Ascaris lumbricoides*, *Trichuris trichiura*, and hookworm are among the most common infections of school-age children in developing countries. It is estimated that there are between one and one and a half thousand million of these worms in the world [1].

Parasitic worms are among the most common cause of chronic infection in humans; in developing countries it is more common to be infected than not [2]. Infection thrives and persists in communities in need of better housing, clean water, appropriate sanitation, better access to health care, education and increased personal earnings [3]. This is typical of most rural communities and urban slums in Nigeria. Children growing up in these communities can expect to be infected soon after weaning, and to be infected and re-infected constantly for the rest of their life [2]. The disease can affect child development, education achievements, reproductive health and economic development [4]. Helminth infection is a major cause of disease burden among children in developing countries [5], especially in sub-Saharan Africa. This high infestation mirrors severe shortage in health care, education, transport, and chronic poverty [3]. In Nigeria, the disease is considered to be more prevalent among the lower class group and peasant farmers who are likely to come in contact with the contaminated soil while working outdoors [4].

Intestinal helminthiasis has been in the poor and has continued to re-emerge shortly after treatment. Re-infection by geohelminths has been reported to start shortly after treatment and reaches and even exceeds pretreatment levels [6]. It is a neglected but serious health problem especially of the school-age children [7]. The entire developing world tropical Africa at large, and Nigeria in particular is characterized by ignorance, low educational status, over population, low income earning, poor environmental sanitation and resource constraints, which are hallmarks of intestinal parasites' transmission-encouraging factors.

The public health importance of the helminths infestations even though high, is overlooked, with school-age children being the highest risk group, who may suffer from nutritional deficits, cognitive impairment, serious illness and in occasional cases, death; that are characteristics of the infestation [8-9].

Soil-transmitted helminthes constitute more than 80% of the intestinal helminth parasites. The prevalence of infestation with soil-transmitted parasites is approximately one billion people world-wide, with school-children being the most heavily-infected group [10]. Records of the prevalence of intestinal helminth infections have been one of the high sides elsewhere and in Nigeria. Two thousand, three hundred and ninety-four (2,394) stool samples from Indonesia had the prevalence of 73.7%, 62.6%, 24.5%, 1.6% for *Ascaris lumbricoides*, *Trichuris trichuris*, hookworms, and *Strongyloides stercoralis* respectively [11]. Ejezie [12] and Onwasigwe [13] recorded the prevalence's of 92.3% and 33.7% respectively in Lagos and Enugu. A high prevalence of 62.8% in intestinal helminthes from stool samples of children aged 0-17 years was also reported from Ibadan [14].

## MATERIALS AND METHODS

### Study Area

The study was conducted in four primary schools located in two rural communities (Umuoghara and Umuezekoha) both in Ezza North L.G.A. of Ebonyi State, Nigeria. The schools are: Community primary School, Okposi-Umuoghara, Udude Primary School Umuoghara, Community primary School Omege Umuezekoha and Central Primary School, Umuezekoha.

The two communities are located in the rain forest vegetation zones, with two distinct seasons-wet and dry. The former commences from April to October, while the later starts from November to March. The climate is tropical with an average annual rainfall of about 1600mm and an average atmospheric temperature of 30<sup>0</sup>C. The humidity is always favourable with the soil full of moisture.

Majority of the inhabitants are artisans who are either petty traders, peasant farmers, labourers especially in Quarry Industry situated there and a few are civil servants. It is a community with very low educational status, where only few people attained tertiary education. Only a few of the inhabitants had access to borehole that is situated very far from the residence. Majority of the population resort to the use of streams and ponds for household water supply. About 70% of the population uses the bush system to toilets where they defecate on bare grounds near the streams and ponds.

The schools used for the study had no toilets. Both teachers and pupils made use of the bush systems, especially the schools farms when no crops are growing on them. Only a few affluent ones had the water system type of toilets in their residence. Majority of the pupils track to schools bore foot.

