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Prevalence of Intestinal Parasitic Infections Among Children in Selected Communities of Ifo Local Government Area (LGA) of Ogun State, Nigeria

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ABSTRACT

Intestinal parasitic infections are diseases of major public health importance caused by nematodes and protozoans. Developing countries are the most affected as the infections are associated with poverty. This study was conducted to determine the prevalence of intestinal parasitic infections among children in selected communities of Ifo Local Government Area (LGA) of Ogun State, Nigeria. A total of two hundred and seventy-four (274) feacal samples were collected from children between the ages of 4 and 15 selected randomly in the communities for the study. The faecal samples were examined for presence of parasites using the formaldehyde-ether concentration technique. Eighty-four (30.66%) of the feacal samples were positive for one intestinal parasites infection or the other. Mixed infection was observed in 22 (8.03%). *Ascaris lumbricoides* was the most prevalent, followed by Hookworm (5.47%). While *Trichuris trichiura* was the least prevalent. Highest prevalence was recorded in Adenrele community (30.56%), while the least prevalence was recorded in Solu community (27.08%). There was no significant difference ($p>0.05$) between the infection rate of the helminth parasites found in the area. Highest prevalence was observed in the female gender, 18.61% and the 7-9 years age group, 11.68%. The study showed that intestinal parasitic infection is prevalent among children in the various communities in Ifo Local Government Area and the infection is predominant among young female children. Continuous deworming exercise, public enlightenment good hygiene practices will reduce the incidence of parasitic infections among children in area.

Keywords: Public health, nematodes, prevalence, parasites, mixed infection.

INTRODUCTION

Intestinal parasitic infections (IPIs) are among groups of parasitic infectious diseases that constitute a major public health problem globally, belonging to the class nematodes and protozoans (WHO, 2020). It is a condition in which parasites predominantly infect the gastrointestinal tract of humans, residing particularly in the intestinal wall (Arora *et al*., 2012). Intestinal parasitic infections are among the most common and widespread infections worldwide and are still the major cause of human morbidity and mortality (Chelkeba *et al.,* 2020). World Health Organization (WHO) estimated that about 3.5 billion people are affected with intestinal parasitic infections; 450 million are symptomatic and more than 200,000 deaths are reported annually (Hailu *et al*., 2020).

The means of exposure to intestinal parasites include, consumption of contaminated food, water and undercooked meat, skin adsorption and via fomites (Adeomi *et el*., 2015). Developing countries are the most affected, majority being school children because of their typical hand-mouth activity, uncontrolled feacal activity and their immature immune systems. The climatic

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conditions in this part of the world favour the development and survival of these parasites, the high prevalence in a region results to infection and diseases that are the immediate causes of malnutrition and death in young children (Opara *et al*., 2012). Generally, helminth infections are associated with poverty, lack of sanitation, impaired hygiene and eggs and larvae. Infections cause iron-deficiency anaemia, growth retardation in children, intestinal obstruction and some other physical and mental health problems (Tigabu *et al*., 2019).

The helminths *Trichuris trichiura*, *Ascaris lumbricoides* and the hookworms as well as the protozoa such as *Entamoeba histolytica* cause infection in over 48 million people worldwide (Houmsou *et al*., 2010). It has been revealed that more than three billion people are infected with intestinal parasites (Anvari *et al*., 2014), with children being more susceptible and constitute the greatest risk population and can contribute to malnutrition especially in children in day care centers and orphanages (Fauziah *et al*., 2022). This is due to ignorance, low levels of safety, direct contacts and sharing toys with other children (Kumar *et al*., 2016). The indiscriminate disposal of human wastes and unhygienic way of life might have been predisposing factors. These parasitic infections have detrimental impact on host nutritional status in several ways, they can depress appetite and food intake, compete for micronutrients, or blood loss resulting in the loss of iron, diarrhea, vomiting, dehydration, weight loss and growth retardation, fever, school attendance, physical activity and cognitive performance of school age children (Nokes and Bundy, 2015).

The public health and socio-economic consequences of intestinal Helminthes are of considerable global concern particularly in the rural. In Nigeria, a considerable amount of human and animal wastes are discharged into the soil daily leading to the contamination of the soil with helminth (Damen *et al*., 2010). Prevalence of intestinal parasitic infections have been reported mostly in the rural and peri urban parts of the country and this has continued due to low living standards, poor sanitation, and ignorance of simple health-promoting behaviors (Abah and Arene, 2015). Thus, the objective of this study was to determine the prevalence of intestinal parasitic infections among children in selected communities of Ifo Local Government Area (LGA) of Ogun State, Nigeria.

MATERIALS AND METHODS

Study area

The study was carried out in seven randomly selected communities in Ifo Local Government Area (LGA) of Ogun State, Nigeria. The communities are Solu, Akinsinde, Ilepa Pakoto, Adenrele, Ososun, and Olose. Ifo LGA (Fig. 1) consists of Urban and peri-urban Communities with a population of 524,837 at the 2006 census. It is located on 6°49′00″N 3°12′00″E. The LGA shares boundary with Ewekoro LGA in the North; Ado Odo/Ota LGA and Lagos State in the South; Yewa South LGA in the West and Obafemi/Owode LGA in the East. The inhabitants of the communities are traders, farmers, civil servants and students (wikipedia, 2017).

