Scholar J **Research Article**

Investigation of Gastrointestinal Parasites Prevalence among Primary School Pupils in Gboko Metropolis –Benue, Nigeria

Atir, Zachariah Sonnen

Sechenov First Moscow State Medical University, Russia.

Received 5 January 2024; Acceptance 25 March 2024; Published 10 April 2024.

Abstract

This study investigated the prevalence of gastrointestinal parasites among primary school pupils in Gboko metropolis. The population of the study consist of 180 pupils between 1-15 years selected from four primary schools in Gboko and their faecal samples obtained, transported and processed in the laboratory using formol-ether concentration technique, after which the parasites found were identified with an Atlas chart. Results were analyzed in relation to age, sex and general comparism of the pupils, using simple percentage. The results showed a high prevalence (25.2%) and the parasite strongyloides stercoralis showed highest prevalence rate (35.7%). Out of the total 180 pupils (96 males and 84 females) 159 were infected with percentage of 84.9% and the prevalence of parasitic infection among the pupils in relation to age showed that 11-15 years had the highest rate 41(22.7%). The study draws attention to the health hazards posed by gastrointestinal parasitic infection among school pupils, so the need for decisive control cannot be overemphasized.

Keywords: Gastrointestinal, Parasites, Prevalence, Pupils.

Introduction

Parasites are one of the important casual agents of diarrhea, loss of weight, abdominal pain, nausea, vomiting, lack of appetite, abdominal distention and iron-deficiency anemia. In Africa, more specifically Sub-Saharan Africa, parasitic infections are the major public health problem and most of the victims are children [1]. Gastrointestinal infections are the major cause for health problems in children from rural areas of developing countries. It is an important cause of morbidity in school age children especially primary school pupils (4 to 15years) who harbor the highest intensity of worm infestation. Children are the most vulnerable cluster with the highest prevalence rate of gastrointestinal parasite infection [2]. Moreover, intestinal parasitic infections in this age group have been linked with significantly growth retardation and an increased risk for protein-energy malnutrition.

Intestinal parasites are microorganisms transmitted directly and indirectly by ingestion through objects like food, water, nails, fingers [3]. For instance, Amebiasis can cause both intestinal and extraintestinal disease spread. These intestinal parasites exhaust nutrients from children they infect, thus retarding their physical development. They destroy tissues and organs, cause abdominal pain, diarrhea, intestinal obstruction, anemia, ulcers and other health problems which can lead to slow cognitive development and impaired learning [4].

Correspondence to: Zachariah Sonnen Atir, e-mail: atir_z_s@student.sechenov.ru

 eISSN: 3027-060X.

How to Cite: Atir (2024). Investigation of Gastrointestinal Parasites Prevalence among Primary School Pupils in Gboko Metropolis, Benue State, Nigeria, Scholar *J,* **2(**4). https://scholarj.com/index.php/sj/article/view/35

The transmission of intestinal parasites infection has behavioural, environmental and biological bases [4]. These parasites are transmitted by ingestion of faecally contaminated food or water or when faecally contaminated hands come in contact with the mouth or through skin penetration of the larva when in direct contact with faecal contaminated soil.

Other factors include personal hygiene, dietary habits, education level, over-crowding, limited access to clean water among others, are the common factors that influence the distribution and the prevalence of intestinal parasitic infections [5]. The effects of the intestinal parasitic infections depend on the species of the parasites, the affected organ and the host immunological status. In an immune-competent person, early infection of intestinal helminthes and protozoa may cause diarrhea and other gastrointestinal discomfort such as vomiting and bloating. It is in line with these assertions that this study posits to investigate the prevalence of gastrointestinal parasites among primary school pupils in Gboko metropolis-Benue, Nigeria.

