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Letter to the Editor

A Cross-Sectional Study of *Ascaris lumbricoides* Infection in a Rural Community in Ebonyi State, Nigeria: Prevalence and Risk Factors

***Ogochukwu CAROLINE OKEKE [1], Patience OBIAGELI UBACHUKWU [1, 2]**

1. *Dept. of Biology/Microbiology/Biotechnology, Faculty of Science and Technology, Federal University Ndufu-Alike, Ikwo, Ebonyi State, Nigeria*
2. *Dept. of Zoology and Environmental Biology, Faculty of Biological Sciences, University of Nigeria, Nsukka, Enugu State, Nigeria*

***Corresponding Author:** Email: okeke.ogochukwucarol@gmail.com

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Dear Editor-in-Chief

Ascaris lumbricoides infection is a common soil-transmitted helminth prevalent in Nigeria. The World Health Organization (WHO) recommends baseline survey of schoolchildren in countries with high prevalence of neglected tropical diseases to determine their prevalence and intensity, with the objective of initiating control programs from results obtained (1). Nigeria Cement Factory community (NigerCem) is a rural community in Nkalagu, Ishielu Local Government Area of Ebonyi State. The community is endemic for urinary schistosomiasis (2). Baseline surveys on urinary schistosomiasis in the area have brought in targeted treatment for this disease. However, mass drug administration for soil-transmitted helminth infections like *A. lumbricoides* infection is being neglected. To create awareness on the need of combination deworming, which involves mass drug administration for ascariasis alongside the ongoing schistosomiasis treatment, stool samples of primary school children between the ages of 5-15 years were collected in clean specimen bottles. Samples were examined for *A. lumbricoides* eggs using Kato-Katz method. Structured questionnaire was also given to each child to provide information on personal bio-data, occupation of parents, number sleeping in a room, history of anthelminthic treatment, access to safe water source, and hygiene and sanitary practices. Results were subjected to chi-square test to ascertain significant differences in prevalence of infection between groups and logistic regression was performed to determine risk factors. All infected children were given mebendazole tablets (Cadila pharmaceuticals, Dholka, India).

Specimen bottles were shared to 286 children but only 212 children (mean age of 11.22$\pm$0.15 years) returned bottles containing stool. Of the 212 children, 45.8% (n=97) and 54.2% (n=115) were males and females, respectively. Children $\leq$10yrs were 33.5% of the population (n=71) while those >10yrs accounted for 66.5% (n=141). Prevalence of ascariasis was 76.2% (n=162), with 23.5% and 76.5% of the children having light and moderate-heavy intensities, respectively. Other soil-transmitted helminths encountered were hookworm (25.5%, n=54), *Trichuris trichiura* (4.2%, n=9) and *Strongyloides stercoralis* (3.3%, n=7). As shown in Table 1, females (79.1%) had slightly higher prevalence of *A. lumbricoides* infection than males (73.2%) but the difference was not statistically significant (P=0.333). Although younger children

had higher prevalence than older children did, prevalence of infection was not significantly associated with age (*P*=0.059). Children whose parents were farmers had significantly higher prevalence of the infection than children whose parents were not farmers (*P*=0.042). Children sleeping in a room of >6 persons had significantly higher prevalence of ascariasis than those sleeping in a room of <6 (*P*=0.028). Water source, sanitary system and practices were not significantly associated with *A. lumbricoides* infection (*P*>0.05). Univariate logistic regression analysis showed that farming as occupation of parents and number of persons sleeping in a room played significant roles in the prevalence of ascariasis (Table 1). However, after adjusting for other variables in the multivariate logistic regression, three variables, which were age, farming as occupation of parents and number of persons in a room, emerged as risk factors of ascariasis in the community (Table 2).

Table 1: Prevalence of *A. lumbricoides* among NigerCem school children and its associating risk factors as determined by univariate logistic regression

Variables		Prevalence	Univariate logistic regression		
	Number examined	Number positive (%)	Odds ratio	95% CI	*P* value‡
Overall	212	162 (76.2)			
Sex					
Male	97	71 (73.2)	1.388	0.735-2.622	0.312
Female	115	91 (79.1)	1		
P value†		0.333			
Age (years)					
≤ 10	71	60 (84.5)	2.086	0.994-4.377	0.052
> 10	141	102 (72.3)	1		
P value†		0.059			
Parents occupation					
Farmers	137	111 (81.0)	2.009	1.053-3.834	0.034*
Not farmers	75	51 (68.0)	1		
P value†		0.042			
Number sleeping in a room					
<6	157	114 (72.6)	1		
>6	55	48 (87.3)	2.586	1.087-6.156	0.032*
P value†		0.028			
Water source					
Stream	183	140 (76.5)	1.050	0.418-2.638	0.917
Borehole	29	22 (75.9)	1		
P value		0.940			
Sanitary system					
Water closet	28	20 (71.4)	1		
Pit	117	91 (77.8)	1.40	0.553-3.543	0.478
Bush	67	51 (76.1)	1.275		0.638
P value†		0.775			
Sanitary practice (Hand washing)					
Yes	178	133 (74.4)	1		
No	34	29 (85.3)	1.962	0.717-5.374	0.190
P value†		0.269			

CI= confidence interval/† *P* value as determined by Chi-square test/‡ *P* value as determined by logistic regression

Table 2: Multivariate analysis for risk factors of *A. lumbricoides* infection among NigerCem school children, Ebonyi State

Variables	Odds Ratio	95% CI	*P* value
Age (≤10 yr)	2.517	1.169-5.420	0.018
Parents Occupation (Farming)	2.136	1.087- 4.196	0.028
Number sleeping in a room	2.567	1.062- 6.205	0.036

CI= confidence interval

The high prevalence of ascariasis in this study (76.9%) reveals that there is high transmission of *A. lumbricoides* ova among schoolchildren. This high prevalence of infection may be due to the parasite's direct mode of infection and high resistance of its infective ova to desiccation (3). It may also be attributed to absence of anthelminthic treatment in the community. Furthermore, because of the established relationship between high prevalence and high worm burden, there is every possibility that children in this community may suffer from deleterious morbidity conditions due to parasite such as appendicitis, haemorrhagic infarctions, perforation of intestine and intestinal obstructive bolus. The lack of association between sex and *Ascaris* prevalence implies that both sexes have similar propensity to ingest *A. lumbricoides* ova while higher prevalence of infection in children $\leq$ 10yrs suggests increased contact with soil infested with parasite ova. The significantly higher prevalence of infection in children whose parents are farmers could be linked to poor sanitary condition of the farm and frequent contact with polluted soils on the farm. When more than six persons sleep in a room, higher prevalence of ascariasis was recorded. There is evidence that transmission is promoted when there is close contact between infected and susceptible individuals due to indiscriminate defecation around dwelling places (4). Contrary to some published reports; source of water, sanitary system and sanitary practice were not associated with ascariasis in this study. Age, farming as occupation of parents and number of persons sleeping in a room are contributors to the high prevalence of *A. lumbricoides* in the community. These risk factors have been identified in other studies (5, 6) and they are tied to low socioeconomic status of individuals.

In conclusion, the high prevalence of *A. lumbricoides* infection calls for immediate control action of mass drug administration bearing in mind that control will be effective when living conditions of individuals in this community are improved.

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