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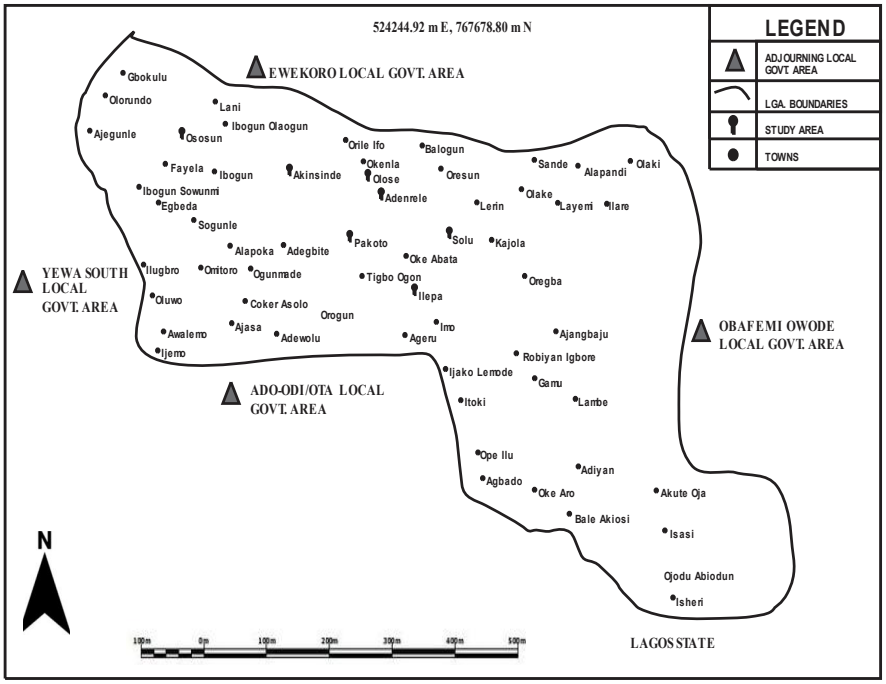

Figure 1: Map of Ifo LGA showing study area

Ethical consent

Permission was obtained from the Ogun State Ministry of Health (Ref. No. HPRS/381/237) to carry out the study. Consents of the traditional leaders and members of the various communities were sought before the collection of samples.

Sample collection

A total of two hundred and seventy-four feacal samples were collected from children between the ages of 4 and 15 selected randomly in the communities for the study. A labelled wide-mouthed, screw capped universal specimen bottle was given out to each of the child to collect the stool sample. The collected samples were immediately preserved with formalin and taken to the Biology laboratory of Tai Solarin University of Education for analysis.

Laboratory Examination of Faecal Samples

The faecal samples were examined for parasites using the formaldehyde-ether concentration technique as described by Cheesbrough (1992). 1g of faeces was suspended in 10ml of 10% formaldehyde solution and mixed with a glass rod. The suspension was passed through a funnel covered with a gauze pad, to remove debris into a centrifuge tube. 3ml of ether was added and the suspension thoroughly mixed. The tubes were centrifuged for 3 minutes at 4000 rpm. Four layers were formed at the end of the centrifugation. The first layer was the ether with fats dissolved in it, the second was the debris, the third was the formaldehyde solution and the fourth was the sediment of eggs and/or larvae. The centrifuge tubes were decanted, leaving only the sediment. The sediment was examined by sampling a drop with a pipette and depositing it on a glass slide. The slide was covered with a slide cover slip and examined microscopically using X10 and X40 objectives of the microscope; each parasite was identified using Medical Laboratory Manual for tropical

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countries (Second edition) by Cheesbrough (1992) as a guide.

Data Analysis

Data collected were analyzed in simple percentages and using Chi-square in SPSS computer software version 22.

RESULTS

Two hundred and seventy-four (274) children were examined for intestinal parasites infections in the selected communities in Ifo LGA. Eighty-four (30.66%) of the children tested positive for one intestinal parasites infection or the other. Mixed infection was observed in 22 (8.03%) of the population (Table 1). Parasites found during the examination of the samples are *A. lumbrcoides* (7.66%), *E. histolytica* (4.38%), *Schistosoma mansoni* (3.28%), Hookworm (5.47%), *Fasciola hepatica* (4.01%), *Giardia lamblia* (2.92%) and *T. trichiura* (2.55%). *A. lumbricoides* was the most prevalent while *T. trichiura* was the least prevalent. Highest prevalence was recorded in Adenrele community (30.56%), while the least prevalence was recorded in Solu community (27.08%). There was no significant difference ($p>0.05$) between the infection rate of the helminth parasites found in the area. *A. lumbricoides*, *E. histolytica,* hookworm and *F. hepatica* were observed in all the communities. However, the difference observed in the infection rates in the study communities were not statistically significant ($P>0.05$).