Materials and Methods

Study population

A total number of one hundred and eighty (180) pupils aged between 1-15 years were selected from 4 primary schools (45 samples from each) in Gboko, Benue state. Using systematic random sampling method for investigation of prevalence of gastro intestinal parasites among primary school pupils in Gboko. The four (4) schools were Ajado Primary School (Gboko South), ST. Peters Primary School (Gboko East), N.K.S.T primary school Anzwar (Gboko North) and Laurel Academy (Gboko West). The study populations consist male and female from 1-15 years of age.

Sample collection

Each pupil was supplied with a clean, labeled wide mouth plastic specimen bottle with a cover, and selected pupils for the study were properly instructed on how to collect and transfer their early morning faecal samples into the specimen bottles to avoid being contaminated using the applicator stick attached to the sample bottle cover, while this was done for younger pupils by their parents. The bottles were then collected from the pupils as they resumed for morning class and faecal samples were immediately taken to the laboratory for analysis. Sample Collection was carried out in accordance to internationally best practice [6].

Procedure

After samples were labelled in the tubes and recorded, the stool sample was mixed with 10% formol saline then filtered through a 350-450 micrometre mesh and 7ml of filtrate was poured into a 15ml centrifuge tube, there was addition of 2ml of diethyl ether and it was mixed. The centrifuge tubes were closed and shaken vigorously for 30 seconds and centrifugation was done at 500rpm for 2-5 minutes, then the top 3 layers were discarded and a drop of the sediment was placed on a glass slide under a coverslip and examined under low power microscope (x10 and x40).

Identification of parasites (microscopy)

An ATLAS chart which carried the display of gastrointestinal parasites which were seen during microscopy was used.

Data analysis

The prevalence (P), defined as the percentage of infected individuals (NP) among the total number of individuals examined (N) (P= (NP/N) x 100).

Results and Discussion

Table 1 showed that the prevalence of gastrointestinal parasites was higher among pupils within the age range of 11-15 years old with 41(22.7%) prevalence rate, while the least prevalence rate was within the age group of 1-5 years with 23(12.8%). However, there was no significant different between enteric parasitosis and age groups.

Table 1. The prevalence of gastrointestinal parasites infection among pupils within the age range of 1-15 years in the study population

Age Rang	No. Examined	No. of Infection (%)
1 –5	42	23(12.8)
6 –10	65	26(14.4)
11 –15	73	41(22.7)
TOTAL	180	90(50.0)

A total number of 180 samples were examined out of the four schools in Gboko township. The population consisted of 84 female pupils who participated in the study. Out of the 84 samples examined in relation to the female sex from the four (4) schools, a total number of 75 infections were recorded with an infection rate of 41.7%. A higher prevalence for *Strongyloides* 7.7% was recorded. Laurel academy and N.K.S.T primary school Anzwar were more exposed with 22(12%) and 19(10.9%) respectively as shown in Table 2.

Table 2. The prevalence of gastrointestinal parasites infection among 84 female pupils in the study population

Parasites	Ajado Pri/Sch	ST.Peters Pri/Sch	Anzwar Pri/Sch	Laurel Acd	Total
A. lumbricoides	1(0.5%)	0	0	0	1
T. trichiura	0	0	0	1(0.5%)	1
S. stercoralis	2(1.1%)	8(4.4%)	12(6.6%)	14(7.7%)	36
E. coli	2(1.1%)	5(2.7%)	1(0.5%)	2(1.1%)	10
G. lamblia	6(3.3%)	4(2.2%)	0	0	10
E. histolytica	2(1.1%)	0	7(3.8%)	5(2.7%)	14
A. duodenale	3(1.6%)	0	0	0	3
Total	16(8.7%)	17(9.3%)	19(10.9%)	22(12%)	

Out of the 180 samples examined from the four schools in Gboko, 96 male pupils participated in the study with a total number of 84 infections with an infection rate of 46.7% as illustrated in Table 3. The table shows that *Strongyloides* had the highest prevalence of infection with 29(16%). Laurel Academy and N.K.S.T Anzwar were more exposed.

