

Intestinal Helminthiasis in Children in Nsukka Local Government Area, Enugu State, Nigeria

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Abstract

A survey of intestinal helminthiasis in children aged 0-5 years was conducted in Nsukka L.G.A of Enugu State, Southeastern Nigeria in 2017. A total of three hundred children were randomly sampled from five communities of the L.G.A using lottery method. The communities include Obukpa, Alor-Uno, Edem-Ani, Okpuje and Ibagwa-Ani. Stool samples were collected from three hundred children in wide-mouthed plastic bottles and three helminth parasites *Ascaris lumbricoides*, *Trichuris trichiura*, and *Ancylostoma duodenale* were recovered using formal-ether concentration method while anal swab method was used to isolate *Enterobius vermicularis*. Out of the total number of children examined for intestinal helminth infections, 82 (27.33%) were infected. Male children had higher (28.29%) prevalence than the females (26.35%) even though the difference was not statistically significant. The highest (35.0%) prevalence of infection was observed in children aged 4 - 5 years followed by children of age group 2 - 3 years old (26.02%) while the least (14.04%) infection was noted among children of one year old and below. Also age and community related intensities were observed. Children of ages 4 - 5 years had higher intensities in all the communities sampled with Edem-Ani recording as high as 8.3 ± 4.3 . The least intensity 3.5 ± 0.7 was found in Okpuje community. *Ascaris lumbricoides* had the highest (10.67%) prevalence in all the communities studied. Co-infections of *A. lumbricoides* and *E. vermicularis* and *A. lumbricoides* with *T. trichiura* were observed in children of age group 4 - 5 years. This study showed a moderately high prevalence of intestinal helminth infections in the area. Control strategies that would prevent spread of intestinal helminthiasis were discussed.

Keywords: Intestinal Helminthes; Prevalence; Intensity; Children; Nsukka L.G.A

Introduction

Intestinal helminths are among the most prevalent parasitic worms infecting humans in many regions of the world. It had been estimated that about 3 billion people globally are infected with helminths and another 1.5 billion infected with soil transmitted helminths. Children are recognized as the most vulnerable group to intestinal helminth infections particularly those dwelling in poor rural and deprived communities of tropical and sub tropical regions of the world. Huge numbers of pre-school age and school age children are among the inhabitants of these regions where intestinal helminthes are intensively transmitted [1]. According to they are the group most responsible for contaminating the environment and transmitting these helminth infections. Poor nutritional status, walking barefooted and poor personal hygiene are among the factors aggravating intestinal helminthiasis. Despite the various studies on helminth parasitic infections in Nigeria like the works of Chigozie, et al. [2], Ekundayo, et al. [3], Ekpenyong & Eye [4], Shehu, et al. [5], Thomas, et al. [6], Ojuronbe, et al. [7]. There are still pockets of rural communities having these diseases that need to be studied hence this survey aimed at identifying the intestinal helminth parasites, determining the prevalence and intensities of infection in children of some rural communities of Nsukka LGA Enugu State Nigeria.

Methodology

Stool samples were collected from three hundred children within age 0 - 5 years in five rural communities of Nsukka Local Government Area selected randomly using lottery method. Quantification of helminth ova was done using formal-ether concentration method while anal swab using transparent adhesive tape was employed for collection of *E. vermicularis* eggs. Light microscopy at 10x

and 40x magnifications were used for identification of helminths ova.

Results

Four species of intestinal nematodes which comprised of *Ascaris lumbricoides*, *Trichuris trichiura*, *Enterobius vermicularis* and hookworms were recovered. Overall prevalence of infection revealed that 82 (27.33%) individuals were infected. The highest prevalence of infection (33.3%) was observed in children from Edem Ani community followed by Ibeagwa Ani community (30.0%) while the least infection was recorded in Okpuje community (21.67%) (Table 1).

Community	Number Examined	Number Infected	Prevalence (%)
Obukpa	60	14	23.33
Edem Ani	60	20	33.33
Alor Uno	60	17	28.33
Ibeagwa Ani	60	18	30
Okpuje	60	13	21.67
Total	300	82	27.33
		$\chi^2 = 2.786$	P-value = 0.5943

Significance difference (P<0.05)

Table 1: Overall prevalence of intestinal helminths in children in Nsukka L.G.A.

Sex prevalence revealed that male children were more infected with intestinal helminth parasites than the females (Table 2). Out of the 152 males and 148 females examined, 43 (28.29%) and 39 (26.35%) prevalence respectively were observed. Though this difference was not statistically significant P>0.05. The highest infection prevalence 17 (11.18%) and 15 (10.14%) for both males and females respectively were with *A. lumbricoides* while the least 6 (3.95%) male and 3 (2.03%) female was with *E. vermicularis*.

