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Helminthiasis among Rural School Children of Amofia-Ngbo Community in Ebonyi State, Nigeria

Ani O. C.[1], Nnamonu E. I[2]. And Onwe S. O.[1]
[1] *Parasitology Research Unit, Department of Biological Sciences, Ebonyi State University, Abakaliki.*
[2]*Physiology Unit, Department of Zoology and Environmental Biology, University of Nigeria, Nsukka.*

Abstract: *Helminth related infections are stillprevalent among many communities in the tropics. Hence ,this study was carried out to find out the rate of infestation, prevalence and associated risk factors of soil transmitted helminthes among rural school children in Amoffia community in Ohaukwu Local Government Area of Ebonyi State, Nigeria. Cross sectional design was carried out among one hundred and fifty (150) pupils randomly selected from the target community and grouped into two groups (A and B). Group A comprised 75 treated individuals while group B comprised 75 untreated ones. Demographic information was obtained through a designed questionnaire that was completed by the pupils' parents.Stool sampleswere also collected and examined microscopically for eggs, larvae and adult of helminthes. The overall prevalence of infection was 34.0%.Hookworms accounted for35.7% and 32.7% in groups A and B respectively, Ascarislumbricoides (14.3%) and (28.9%), Schistosomamansoni (21.4%) and (5.8%)and Trichuristrichiura (7.1%) and (1.9%) in groups A and B respectively. None of the respondents had access to pipe borne water. The result showed that prevalence of helminthes among the school children in Amoffia community is quite high and could be of public health importance.There is therefore the need to deworm these children while clean and potable water should be made common commodity in rural communities.*

Keywords: *Helminthes, Ascarislumbricoides, Hookworms, Schistosomamansoni,, Trichuristrichiura, Infection, Prevalence*

I. Introduction

Intestinal helminth infections have harmful effects on the physical and mental development in deficiently nourished community populations (Damenet al., 2010). The population mostly at risk is school-aged children, who may suffer nutritional deficits, cognitive impairment, serious illness, and occasional deaths from complications of helminthes infections. Nigerian children in villages areto a great extent unprotected to parasitic infections almost through the whole of their lifetimes (Cowper, 1966). In rural and urban environments, water used for drinking and domestic purposes, food and vegetables, the soil, and insect bites are all sources of parasitic infection (Cowper, 1966).Thus, the risk of an individual suffering geohelminthes related morbidity appears to be a joint function of the species harboured, the intensity of infestation and /or the virulence of species (Flores et al., 2001). The public health impact of helminthes infection has consistently been under-estimated because diseased condition mostly manifest at chronic stage. Diseased states have also been reported to manifest earlier, where there are factors in the host that compromise the ability of the host to fight infection (Hotezet al., 2007).The growing body of literature has identified different risk factors that perpetuate the existence of helminthes in the communities, and these are individual, household, cultural and environmental factors (Curtaleet al., 2000).Generally, rural areas are expected to have higher worm load, than the urban areas because of the preponderance factors (poverty, poor environmental hygiene, and complete absence of municipal services) that perpetuate continual existence of the worms (Ejezie, 1983). Local studies have shown prevalence of helminthes in children in rural areas to be in range of 30-74% (Meremikwuet al., 1995), while studies focusing on urban areas are mostly hospital-based with prevalence ranging from 15-30 % (Igbogboja andIkeh 1997).There is a need to continuously assess the level of success achieved by government in the implementation of on-going National Primary Health care policy in the community and the State at large.Therefore, this research was focused on the prevalence study on the incidence of helminthes among rural school children.

II. Materials And Methods

Study area

The study was carried out in Amoffia Community in Ohaukwu Local Government Area of Ebonyi State, Nigeria, between November and December 2014. Based on 2006 population census, the area has an estimated population of 800,000 people and has a temperate- like climate with captivating hill surrounding it. The community is made-up of about fifteen villagesconsisting many families. Each of the family comprised of about 9 to 12 individuals.

Ethical Consideration

Prior to beginning of the study, authorization was sought from the school authorities and the parents of the pupils were informed about the study and asked to consent to their children's participation. The pupils were encouraged with some edible materials and provisions to treat the infected pupils withantihelminth drugs were made.