Table 3. The prevalence of gastrointestinal parasites infection among 96 male pupils in the study population

Parasites	AjadoPri/Sch	ST.Peters Pri/Sch	AnzwarPri/Sc	Laurel Acad.	Total
A. lumbricoides	1(0.5%)	0	0	0	1
T. trichiura	3(1.6%)	0	0	0	3
S. stercoralis	1(0.5%)	6(3.3%)	11(6.1%)	11(6.1%)	29
E. coli	2(1.1%)	2(1.1%)	3(1.6%)	2(1.1%)	9
G. lamblia	6(3.3%)	6(3.3%)	1(0.5%)	0	13
E. histolytica	3(1.6%)	0	12(6.6%)	8(4.4%)	23
A. duodenale	5(2.7%)	0	1(0.5%)	0	6
Total	21(11.3%)	14(7.7%)	28(15.3%)	21(11.6%)	

Table 4 compared the prevalence of intestinal parasites among primary school pupils in different schools. The results showed that N.K.S.T primary school Anzwar had the highest prevalence rate of infection with 46(25.2%), followed by Laurel academy with the prevalence rate of 44(24%). Ajado primary school was infected with 38(19.3%). While ST. Peters primary school pupils were observed to have the least prevalence rate of infection 31(16.2%). The table shows an overall high rate of infection from *Strongyloides,* 65(35.7%), with a sum percentage of 71.4% from the four schools.

Table 4. The relationship between pupils in the four schools and the prevalence of gastrointestinal parasitic infection

Parasites	AjadoPri/Sch	ST.PetersPri/Sch	AnzwarPri/Sch	Laurel Acad.	Total (%)
A. lumbricoides	2(1%)	0	0	0	2(1%)
T. trichiura	3(1.6%)	0	0	1(0.5%)	4(2.1%)
S. stercoralis	4(2%)	13(7.2%)	23(12.7%)	25(13.8%)	65(35.7%)
A. duodenale	8(4%)	0	1(0.5%)	0	9(4.5%)
E. coli	4(2%)	8(4%)	2(1%)	5(2.7%)	19(9.7%)
G. lamblia	12(6%)	10(5%)	1(0.5%)	0	23(11.5%)
E. histolytica	5(2.7%)	0	19(10.5%)	13(7.2%)	37(20.4%)

Total	38(19.3%)	31(16.2%)	46(25.2%)	44(24.2%)

The result of the present study revealed that 84.9% of the primary school pupils examined in Gboko local government area of Benue State were infected with different gastrointestinal parasites, and the presence of these parasites found, supports the earlier observation that parasitic infections constitute a major public health problem in the country. The overall prevalence of 84.9% with the intestinal parasites found in this study was higher and comparable with what was reported (82.8%) from residents of four villages in southwestern Ethiopia [7]. (1994). However, the prevalence in this study was a lot higher compared to other community-based studies conducted in Saudi Arabia by [8], showing an overall prevalence of 32.2%. when compared with [9] who reported 84.6%, [10] reported 42.7%, [11] reported 30.7. This high prevalence of intestinal parasitic infection in Gboko may be due to the lack of awareness about personal cleanliness and hygiene among primary school pupils and a care free attitude among this age group.

This study revealed that the age group of 11-15years had the highest prevalence of 22.7% while the age group 1-5 years old had the least prevalence 12.8%. Though there was no significant difference statistically between the age group, but there was slight decline in prevalence as the age decreased. This study was in agreement with [11] who reported that prevalence of intestinal parasites was not age dependent.
This study showed that N.K.S.T Primary School, Anzwar, Gboko North recorded the highest prevalence of 25.2% followed by Laurel academy Gboko West 24.2% then Ajado primary School Gboko South with 19.3%, while ST. Peters primary School, Gboko East had least prevalence of 16.2%. Although there was no significant difference in intestinal parasites in the schools. N.K.S.T Primary School, Anzwar recorded the highest prevalence and this could be attributed to unhygienic behaviour(s) among pupils both at home and in school. Lack of sanitation facilities in these schools might have also contributed to the high prevalence. In all the selected schools, it was observed that there were bad toilet facilities, they were not functional or no adequate water supply in the schools. Pupils who play within and outside the school with soil, bare footed and could pick objects on the ground or eat without washing hands.