### The Study population

Two hundred and two school children within the age bracket of 7-15 years were used in the study.

Fifty-two (52) were selected from Community Primary School, Okposi Umughara, 48 from udude primary school, Omege-Umuezekoha while 52 were from Central Primary School Umuezekoha.

### Ethical Consideration

Informed consents were sought and obtained from the older pupils. Among the very young ones, approvals from the school headmaster and or class teachers and or parents were got before the commencement of the study.

**Questionnaire Information**

Simple questionnaire was used to obtain information from the older ones who could either respond by writing or answering questions being asked. For the younger ones, home visits were made to get the required information. The information sought was age of pupils, sex, educational status of parents, especially mothers, occupation of parents, toilet facilities in use, and source of water supply for drinking and for domestic activities.

**Collection of Specimens**

Wide-mouth plastic containers were given to the 202 pupils involved in the study. Correct specimen collection demonstrations and instructions were made and given to them. They were told to take the containers home and return same next morning to school, with fresh stool samples. Each container was labeled with name, age and sex of each pupil. The collected samples were transport to the laboratory for analysis.

**Laboratory Analysis**

Macroscopic examination of the specimen was performed. This was followed by the microscopic examination which involved the wet preparation and concentration techniques respectively.

The procedure followed methods by Cheesbrough [15]. The formol ether concentration technique was employed. With the use of an applicator stick, about 1g of faeces was emulsified in about 4ml of 10% formal water in screw-cap tube. About 3-4 ml of 10% formal water was further added and shaken to mix very well. Therefore, the sample was sieved and the suspension was collected in a beaker. The suspension was transferred to a centrifuge tube and about 4ml of diethyl ether was added. The tube was stoppered and mixed for 1 minute. The stopper was loosened and the sample was centrifuged immediately at 3000 rpm for 1 minute. Thereafter, the ether, faecal debris and formol water was discarded, leaving the sediment. The sediment was transferred to a grease-free microscopic slide and examined microscopically with the use of 10X and 40X objectives respectively. The recovered helminthes were identified using Atlas by Cheesbrough [15] and that of Arora and Arora [16].

**Statistical Analysis**

Results were expresses in percentage and proportions, using descriptive statistics.

**RESULTS****TABLE 1: School by school prevalence of intestinal helminthiasis**

Schools	Number Examined	Number Infected	Prevalence (%)
Community Primary School Okposi Umuoghrara	52	26	50.00
Udude Primary School Umuoghrara	48	18	37.50
Community Primary School ,Omege Umuezekoha	50	23	46.00
Central Primary School Umuezekoha	52	22	42.30
Total	202	89	44.06

**TABLE 2: Age and gender prevalence of intestinal helminthiasis**

Age	Male			Female		
	No. Examined	No. Infected	Prevalence (%)	No. Examined	No. Infected	Prevalence (%)
7-9	40	22	55.00	35	17	48.57
10-12	35	18	51.43	30	12	40.00
13-15	30	11	36.67	32	9	28.13
Total	105	51	48.57	97	38	39.18

**TABLE 3: Prevalence of intestinal helminthiasis with respect to toilet facilities**

Toilet Facility	No. Examined	No. Infected	Prevalence (%)
Bush	137	74	54.01
Pit	46	13	28.26
Water System	19	2	10.53
Total	202	89	44.06

**TABLE 4: Prevalence of intestinal helminthiasis with respect to parental occupation**

Occupation	No. Examined	No. Infected	Prevalence (%)
Civil servant	27	4	14.82
Petty trading	36	14	38.89
Farming	88	50	56.82
Labourer	51	21	41.18
Total	202	89	

## DISCUSSION

Two hundred and two (202) school children that fall within the age bracket of 7-15 years, who were selected from primary schools from the communities of Umuoghara and Umuezekoha, were used from the study. Fifty two (52) were selected from Community Primary School, Okposi Umuoghara, 48 from Udude Primary School Umughara, 50 from Community Primary School Omege-Umuezekoha while 52 were from Central Primary School Umuezekoha.