Table 1: Distribution of intestinal parasites among children in selected communities in Ifo LGA

	No. Examined	No. Infected	*A. lumbricoides*	*E. histolytica*	*S. mansoni*	Hookworm	*F. hepatica*	*G. lamblia*	*T. trichuira*	Mixed infection	Prevalence (%)
Solu	48	13	3	2	2	2	2	1	1	3	27.08
Akinsinde	31	9	2	2	0	2	1	2	0	2	29.03
Ilepa	37	11	4	2	0	2	2	1	0	4	29.73
Pakoto	36	11	2	1	0	3	1	2	2	2	30.56
Adenrele	51	18	5	2	3	3	1	1	2	6	35.29
Ososun	42	14	3	2	2	2	2	1	2	4	33.33
Olose	29	8	2	1	2	1	2	0	0	1	27.59
TOTAL	274	84	21	12	9	15	11	8	7	22	30.66
Percentage	100	30.66	7.66	4.38	3.28	5.47	4.01	2.92	2.55	8.03	

Table 2 showed the gender distribution of infections among the respondents. 122 (44.53%) of the children were males and 152 (55.47%) were females. The infection was more prevalent in females (18.61%) compared to the males (12.04%). There was significance difference in the infection prevalence between the male and female children in the communities ($P<0.05$).

Table 2: Distribution of infection among male and female children in the selected communities in Ifo LGA

	No. Examined	No. Infected	Male		Female		Prevalence (%)	
			Examined	Infected	Examined	Infected	Male	Female
Solu	48	13	21	5	27	8	23.81	29.63
Akinsinde	31	9	14	4	17	5	28.57	29.41
Ilepa	37	11	16	4	21	7	25.00	33.33
Pakoto	36	11	14	5	22	6	35.71	27.27
Adenrele	51	18	22	5	29	13	22.73	44.83
Ososun	42	14	23	8	19	6	34.78	31.58
Olose	29	8	12	2	17	6	16.67	35.29
TOTAL	274	84	122	33	152	51	12.04	18.61

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The infection distribution within the age group was shown in Table 3. Infection of intestinal parasites was most prevalent within the age group 7-9 years, while the least prevalence was recorded within the age group 13-15 years.

Table 3: Distribution of infection among age group in selected communities in Ifo LGA

	No. Examined	No. Infected	Age 4-6	Age 7-9	Age 10-12	Age 13-15
Solu	48	13	3	6	2	2
Akinsinde	31	9	3	3	2	1
Ilepa	37	11	4	3	3	1
Pakoto	36	11	2	4	3	2
Adenrele	51	18	4	7	4	3
Ososun	42	14	3	6	3	2
Olose	29	8	2	3	2	1
TOTAL	274	84	21	32	19	12
Prevalence (%)	100	30.66	7.66	11.68	6.93	4.38

DISCUSSION

The result of this study showed that intestinal parasitic infections are still prevalent among children in the studied communities in Ifo LGA. Findings from previous studies conducted in Ogun State like those of Johnson and Adetula (2019), Uthman *et al*. (2018), `Akingbade *et al.* (2013) and Adenusi and Adewoga, (2013) also confirmed incidence of intestinal parasites in the state. Similarly, they also found *A*. *lumbricoides* and the most predominant parasite in the state. Manir *et al*, (2017) in a study conducted in Kano state also reported *A. lumbricoides* as the most prevalent intestinal parasite in the area. Since helminth infections are associated with poverty, lack of sanitation and amenities the inhabitant of Ifo LGA are highly susceptible to intestinal parasitic infection. According to Fasudo *et al*. (2015), lack of facilities including access to potable water had contributed to the increased exposure of residents in the area to varieties of infections.

The significant difference between the gender in the study area showed that female children were more infected with intestinal parasites compared to male children. This is in line with the finding of Kumurya *et al*. (2021) who also reported predominance in female. However, the reports of Gbonhinbor *et al*. (2022) and Manir *et al.* (2017) observed higher prevalence in females compared to males.

Intestinal parasitic infection was found to be most prevalence among age group 7-9 years in this study. Highest prevalences were reported within around the same age grade in the studies conducted by Manir *et al*, (2017) who reported 7-12 years, Gbonhinbor *et al*. (2022) who reported 5-7 years and Damen *et al*., (2011) who reported 6-8 years. The least prevalence was however observed in this study with the 13-15 years age group. Damen *et al*., (2011) had observed that inverse relationship between the age and the prevalence of intestinal parasites might be due to higher level of awareness and good hygienic practice in the older age groups.

CONCLUSION

Intestinal parasitic infection is still prevalent among children in the various communities in Ifo LGA. *A. lumbricoides* was the most prevalent parasitic helminth in the area. This infection mostly affects young children between the ages of 7 and 9 years in the area and majorly the female gender. Continuous infection of the disease in the area is as a result of the presence of predisposing factors

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such as poverty and lack of facilities in the LGA.

Improved sanitation, provision of potable water, periodic treatment of children using broad spectrum or multi-agent drug combinations as well as public enlightenment and emphasis on personal hygiene will enhance the prevention and control of parasitic infections among children in area.

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