Sex	Number Examined	Number infected	<i>A. lumbricoides</i>	<i>T. trichiura</i>	<i>E. vermicularis</i>	Hookworms	Co-infection
Male	152	43 (28.29)	17 (11.18)	12 (7.89)	6 (3.95)	8 (5.26)	6 (3.95)
Female	148	39 (26.35)	15 (10.14)	13 (8.78)	3 (2.03)	8 (5.41)	5 (3.38)
Total	300	82 (27.33)	32 (10.67)	25 (8.33)	9 (3.00)	16 (5.33)	11 (3.67)
χ^2		0.142	0.087	0.078	0.95	0.003	0.069
P-value		0.7065	0.7685	0.7806	0.3297	0.9563	0.7932

Significance difference (P<0.05)

Table 2: Sex prevalence of intestinal helminth infections among children in Nsukka L.G.A.

Table 3 showed the distribution of intestinal helminth parasites among the communities in Nsukka L.G.A. Children from the Edem Ani and Ibeagwa Ani

communities had the same and highest prevalence (11.67%) respectively for *Ascaris* infection. The same prevalence percentage (11.67%) was observed in

children from Alor Uno for *T. trichiura*. Hookworm infection was absent in Okpuje community and only in

Edem Ani community was co-infection with *Ascaris* and *Enterobius* observed.

Community n=60	<i>Ascaris lumbricoides</i>	<i>Trichuris trichiura</i>	<i>Enterobius vermicularis</i>	Hookworm infections	<i>Ascaris + Enterobius</i>	<i>Ascaris + Trichuris</i>
Obukpa	6 (10.00)	4 (6.67)	2 (3.33)	2 (3.33)	0 (0.0)	3 (5.0)
Edem Ani	7 (11.67)	5 (8.33)	1 (1.67)	7 (8.33)	2 (3.33)	0 (0.0)
Alor Uno	6 (10.00)	7 (11.67)	1 (1.67)	3 (5.00)	0 (0.0)	2 (3.33)
Ibeagwa Ani	7 (11.67)	5 (8.33)	2 (3.33)	4 (6.67)	0 (0.0)	3 (5.0)
Okpuje	6 (10.00)	4 (6.67)	3 (5.00)	0 (0.0)	0 (0.0)	1 (1.67)
Total	32 (10.67)	25 (8.33)	9 (3.00)	16 (5.33)	2 (0.67)	9 (3.00)
χ^2	0.21	1.309	1.604	8.847	8.054	3.895
P-value	0.9949	0.8598	0.8081	0.065	0.0896	0.4205

Significance difference (P<0.05)

Table 3: Distribution of intestinal helminth parasites among children in communities studied.

Age related prevalence of internal helminthes in the children studied showed that children in age group 4 - 5 years had the highest prevalence (14.17%) of infection for *A. lumbricoides*, 10.0% for *T. trichiura* and 6.67% for

hookworm infections. The least overall prevalence of infections (14.04%) was observed in age group 0 - 1 year and mixed infection was entirely absent among children in this group (Table 4).

Age (Years)	Number Examined	Number Infected	<i>Ascaris lumbricoides</i>	<i>Trichuris trichiura</i>	<i>Enterobius vermicularis</i>	Hookworm infections	<i>Ascaris + Enterobius</i>	<i>Ascaris + Trichuris</i>
0 - 1	57	8 (14.04)	3 (5.26)	3 (5.26)	0 (0.0)	2 (3.51)	0 (0.0)	0 (0.0)
2 - 3	123	32 (26.02)	12 (9.76)	10 (8.13)	4 (3.25)	6 (4.88)	2 (1.63)	2 (1.63)
4 - 5	120	42 (35.0)	17 (14.17)	12 (10.0)	5 (4.17)	8 (6.67)	0 (0.0)	4 (3.33)
Total	300	82(27.33)	32 (10.67)	25 (8.33)	9 (3.00)	16 (5.33)	2 (0.67)	6 (2.00)
χ^2		8.734	3.396	1.146	2.351	5.508	2.897	2.337
P-value		0.0127	0.183	0.5637	0.3087	0.0637	0.2349	0.3104

Significance difference (P<0.05)

Table 4: Age prevalence of intestinal helminth infections in children age 0 - 5 years in Nsukka L.G.A.

The overall mean intensity of intestinal helminth infections revealed that children of ages 4 - 5 years had the highest mean intensities in all the communities studied. The highest mean intensities of 8.3 ± 4.3 and 7.3 ± 3.9 for *A. lumbricoides* and *T. trichiura* respectively were recorded in Edem Ani community. These were followed by ages 2 - 3 years, 6.5 ± 0.8 and 5.3 ± 3.0 for both

parasites respectively. Obukpa community had the least intensities for hookworm infections in all the ages groups (Table 5). No infection with *E. vermicularis* was observed among the children age 0 - 1 year in the communities except Okpuje community; and in Edem Ani community, only in age group 2 - 3 years was *E. vermicularis* infection observed.