The recorded parameters were *A. lumbricoides*, *S. stercularis*, hookworm and *T. trichiuria*. Among four studied schools, Community Primary School Okposi Umuoghara were infected most with a prevalence of 50%. This was followed by Community Primary School, Omege Umuezekoha, with a prevalence of 46% while Udude Primary School Umuoghara had the least prevalence of 37% (Table 1). The variations in levels of prevalence among the schools could be attributed to levels of sanitary premises and the socio-economic differences among the pupils. Hence Ali et al. [17] reported that measures should be adopted to monitor, control or prevent this tendency of parasites and/or their eggs/cysts from invasion of the body system. The obvious preventive measures would include: the improvement of general standards of sanitation through the installation of suitable sewage treatment and disposal facilities, and provision of pipe-borne water supply as pre-requisites for successful prevention and control.

When the prevalence of infection was considered based on the age of the pupils (Table 2), it was observed to be decreasing with advancement in age. Pupils within the age bracket of 7-9 years were infected most with prevalence of 55% and 48.57% for male and female pupils respectively. This was followed by prevalence of 51.43% and 40.00% among males and females respectively for age group 10-12 years. Least prevalence of 36.67% and 28.13% was recorded for males and females respectively for age group 13-15 years. The finding of this work is in line with those of Widjana and Sutisna [11], and Ndamukong et al. [18], who reported that the worm burden of the recovered parasites decreased as children got older. However, the finding disagrees with those of Dada-Adegbola et al. [14] and Chukwu et al. [10], who reported that the prevalence of *Ascaris lumbricoides* significantly increased with increase in age. In the same Beaver [19] reported that though all ages can be infected, but infected is more common among children than in adults. As a rule, children carry the heaviest worm and egg burdens also because of their defecation practices, they are principal disseminators of infection. This should be worrisome to the public because a range of studies has shown that iron deficiency can undermined the growth, appetite and physical fitness of children and may impair their educational performance [20].

There is a general picture of high prevalence of low haematocrit value among the students in the study area. Finding in this study shows that prevalence rate of hookworm infection is inversely related to blood level in the children. Subsequently, this work also does not correlate with the work of Adeyeba and Tijani [21].

More males, 51 out of 105 with prevalence of 48.57% than females, 38 out of 97 with prevalence of 39.18% were infected. The finding is in concordance with that of Chukwu et al. [10], who reported a higher prevalence of *Ascaris lumbricoides* among males than in females. This work is in disagreement with the work of Odebunmi et al. [22], who reported that the prevalence of hookworm infection is higher in females (6.5%) than in males (1.9%). And female subjects culturally engage in farming activities more than male counterpart in their study area. This practice of course render female more vulnerable to infection as the surrounding ground may have turned nursery for parasite. Also, the finding of this work disagrees with that of Ndamukong et al. [18].

The prevalence of infestation with respect to toilet facility in use shows that those who defecate in the bush had the highest prevalence of 54.01% whereas the least prevalence (10.53%) was recorded among the users of water system (Table 3). This could have resulted from infestation transmission through larval penetration of the feet as most of the children are known for walking bare-footed in the bush as they seek places to defecate. Most of the geohelminth

infestations might have occurred from touching the ground, and piercing and eating contaminated edibles from the bush soil.

The prevalence of infestation with respect to parental occupation was found to be highest (56.8%) among children whose parents were civil servants (14.82%). The highest prevalence recorded among children whose parents are farmers could be as a result of the fact that the children go to farm with their parents, where they play around with barefoot and eat indiscriminately anything they could find on the farm, including raw and unwashed fruits and vegetables.

The finding has established that there is high prevalence of intestinal helminthiasis in the study area. Age, gender, poor toilet facilities, and parental occupation have been identified to encourage helminthiasis. Therefore, health education and public awareness, chemotherapy (deworming) is highly advocated.

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