

Scan to know paper details and author's profile

Prevalence of Gastrointestinal Parasites among School Children in Delta State, Nigeria

Obioma Jacinta Eboh, Christopher E. Okaka & Thankgod Onuoha Novena University Ogume

ABSTRACT

Gastro-intestinal parasites occur worldwide and pose a health challenge especially in rural areas. The problem is more among children living in sub-Saharan Africa. Hence, the need to study the prevalence of gastro-intestinal parasites among primary school children in Delta State, Nigeria. A total of 436 children were enrolled for the study in five government primary schools in Amai: Ododo Primary School, Igwete Primary School, Nge Primary School, Ekum Primary School and Umubu Primary School. Stool samples were collected from the pupils and examined in the laboratory for the presence of parasites. Two different techniques used for the laboratory analysis were the direct wet mount and the formal - ether concentration technique. The overall prevalence rate was 50.00%. The highest prevalence rate was recorded in Ododo Primary School (68.52%) while the least prevalence rate was recorded in Nge Primary School (35.06%). The gastro-intestinal parasites observed were Giardia lamblia, Entamoeba species, Ascaris lumbricoides, Taenia species, hookworm, Strongyloides stercoralis and Schistosoma mansoni. Males recorded a higher prevalence rate (51.34%) than females (48.58%). The age group 5-7 years recorded the highest prevalence rate (54.22%) while the age group 14-16 years recorded the least prevalence (42.86%). There was a significant difference (p < 0.05) between infection and the following: type of school and geographical location, source of drinking water at home, boiling of water before drinking it, and availability of toilet facility at home. Provision of toilets and safe drinking water in homes and schools, and proper environmental sanitation and hygiene are recommended.

Keywords: gastro- intestinal parasites, prevalence, infection, school children.

Classification: DDC Code: 372.11020973 LCC Code: LB1776

Language: English



LJP Copyright ID: 925684 Print ISSN: 2631-8490 Online ISSN: 2631-8504

London Journal of Research in Science: Natural and Formal

Volume 22 | Issue 8 | Compilation 1.0



© 2022. Obioma Jacinta Eboh, Christopher E. Okaka & Thankgod Onuoha. This is a research/review paper, distributed under the terms of the Creative Commons Attribution-Noncom-mercial 4.0 Unported License http://creativecommons.org/licenses/by-nc/4.0/), permitting all noncommercial use, distribution, and reproduction in any medium, provided the original work is properly cited.



Prevalence of Gastrointestinal Parasites among School Children in Delta State, Nigeria

Obioma Jacinta Ebohª, Christopher E. Okaka ª & Thankgod Onuoha[®]

ABSTRACT

Gastro-intestinal parasites occur worldwide and pose a health challenge especially in rural areas. The problem is more among children living in sub-Saharan Africa. Hence, the need to study the prevalence of gastro-intestinal parasites among primary school children in Delta State, Nigeria. A total of 436 children were enrolled for the study in five government primary schools in Amai: Ododo Primary School, Igwete Primary School, Nge Primary School, Ekum Primary School and Umubu Primary School. Stool samples were collected from the pupils and examined in the laboratory for the presence of parasites. Two different techniques used for the laboratory analysis were the direct wet mount and the formal – ether concentration technique. The overall prevalence rate was 50.00%. The highest prevalence rate was recorded in Ododo Primary School (68.52%) while the least prevalence rate was recorded in Nge Primary School (35.06%). The gastro-intestinal parasites observed were Giardia lamblia, Entamoeba species, Ascaris lumbricoides, Taenia species, hookworm. Strongyloides stercoralis and Schistosoma mansoni. Males recorded a higher prevalence rate (51.34%) than females (48.58%). The age group 5-7 years recorded the highest prevalence rate (54.22%) while the age group 14-16 years recorded the least prevalence (42.86%). There was a significant difference (p< 0.05) between infection and the following: type of school and geographical location, source of drinking water at home, boiling of water before drinking it, and availability of toilet facility at home. Provision of toilets and safe drinking water in homes and schools, and proper environmental sanitation and hygiene are recommended.

Keywords: gastro- intestinal parasites, prevalence, infection, school children.

Authora: Department of Biological Sciences, Novena University Ogume, Delta State, Nigeria.

