

Prevalence of intestinal parasites among primary school children

¹Folashade R.A Ede, ¹Eugene I Ikeh, ²Nanma Dashe

Abstract

Background: Intestinal parasitism is a public health problem in tropical countries. It is associated with complications such as intestinal obstruction, mal-absorption, anemia, retarded growth, low cognitive skills and low participation among school aged children. Several prevalence studies have been done in different parts of the country. However, to the best of our knowledge, none has been reported from northeastern part of Nigeria. This study was therefore carried out to investigate the prevalence of intestinal parasitism among primary school children in Wukari Local Government Area (L.G.A) of Taraba State-Nigeria.

Methods: A total of 1123 fecal samples were randomly collected from five primary schools pupils and examined using the direct wet mount preparation and formol ether concentration method.

Results: Four hundred and ten samples (410) had intestinal

parasites with prevalence of 36.5%. The distribution of the parasites were as follows: Hookworm (26.5%), *Entamoeba coli* (19.1%), *Iodaemoeba butschlii* (9.6%), *Entamoeba histolytica* (6.6%), *Teania species* (2.2%), *Giardia lamblia* (2.0%), *Hymenolepis nana* (1%), *Strongyloides stercoralis* (0.3%), *Ascaris lumbricoides* (0.8%), *Trichuris trichiura* (0.3%), *Schistosoma mansoni* (0.3%), and *Enterobius vermicularis* (0.1%).

Conclusion: The study highlights the prevalence of intestinal parasites among primary school children in the study area with an overall prevalence of 36.5%.

Keywords: Parasites, parasitism, Helminths, Protozoa, prevalence

Highland Med Res J 2014;14(1):21-24

Introduction

Intestinal parasitic infection is among the most prevalent of parasitic infections worldwide. It exists everywhere in the world but it is a public health problem in tropical countries because of favorable climatic conditions and the difficulty in achieving efficient hygiene.¹ Heavy worm burden and poly-parasitism have been reported in primary school children. This exposes them to some complication such as intestinal obstruction, mal-absorption and anemia which are compounded in the context of poor nutritional status². It is a public health problem because of the nutritional related repercussion since they are partially or totally responsible for malnutrition and its consequences such as retarded physical growth, retarded cognitive skills and low performance in education among children.^{3,4} The extent of the parasitic infection has not declined despite the present availability of drugs as factors such as low socio-economic status of the people and the persistence of epidemiology chain makes rapid contamination and

subsequent infection of children possible.

Several epidemiological studies had indicated high prevalence rate of intestinal parasitic infection among Nigeria children.^{5,8} This study was therefore carried out to determine the prevalence of intestinal parasites among primary school children in Wukari L.G.A of Taraba, Nigeria and to draw the attention of relevant authorities to the need to adapt appropriate polices that will alleviate the problem.

Materials and Methods

This study was carried out in Wukari, the headquarters of Wukari L.G. A of Taraba State-Nigeria between September 2006 and December 2006. The primary schools in Wukari L.G.A are divided into six wards and a school was selected from each ward. Random numbers were given to the students making sure equal numbers of males and females were selected for good data collection. A questionnaire was drawn to obtain information on personal data relevant to the study. This was distributed to the students to be answered with the help of their parents. The primary health care of the local government was duly informed for their permission.

A total of 1123 fecal samples were collected and examined using direct wet mount preparation. With the aid of an application stick, a pinhead size quantity of the specimen was emulsified in a drop of saline (0.85%NaCl) and also in a drop of Lugol's iodine diluted 1 in 5 with distilled water. Formol-ether

¹Department of Medical Laboratory Science, Faculty of Medical Sciences, University of Jos ²Department of Medical Microbiology, Faculty of Medical Sciences, University of Jos

Corresponding Author:

Ede R A

E-mail: beckiss_5@yahoo.com

concentration method modified by Allen and Ridley⁹ was also employed.

Data of this study were analyzed by EpiInfo™ 7 Community Edition (Centers for Disease Control and Prevention, Atlanta, GA, USA) software statistical package programs. Statistical evaluation of difference in prevalence according to the gender, location of schools, age groups, water source, washing of fruits and vegetables, type of toilet facility and shoe wearing habit was performed with the Chi-square test. The p value of <0.05 was selected for statistical significance.

Results

The schools within the study area were categorized as either rural or semi urban. There was a good representation of both sexes in the study, most of the pupils fall within the age group 9-12years. Of the 1123 samples collected and examined 410(36.5%) had intestinal parasites. The distribution of the parasites were as follows: Hookworm (26.5%), *Entamoeba coli* (19.1%), *Iodaemoeba butschlii* (9.6%), *Entamoeba histolytica* (6.6%), *Teania species* (2.2%), *Giardia lamblia* (2.0%), *Hymenolepis nana* (1%), *Strongyloides stercoralis* (0.3%), *Ascaris lumbricoides* (0.8%), *Trichuris trichiura* (0.3%), *Schistosoma mansoni* (0.3%) and *Enterobius vermicularis* (0.1%) as shown in Figure 1.