In this study, the intestinal parasites identified include *Entamoeba histolytica*, *Strongyloides stercoralis*, *Ancyclostoma duodenale*, *Entamoeba coli*, *Giardia lamblia*, *Trichuris trichuria* and

Ascaris lumbricoides. However, prior to the prevalence differences among the parasitic species in the afore mentioned schools, *Strongyloides stercoralis* had the higher prevalence rate of 71.4%% and is mostly found in males than in females.

Conclusion

The investigation of gastrointestinal parasites prevalence among primary school pupils in Gboko metropolis is presented. From the findings, it is evident that the prevalence of intestinal parasites

in the four (4) primary schools' pupils in study showed a higher prevalence in the male (46.7%) demographic than the female (41.7%) among the sexes. There was also a low age group (11-15) with the higher prevalence (22.7%) among the groups and among the species of parasites, the *Strongyloides stercoralis* had the highest prevalence rate (35.7%) in the study population. Based on these findings, the study recommended that local health officers should visit schools regularly for routine deworming and health education to improve conditions. Treatment should be given to those who are already infected and "everyone", the pupils, parent signs, symptoms and prevention methods of these parasitic diseases.

References

[1]. WHO. (2007). Initiative for Vaccine Research: Hookworm disease. Retrieved 16 Jul 2007, 2007, from http://www.who.int/vaccine_research/diseases/soa_parasitic/en/index2.html

[2]. Saathoft E, Olsen A, Magnussen P, Kvalsving JD, Wilhelm B, et al. (2004) Patterns of schistosoma Haematobium infection, impact of preziquentel treatment and re-infrection after Treatment in a cohort of school children from rural Kwazulu- Natal/South Africa. BMC Infect Dis 4: 15-40.

[3]. Zaglool DA, Khodari YA, Othman RAM, Farooq MU (2011) Prevalence of intestinal parasites and bacteria among food handlers in a tertiary care hospital. Niger Med J 52: 266-270.

[4]. Michael OH, John H, Pierol O. (2010) Epiidemiology and control of human gastrointestinal parasites in children. Natural Library of Medicine and National Institute of Health, 8:219-234.

[5]. Mahsol HH, Mat DZA, Jalit MF, Ahmad AH. (2008) Gastrointestinal protozoan parasites amongst school children in Inanam, Sabah. A Journal of Science and Technology,23:45-51.

[6]. PAHO. (2001). Profile of the Health Services of the Dominican Republic. Paper presented at the Program on Organization and Management of Health Systems and Services.

[7]. Yeneneh H. (1994). Survey of intestinal parasites in Bure area, Illubabor, southwest Ethiopia. Ethiop J Health Dev, 8:29–35.

[8]. Al-Shammari S, Khoja T, El-Khwasky F, Gad A. (2001). Intestinal parasitic diseases in Riyadh, Saudi Arabia: prevalence, socio-demographic and environmental associates. Trop Med Int Health 2001, 6:184–189.

[9]. Awi-Waadu GDB (2005) The prevalence of gastro-intestinal tract parasites in the inhabitants of Bori military cantonment in Port Harcourt Local Government Area of Rivers State, Nigeria. Af J Appl Zoology Environ Biol 7: 56-60.

[10] Abah AE, Arene FOI. (2006). Intestinal parasitic infections among primary school children as an index of level of sanitation in Akpor Area of Port Harcourt, Rivers State Nigeria, Abstract, Nigeria Society for Parasitology.

[11] Odu NN, Elechi VI, Okonko IO. (2013). Prevalence of intestinal helminthes infection among primary school in urban and semi-urban area in Port-Harcourt, River State, Nigeria. World Rural Observation, 5(1): 52-61.