σ ρ: Department of Animal and Environmental Biology, University of Benin, Benin City, Edo State, Nigeria.

I. INTRODUCTION

Worldwide, intestinal parasitic infections are among the commonest infections (Ukpai and Ugwu, 2003; Kang et al., 1998). Parasites affect more than half the world's population and are a major cause of mortality in the developing world (Arora and Arora, 2014). Worldwide, the highest prevalence rate of intestinal parasitic infections occurs in children living in Sub-Saharan Africa, and closely followed by Asia and the Latin America and the Carribean (Broker et al., 2006).It is good to note that, intestinal helminthes are the most common diseases with higher negative public health and socio-economic effect in sub-Saharan Africa (Enimien et al., 2014). Poor hygienic behaviours that encourage the infection and transmission include indiscriminate disposal of human and animal faeces, which allows contact of faeces and the micro-organisms they harbour with soil or water (Manir et al., 2017). Many of the intestinal parasites are transmitted through the faeco-oral route (Alemu et al., 2019).

In Nigeria, a good quantity of human and animal waste matter are dumped into the soil on regular basis causing soil seepage with disease causing organisms such as cysts, eggs and larva of these intestinal parasites (Udensi and Opara, 2011).

In Nigeria, most of the study of common parasitic infections are always done in rural areas where lack of proper sanitation and hygiene, and also general ignorance of the disease provide optimum environment for transmission (Damen et al., 2010). Although a lot of the infections with parasitic diseases in school children in Nigerian villages may not cause disease or mortality, but the disease burden has been shown to be high (Onyishi and Okafor, 2005).In as much as many studies have been conducted on gastro-intestinal parasites in Nigeria, yet there are still localities including the study area for which information on specific gastro-intestinal parasites among school children is unavailable. The unavailability of such important information for health policy formulation and implementation is a gap that urgently needs to be filled.

II. MATERIALS AND METHODS

2.1 Study area and sample collection

The study was conducted in Amai, Ukwuani Local Government Area of Delta State, Nigeria. Data were collected between October 2015 and September 2016. Amai community lies within the tropical rain forest zone and has the characteristic rainy and dry seasons. The land is very fertile for agriculture and the indigenes are predominantly farmers, with some traders and civil servants.

Clean plastic bottles with cover and information numbers were distributed to the randomly selected pupils. The respondents were instructed in the classroom on how to collect their early morning faecal samples without contamination using the applicator stick attached to the sample container (Iwunze *et al.*, 2017).As the school children resumed for morning class, the bottles were then collected from them; and the faecal samples were immediately preserved with formalin and finally taken to the laboratory for analysis (Odo *et al.*, 2016). The weight and age of the school children were taken (Udensi *et al.*, 2015).

2.2 Stool examination

In the laboratory, each stool sample was examined macroscopically for the presence of blood, mucus, segments of adult worms and constituency. Each stool sample was examined for ova, cysts and larvae of gastro-intestinal parasites using the direct wet mount and the formol ether concentration technique as described by (Cheesbrough, 2006).

2.3 Data analysis

The data were analysed using SPSS-IBM version 23.0. The results of the descriptive statistics were presented in frequency tables and inferential statistics such as Chi-squarewere used to test for the relationship between variables and infection. A p-value of < 0.05 was accepted as statistically significant.

N(%)

Sex Male (51.38) 224 Female 212 (48.62)Age group (years) 83 (19.04)5-7 8-10 190 (43.58)11-13 142 (32.57)14-16 (4.82)21 Body weight(kg) (23.62)≤ 19 103 (55.28)20-29 241 81 (18.58)30-39 40-49 11 (2.52)

III. RESULTS

Variable

Table I: Characteristics of study populations n = 436

Prevalence of Gastrointestinal Parasites among School Children in Delta State, Nigeria

Type of school and geographical location		
Ododo primary school	108	(24.77)
Igwete primary school	108	(24.77)
Nge primary school	77	(17.66)
Ekum primary school	84	(19.27)
Umubu primary school	59	(13.53)
Presence of GIT parasite		
Yes	218	(50.00)
No	218	(50.00)
Type of GIT present (n=274)		
Giardia lamblia	37	(13.50)
Entamoeba species	20	(7.30)
Ascaris lumbricoides	128	(46.72)
Taenia species	9	(3.28)
Hookworm	58	(21.17)
Strongyloides stercoralis	18	(6.57)
Schistosoma mansoni	4	(1.46)

Table II: Prevalence of gastro intestinal parasites and bivariate analysis of socio-demographic and behavioural factors associated with infestation.