Procedure

Faecal specimens were collected from 150 randomly selected school children. The pupils were grouped into two (A and B) groups.Group A comprised of 75 children selected at random from alleconomic class levels. They were given a single dose of Combantrin (Anthelminthic), and after one month, they were given clean, dry, wide-mouth transparent containers and thought how to collect their stool specimens for investigation. Group B comprised of 75 children who did not take any anti-helminthic drug, either at home or at school, within the period of the study. Demographicinformation was obtained through a designed questionnaire that was completed by the pupils' parents. Each stool sample was examined macroscopically and prepared for microscopic examination using the formol-ether concentration method by Allen and Ridley (2001). Preparations were subsequently examined for intestinal helminthes eggs and larvae using X10 and X40 objectives in the Applied Biology Department Laboratory, Ebonyi State University, Abakaliki. The results of both groups (A and B) were subsequently compared.

Statistical Analysis

Epi Info Statistical Software version 2002 was used to analyze the data obtained. Comparative analysis of the results was done using two-tailed Chi-square test (χ^2) and P-value of 0.009 was considered significant.

III. Results

Stool samples from the Group A and Group B were examined and 11(7.3%) and 40(26.7%) were positive for soil transmitted helminthesrespectively, making a total of 51 positive samples and an overall prevalence of 34.0% (Table 1). The de-worm difference in group A and B was not statistically significant (P>0.05).

Table 1.Prevalence ofhelminthesinfections among rural school children in Amoffia, Ohaukwu, Ebonyi State.

Group	Number examined	Number of occurrence	Prevalence (%)
A	75	11	7.3
B	75	40	26.7
	150	51	34.0

$\chi^2 = 71.814$ P<0.05

Based on age, the prevalence in Group A was highest between 6-10 years old and lowest between 16-20 years old pupils in the ratio of 12.0% and 2.7% respectively while in Group B, the prevalence was also highest between 6-10 years old and lowest among 16- 20 year old pupils in the ratio of 33.3% and 6.7%respectively (Table 2).

Table 2.The prevalence of helminth infections in relation to subjects' age

Age (years)	GROUP A Number examined	Number of occurrence (%)	GROUP B Number examined	Number of occurrence (%)
1-5	25	5(20)	21	12(28.0)
6-10	28	9(32.14)	24	19(33.3)
11-15	17	6(35.29)	24	15(32.0)
16-20	5	2(40)	6	3(6.7)
Total	75	22(29.33)	75	

$\chi^2 = 1.714$

Based on sex, the prevalence of soil transmitted helminthes in both groups was higher in males (15.0% and 52.9% in groups A and B) respectivelywhile the prevalence was lower in female (8.6% and 34.2% in groups A and B) respectively. Thus, total prevalencefor males and females were 23.6% in group A and 87.1% in group B (Table 3).

Table 3. Prevalence of helminth infections in relation tosubjects' gender.

Gender	Group A Number examined	Number positive (%)	Group B Number examined	Number positive (%)
Male	40	6(15.0)	34	18(52.9)
Female	35	3(8.6)	41	14(34.2)
Total	75	9(23.6)	75	32(87.1)

In order of prevalence, the type of helminthes encountered in group A and B are shown in Table 4.

Table 4.Prevalence of varioushelminth infections in dewormed and non-dewormed children.

	Group A	**Group B**
Parasites	Numbers of occurrence (%)	Numbers of occurrence (%)
Hookworms	5(35.7)	17(32.7)
Ascarislumbricoides	2(14.3)	15(28.9)
Schistosomamansoni	3(21.4)	3(5.8)
Strongyloidesstercoralis	2(14.)	9(17.3)
Trichiuristrichura	1(7.1)	7(13.5)
Taenia species	1(7.1)	1(1.9)
Total	14(18.7)	52(69.3)

More so, multiple parasitic infections occurred in different age groups within the two major subject groups A and B. This polyparasitism is shown in Table 5

Table 5.Frequency of polyparasitismamong different age groups.