Community (Years)	<i>Ascaris lumbricoides</i>			<i>Tricuris trichiura</i>			<i>Enterobius vermicularis</i>			Hookworm		
	0 - 1	2 - 3	4 - 5	0 - 1	2 - 3	4 - 5	0 - 1	2 - 3	4 - 5	0 - 1	2 - 3	4 - 5
Obukpa	2.5±0.7	4.0±3.2	6.3±3.2	3.3±1.0	3.6±0.5	5.2±3.0	0.0±0.0	1.0±0.0	2.0±0.0	0.0±0.0	1.0±0.0	2.0±0.0
Edem Ani	2.7±0.6	6.5±0.8	8.3±4.3	1.5±0.7	5.3±3.0	7.3±3.9	0.0±0.0	2.0±0.0	0.0±0.0	1.0±0.0	2.7±1.2	3.5±0.7
Alor Uno	1.0±0.0	3.0±1.2	5.3±0.7	1.0±0.0	3.0±1.0	5.6±4.5	0.0±0.0	0.0±0.0	1.5±0.7	0.0±0.0	4.0±1.0	5.6±4.5
Ibeagwa Ani	2.0±1.0	3.5±0.7	5.7±2.5	1.5±0.3	2.7±0.6	6.3±3.2	0.0±0.0	3.5±0.7	2.5±0.6	2.0±0.7	3.5±0.8	5.0±4.3
Okpuje	2.5±0.6	6.3±1.5	6.5±1.2	2.0±0.0	3.0±0.0	4.0±1.0	2.0±0.0	1.5±0.6	1.5±0.6	0.0±0.0	2.0±0.7	3.5±0.7

All values expressed as mean \pm standard error mean (\pm SEM)

Table 5: Overall mean intensity of intestinal helminth infections in children by age and community.

Discussion

From the results of the study, it was obvious that a moderately high prevalence of intestinal helminth infections existed among children age 0 - 5 years in Nsukka LGA of Enugu State. The parasites recovered from the study groups were similar to those documented [8,9]. *Enterobius vermicularis* infection observed in this work conformed to the findings of Otu-Bassey, et al. [10]. That worked on school children in Calabar, Nigeria and recorded prevalence of 7.5%. Also, prevalence was higher (11.7%) in area of high population density than area with low population density (3.3%). The result also showed that there were differences in the prevalence of infections among the communities. The overall high prevalence of infection recorded in Edem Ani community could be attributed to high population density of the community coupled with very poor hygienic conditions of the environment. Proper sewage and refuse disposal were grossly neglected in the community. Differences in prevalence of infection also existed among the ages studied. Children of 0 - 1 year had the least (14.04%) prevalence while those in ages 4 - 5 years had higher (35.04%). This disagrees with the findings of Odu, et al. [11]. Who reported that prevalence of intestinal helminth infections are not age dependent [6].

Also reported low prevalence of helminth infections in younger children while older school age children had higher infection rates. This was attributed to exposure to unhealthy environments normally seen in poor rural communities of sub-Saharan Africa including Nigeria. Older children are more exposed as they are usually allowed by parents to freely move around in their surroundings often bare footed coupled with their poor hygienic eating and playing habits. *Ascaris lumbricoides* was the most common helminth parasite encountered in the study and had the highest prevalence (10.67%) and intensity (8.3±4.3) among the communities and age groups respectively. This corroborated the findings of Ekpenyong & Eyo [4]. Who worked with school children in Igbo-Eze south LGA, Enugu State, Nigeria [5].

Also reported the same high prevalence of *A. lumbricoides* infection (32.33%) in school children in Zamfara State, Nigeria. *Trichuris trichiura* and hookworm infections were also observed in this study. These infections as observed from previous works of Obiukwu, et al. [12,10]. Could be as a result of these children handling faecal polluted soil and walking barefooted within the environment. It was noted that most families in the study area do not have good toilet facilities. They defecated in nearby bushes and fallow farm lands. High prevalence of hookworm infection in school children was

also reported [2]. The Eastern Nigeria where inhabitants of the communities pass excreta in surrounding bushes.

Reports from this present work showed co-infections of intestinal helminth parasites among the children studied. Multiple infections with *A. lumbricoides* and *T. trichiura* and Hookworms were also documented in the works of Mordi, et al. [13]. There were no statistical differences in infection of male and female children ($P \geq 0.05$). This finding deviated from the reports of Mordi, et al. [13]. Who observed higher prevalence in males than females pointing out that this may be as a result of the male children being more actively involved in outdoor activities which enhanced greater exposure to infected soil.

Infections with helminth parasites no doubt, have debilitating effects on children such as reduction in cognitive development, mental retardation, general body weakness [14]. It is obvious that from the findings of this study, there is great need for provision of basic social amenities and public enlightenment programs for the inhabitants of the study area. Children should be taught to observe basic personal hygiene practices and the consequences of walking bare footed or indiscriminate passing of excreta in the environment.

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