	Variable	Number examined	Number infected	Infection rate(%)	Chi-square	Df	Significance (P-value)
	Sex						
	Male	224	115	51.34	0.331 ^a	1	0.565
	Female	212	103	48.58			
Age group (years)							
	5-7	83	45	54.22			
	8-10	190	94	49.47	1.068 ^a	3	0.785
	11-13	142	70	49.30			
	14-16	21	9	42.86			
Body weight(kg)							
	≤ 19	103	54	52.43			
	20-29	241	120	49.79	0. 449 ^a	3	0.930
	30-39	81	39	48.15			
	40-49	11	5	45.45			
Type of school							
	Ododo primary school	108	74	68.52	29.165ª	4	*0.000
	Igwete primary school	108	60	55.56			
	Nge primary school	77	27	35.06			
	Ekum primary school	84	35	41.67			
	Umubu primary school	59	22	37.29			
Parent Education							
	No formal education	47	18	38.30	2.886 ^a	1	0.089

Prevalence of Gastrointestinal Parasites among School Children in Delta State, Nigeria

London Journal of Research in Science: Natural and Formal

	Formal education	389	200	51.41			
	Occupation of						
	parents						
	Unemployed	10	7	0.70	2.037^{a}	2	0.361
	Farming	223	112	50.22			
	Wage earner	203	99	48.77			
	Family type						
	Monogamous	270	132	48.89	0.350 ^a	1	0.554
	Polygamous	166	86	5.81			
S	ource of water						
	Stream	8	4	50.00	11.861 ^a	5	*0.037
	Pond	27	7	25.93		+	
	Well	125	71	56.80		+	
	Borehole	267	134	50.19		+	
	Sachet water	7	2	28.57		+	
	Bottled water	2	0	0.00		+	
	Boiling before						
	arinking			-0	a (Qa)		*****
	Yes	42	12	28.57	9.689°	2	^0.008
	Sometimes	24	10	41.67			
		370	196	52.97		+	
	Voc	202	100	40.05	45 4108		*0.000
	res	323	130	40.25	47.412	1	[~] 0.000
	INU East worders	113	00	//.00		+	
	Often	101		F 4 4 6	0.5018	-	0.020
	Onco in a while	101	55	54.40	2.521	2	0.203
	No	71	133	50.30 42.25		+	
	Farming	/1		42.23			
	Ves	246	176	50.87	0.504 ^a	1	0.478
	No	00	/0	46.67	0.304		0.4/0
	Sanitation			40.07		+	
	Yes	370	177	47.84	4.842^{a}	2	0.089
	Sometimes	59	36	61.02			0.00)
	No	7	5	71.43		+	
Р	laving barefoot	/		/ 10			
	Yes	147	73	49.66	4.294 ^a	2	0.117
	Sometimes	164	91	55.49			/
	No	125	54	43.20			
Pr	evious vomiting		57	10 - 0		+ +	
	Vac	260	180	E0.00	0.000 ^a		1 000
	105	300	100	30.00	0.000		1.000
	No	76	38	50.00		\downarrow	
Previous deworming							
	Yes	394	195	49.49	0.422 ^a	1	0.516
	No	42	23	54.76			
	Govt. san.		-			+	
	Inspectors						
	Yes	212	104	49.06	0.147 ^a	1	0.702
	No						
	100	224	114	50.89			

*Significant P values

Prevalence of Gastrointestinal Parasites among School Children in Delta State, Nigeria

A total of 436 primary school children were examined for intestinal parasitic infections, out of this 218 (50.00%) were infected (Table 1). Parasites identified in the study were Giardia lamblia 13.50%, Entamoeba species 7.30%, Ascaris lumbricodies 46.72%, Taenia species 3.28%, Hookworm 21.17%, Strongyloides stercoralis 6.57% and Schistosoma mansoni 1.46% (Table 1). The prevalence in the schools were: Ododo primary school 68.52%, Igwete primary school 55.56%, Nge primary school 35.06%, Ekum primary school 41.67% and Umubu primary school 37.29% (Table II). Out of the 224 males examined, 115 (51.34%) were infected while out of 212 females examined 103 (48.58%) were infected (Table II). The age group 5-7 years had the highest prevalence of 54.22%, 8-10 years 49.47%, 11-13 years 49.30% and 14-16 years 42.86%(Table II).There was a statistically significant difference (p < 0.05) between infection and the following: type of school and geographical location, source of drinking water at home boiling of water before drinking it, and availability of toilet facility at home (Table II).