	Group A		Group B	
Age (years)	Number examined	Number with multiple infections (%)	Number examined	Number with multiple infections (%)
1-5	25	1(4.0)	21	4(19.0)
6-10	28	2(7.1)	25	6(24.0)
11-15	17	1(5.9)	24	3(12.5)
16-20	5	0(0.0)	5	1(20.0)
Total	75	4(5.3)	75	14(17.3)

IV. Discussion

The results of this study showed an overall prevalence of 34.0% of soil transmitted helminthes infection in the rural school children studied (Table 1). This finding is comparable with the results of previous studies ofSimon-Oke et al., (2014) whorecorded 48.9% and Aniet al., (2014) that recorded 39.7%in their separate studies at the western and southern zones of Nigeria whileDamenet al.,(2011), recordeda higher rate of (80.9%) in their study of the prevalence of intestinal parasitism among the Almajiris. The reason for this relatively higher rate in the latter is akin to the feeding habit and very low lifestyle of the selected subjects. In general,these findings are corroborative in the prevalence ofhelminthiasis –a major problem in Nigeria, and a part of neglected tropical infections (NTI's).Group A rural school children had a prevalence of 7.3% on intestinal helminthes. This might be due to the fact that the area of study is rural and endemic for soil transmitted helminthes (Damenet al., 2010). Hence, the helminthes found in this group, most likely, occurred out of re-infection after treatment. These findings are in agreement with other studies, including that ofEjezie (1983).The factors responsible for high prevalence in this study could include insufficient health education, lack of toilet facilities, lack of environmental sanitation, andutter absence of pipe-borne water in the study area where complete dependence on ponds, rivers and well water asmain sources of drinking water prevail.There was a significant difference between the prevalence of soil transmitted helminthes in group A and group B ($P<0.05$)

Furthermore, the age group of 6-10 years in study group B recorded the highest prevalence of 24.0%, which is similar to the findings of Brooker(2010), but differ from those of Meremikwuet al., (1995). In group A, the same age group had 7.1% prevalence, which is in accordance with a previous study of which the lowest prevalence was recorded in the age group 16-20 years old, and this could be associated with a higher level of awareness on the values of personal hygiene.There was a significant difference between male and female prevalence in group A ($P<0.05$). This finding is similar to those of Salako(2001). The finding is the same with residents in group B which is similar to the findings of Flores et al., (2001) and Knoppet al., (2008), who reported significant differences in the prevalence of intestinal helminthes in their studies.

Hookworm had a prevalence of 35.7% and 32.7% in groups A and B respectively. These findings are higher compared with the prevalence of hookworm recorded by Meremikwuet al(1995), 23.1%, Ani and Umerah (2008), 17.50% and Flores et al., (2001), who reported 14.7% and 28.9% in group A and B respectively. These findings were higher compared with the results of Salako(2001), probably because the later was carried out in an urban setting. Strongyloidesstercoralishad a prevalence of 14.3% and 17.3% in groups A and B respectively. This is higher than the 11.4% prevalence recorded by Flores et al., (2001)but lower than the 27.5% and 25.5% prevalence recorded by Knoppet al.,(2008) and Uhuo et al., (2011) respectively.

The prevalence of SchistosomamansoniandTaeniaspeciesin both groups were similar, and this confirmed the fact that the anti-helminthes administered had no effect on trematodes and cestodes. This study also recorded multiple infections as reported by previous studies (Flores et al., (2001)and Knoppet al., (2008). Hence, multiple infections appear to be a norm in some Nigerian communities. This may be that an already established parasite's activities may create an environment within the host that will be suitable for other parasites (Knoppet al., 2008).

V. Conclusion

The prevalence of soil transmitted helminthes among rural school children in this study is similar within the National average of 14.30%. The determinants of infection in both group A and B are plausibly age, sex, level of education and type of toilet facilities. This research shows that there is no provision of adequate sanitation and sewage facilities in the study area. Also, the teaching of health and hygiene are not given adequate attention in the rural primary and secondary schools pupils in the study area.Soil transmitted helminthes infections will remain a worldwide public health threat as long as poverty persists in the developing world.

VI. Recommendations

Large-scale de-worming is necessary to reduce the morbidity due to this infection. However, the lack of improved water supplies and sanitation impede the reliability of this approach for sustainable reductions in the frequency and intensity of infection. There is also need for integrated central approaches complementing preventive chemotherapy with information, education and communication (IEC) strategies and sanitation improvement in order to prevent helminthic infections. Clean and potable water should be made common commodity in rural communities.

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