IV. DISCUSSION

The prevalence of gastrointestinal parasites among school children in the study area was 50.00%. The prevalence was high and also in line with the work of some other authors; for instance, Banke et al., (2006) reported 54.13% prevalence among school children in Makurdi, Nigeria, Odo et al.,(2016) reported 52.5% prevalence among school children in Uzo Uwani Local Government Area of Enugu State Nigeria and Usip et al., (2013) reported 59.10% among primary school pupils in Abak Local Government Area of Akwalbom State, Nigeria. The reason for the high prevalence in the study area could be as a result of poor environmental hygiene both in the schools and homes. In the course of the study, it was observed that there was no good refuse disposal and majority of the homes lacked toilet facilities. Moreover, the schools visited had no functional toilet. Michael et al., (2010) had explained that poor sanitation encourages transmission of gastro-intestinal parasites.

Males recorded a higher prevalence of 51.34% than females who recorded a prevalence of 48.58%. This is in line with the report of other researchers elsewhere (Odinaka et al., 2015, Sisay and Lemma, 2019, Albonico, et al., 1997, and Baral et al., 2017). This could be because the males play more on bare foot outside the home than the females (Sisay and Lemma, 2019). Also, the females at this stage of life tend to be more hygienic than the males. And these are risk factors in the transmission of gastro intestinal parasites. The age group 5 -7 years recorded the highest prevalence of 54.22% while the age group 14 - 16years recorded the least prevalence of 42.86%. This could be because soon after weaning the body immunity reduces and children between 5 to 7 years of age are not yet able to take good care of themselves and maintain proper hygiene. This is in line with the work of Akingbade *et al.*, (2013) who reported a significantly higher prevalence in age group 4-5 years old.

Ododo primary school had the highest prevalence of 68.52% followed by Igwete primary school 55.56% while Nge primary school had the least prevalence of 35.06%. There was a statistically significant difference (p < 0.05) between infection and the type of school. Ododo primary school and Igwete primary school that recorded high prevalence were noted to have more pupils in attendance. Gastro-intestinal parasites are easily transmitted in crowded environments (Micheal *et al.*, 2010).

The study showed that those whose source of drinking water was well had the highest prevalence of 56.80% while those who drank bottled water had no infection. The high prevalence among pupils who drank water from the well is not far-fetched. Eboh *et al.*, (2017) noted that majority of the wells in Amai lack covers and serve as drainage pits during the rainy season and a result, not fit for human consumption without proper purification.

The highest prevalence 52.43% was recorded among pupils with body weight 19kg and below while pupils with body weight of 40 to 49kg had the least prevalence. The prevalence reduced with

Prevalence of Gastrointestinal Parasites among School Children in Delta State, Nigeria

highest prevalence was recorded in the least age among school children. group.

The study revealed that those who do not boil water before drinking had the highest prevalence of 52.97% while the least prevalence of 28.57% was observed among those who boiled water before drinking. Other authors had documented this in the past (Ekpenyong and Ayo, 2018). Safe drinking water reduces the risk of contracting infectious diseases (Gyang et al., 2016; Willms, 2008).

The highest prevalence of 77.88% was observed among pupils who had no toilet facility at home while the least prevalence of 40.25% was observed among pupils who had a toilet facility at home. This is in line with the work of some authors. It has been reported that availability or lack of sanitary facilities particularly toilet would greatly determine the infection rate of intestinal parasites in any given place (Amuta et al., 2017).

The highest prevalence of 54.46% was observed among pupils who often bought food from vendors while the least prevalence of 42.25% was observed among pupils who did not buy food from vendors. It has been noted that most of the people in rural areas live in poor sanitary conditions which encourage the transmission of parasitic diseases (Etusim et al., 2006). Food vendors in rural areas may not maintain better sanitation like their other rural dwellers. Also, it is likely that the food vendors may keep prepared food open for flies to perch on, thereby increasing the chances of intestinal parasites to be transmitted.

The study showed that the highest prevalence of 46.67% occurred among those who do not go to farm. This is possible because in the farm they tend to work bare footed and could pick objects on the ground or eat without washing hands (Odo et al., 2016).

The highest prevalence of 71.43% was observed among pupils who do not maintain good sanitation at home while the least prevalence of 47.84% was observed among pupils who maintain good sanitation at home. Poor sanitary conditions have been attributed to be one of the factors that cause

increasing body weight. This may be because the the highest infection rates and worm burden

V. CONCLUSION

This is the first study on gastro-intestinal parasites among primary school children in Amai, Ukwuani Delta State. Due to the negative impact on gastro intestinal parasites on the health and development of primary school children, it is important to document the gastro-intestinal parasites present in school children in the study area. The study showed that the primary school children were infected with the following gastro-intestinal parasites:Giardia lamblia 13.50%, Entamoeba species 7.30%, Ascaris lumbricoides 46.72%, Taenia species 3.28%, 21.17%,*Strongyloides* stercoralis Hookworm 6.57% and Schistosoma mansoni 1.46%. There was significant difference in the prevalence between infection and the following: type of school and geographical location, source of drinking water at home, boiling of water before drinking it, and availability of toilet facility at home. Safe drinking water should be provided in the communities and schools to control water borne diseases. There is a need to purify water using simple methods such as boiling before drinking it. Toilets should be provided in homes and schools to ensure proper sewage disposal.

Ethical standards The research conducted here complies with host country and institutional policies of ethical research on humans.

REFERENCES

- Akingbade OA, Akinjinmi, AA, Ezechukwu US, 1. Okerentugba, PO, Okonko, IO (2013)Prevalence of intestinal parasites among children with diarrhea in Abeokuta, Ogun State, Nigeria. Researcher 5 (9): 66 - 73
- 2. AlbonicoM., Chwaya HM, Montresor A, Stolfzfus RJ, Tielsch JM, Alawi KS, Savioli L (1997) Parasitic infections in Pemba Island school children. East Africa Medical Journal 74 (5): 294-8.
- 3. AlemuG, Abossie A, Yohannes Z (2019) Current status of intestinal parasitic infections and associated factors among primary school

children in Birbir Town, Southern Ethiopia.*BMC Infectious Diseases* 270 (2019)

- 4. Amuta EU, Iboyi MO, Ajangem S (2017) A comparative study of gastro intestinal parasites among secondary school students in the rural and urban communities of Makurdi Local Government Area of Benue State, Nigeria. *Int. J. Tropical Dis. and Health* 25 (4):1-9.
- 5. Arora DR, Arora BB (2014)Medical Parasitology. Fourth Edition. Indian CBS Publishers, New Delhi P.267.
- 6. Banke ROK, Omudu EA, Ikenwa DA, Feese IJ of gastro-intestinal (2006)Prevalence parasites in relation to availability of sanitary facilities among schooling children in Makurdi, Nigeria. Animal Research International 3 (2): 489-493.
- 7. Baral R, Jha, P, Amatya R, Khanal B (2017) Prevalence of intestinal parasitic infections among patients attending in a tertiary care hospital of eastern region of Nepal. A retrospective laboratory based study. *Asian Journal of Medical Science*8(3): 55-9.
- 8. Brooker S, Clement AC, Bundy DA (2006) Global epidemiology, ecology and control of soil transmitted helminth infection. *Advance in Parasitology* 62: 221-261.
- Cheesbrough M. (2006) District Laboratory Practice in Tropical Countries (Part 1), 2nd Edition Update. Cambridge University press. Cambridge. Pp 191-235
- 10. Damen JG, Lar P, Mershark P, Mbaawuga EM, Nyary BW (2010) A comparative study on the prevalence of intestinal helminthes in dewormed and non-dewormed students in a rural area of North Central Nigeria. *Lab. Med* 41(10): 585-589.
- 11. Eboh OJ, Ogu GI, Idara MU (2017) Microbiological quality of borehole and well water sources in Amai Kingdom, Ukwuani Local Government Area Delta State, Nigeria. *International Journal of Advanced Academic Research* 3(7):1-12.
- Ekpenyong EA, Eyo JE (2008) Prevalence of intestinal helminths infections among school children in tropical semi urban communities. *Ani. Res. Int* 5: 804-10.

- 13. Enimien OJ, Fana SA, Emmanuel WB (2014) Intestinal helminthic infection in human (Northeast Nigeria). *International Journal of Innovation and Applied Study* 5 (2): 102-105.
- 14. Etusim PE, Inyama U, Nduka F, Melariri P (2006) The role of the environment in the epidemiology of soil transmitted human helminthic parasites (geohelminths) in Okigwe, Imo State, Nigeria. *Journal of Research in Bioscience* 2 (3): 28-32
- 15. Gyang VP, Chuang T, Liao C, Lee Y, Akinwale OP, Orok A, Ajibaye O, Bebasola AJ, Cheng P, Chou C,Huang Y, Sonk P, Fan C (2016) Intestinal parasitic infections: current status and associated risk factors among school aged children in an archetypal African Urban slum in Nigeria. *Journal of Microbiology, Immunology and Infection13*: 56-59.
- Iwunze JI, Amaechi AA, Iheme JN, Njoku FU, Odemene CC (2017) Prevalence of intestinal parasites among primary school children in Obowo L.G.A of Imo State, Nigeria. *American Journal of Environment and Geoscience*,l(1): 29-33.
- Kang A, May MS, Jajan DP, Jasper DD, Minnie MM, MarhtaVI, Muliyil JP (1998) Prevalence of intestinal parasites in southern rural India. *Tropical Med. and Intl. Health*3: 70-75.
- 18. Manir N, Umar LM, Abduhadi BJ (2017) Survey on prevalence of intestinal parasites associated with some primary school aged children in Dutsina Area, Kastina State, Nigeria. M. O. J. Biol. Med2(2):11-23.
- Michael OH, John H, Pierol O (2010) Epidemiology and control of human gastro – intestinal parasites in children. Natural Library of Medicine and National Institute of Health 8:219 - 234.
- 20. Odinaka KK, Nwolisa EC, Mbanefo F, Iheakaran AC, Okolo S (2015) Prevalence and pattern of soil transmitted helminthic infection among primary school children in a rural community in Imo State, *Nigeria. J. Trop. Med.* ID 349439 vol. 2015.
- 21. Odo GE, Agwu JE, Ekeh FN, Ezea CO, Aguoru GC, Anya C, Omeje KO, Ubachukwu PO (2016) Prevalence of intestinal parasites among school children in Uzouwani Local

Prevalence of Gastrointestinal Parasites among School Children in Delta State, Nigeria

Government Area of Enugu State. International J. of Res. Studies in Microbiology and Biotechnology 2 (2): 7-14.

- 22. Onyishi GC, Okafor FC (2005) Helminth parasitic diseases status of school of within the Anambra river basin irrigation project area. *Biological Research Journal* 3(1): 93-98.
- 23. Sisay A, Lemma B (2019) Assessment on the prevalence and risk factors of gastrointestinal parasites on school children at Bochesa elementary school, around Lake Zwai, Ethiopia. *BMC Res. Notes* 12, 410.
- 24. Udensi JU, Opara FN (2011) Waste to wealth: An approach to environmental waste management. *International Journal of Environmental Health and Human Development* 12: 66-70.
- 25. Udensi JU, Mgbemena IC, Emeka NI, Ugochukwu MG, Awurum IN (2015) Prevalence of intestinal parasites among primary school children in three geopolitical zones of Imo State, Nigeria. *Science Journal of Public Health* 3 (5-1):25-28.
- 26. Ukpai OM, Ugwu CD (2003) The prevalence of gastro-intestinal tract parasites in primary school children in Ikwuano L.G.A of Abia State Nigeria. *The Nigeria Journal of Parasitology* 24:129-136.
- 27. Usip L, Esiest P, David NC (2013) The prevalence of human intestinal helminthes and the efficacy of anthelmintic lavamisole drug in Abak Local Government Area of Akwaibom State, Nigeria. *Basic Researcher Journal of Medicine and Clinical Sciences* 2 (5): 52-58.
- 28. Willms K (2008) Morphology and biochemistry of the pork tapeworm, *Taenia solium*. *Current Topics in Medicinal Chemistry* 8 (5): 375 - 382.