There was no significant difference in the prevalence of intestinal parasites in relation to gender (p=0.607). There was a significant difference in the prevalence of intestinal parasites according to the location of schools (p>0.05). In relation to age groups there was significant difference with the age group 5-8years recording the least prevalence of 30.2% (p>0.05). The association between prevalence of intestinal parasites and source of drinking water was tested; pupils who drank water from well recorded the highest prevalence (39.5%) when compared to other sources (p=0.004). There was significant difference in prevalence among pupils who ate unwashed fruits and vegetables when compared with those that wash their fruits and vegetables (p<0.001). There was significant association between prevalence of intestinal parasites and type of toilet facility (p=0.043); as those that used bush/open field recorded the highest prevalence of 41.9%. The prevalence of intestinal parasites in relation to shoe wearing habit was evaluated; there was no significant difference in the prevalence of intestinal parasites in relation to shoe wearing habit (p=0.203) as shown in Table 1.

Table 1: Characteristics of children infested with intestinal parasites

Variable	Total	Parasite (+)	Parasite (-)	p-value
Males	557(49.6)	208 (37.3)	349 (62.7)	P=0.607
Urban	726 (64.6)	245 (33.7)	481 (66.3)	p>0.05
Age group				
5-8	278 (24.3)	84 (30.2)	194 (69.8)	P>0.05
9-12	550 (50.0)	213 (38.7)	337 (61.3)	
>13	295 (26.3)	113 (38.3)	182 (61.7)	
Water source				
Well	774 (68.9)	306 (39.5)	468 (60.5)	P=0.004
Stream	133 (11.9)	38 (28.6)	95 (71.4)	
Borehole	216 (19.2)	66 (30.6)	150 (69.4)	
Wash fruits				
Yes	958 (85.3)	326 (34.0)	632 (66.0)	P<0.001
Toilet facility				
Bush/open field	277 (24.7)	116 (41.9)	161 (58.1)	P=0.043
Pit latrine	697 (62.0)	244 (35.0)	453 (65.0)	
Water closet	149 (13.3)	50 (33.6)	99 (66.7)	
Shoewearing				

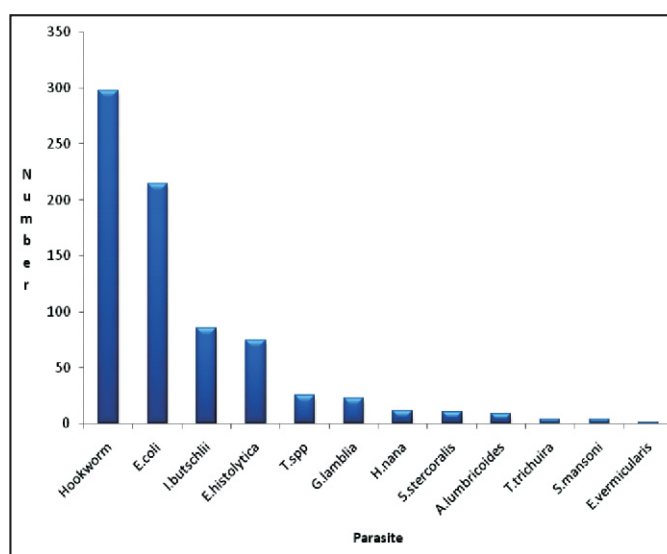


Figure 1: Prevalence of individual intestinal parasites isolated from school children in Wukari L.G.A. of Taraba State

Discussion

Results from the present study show the existence of both helminthic and protozoan infection among primary school children in the study area yielding an overall prevalence of 36.5%. This figure is lower than the prevalence of 51.3% to 72% reported in the study carried out in two communities in south western

Nigeria.^{7,8} However the prevalence of 36.5% in the study is similar to the 30.5% reported in Jos, an urban centre;¹⁰ this condition was explained by the fact that intestinal parasitism is higher in rural areas than urban settlements.⁸

Hookworm was observed to be the most prevalent helminth responsible for intestinal parasitism registering 300 cases and a prevalence of 26.5% in the study population. This is high compared to the prevalence of 5.3% observed in a survey among primary school children in Jos. The difference may be attributable to the rural nature of our study area. In addition, Hookworm infestation is known to flourish in rural communities with moist sandy shaded soil and inadequate latrines¹¹.

The prevalence of *Ascaris lumbricoides* was found to be 0.8%. This is in agreement with the findings of Raji *et al*¹² who reported a prevalence of 2.5% for *A. lumbricoides*. However, it is at variance with the high prevalence of 74.1% reported in another study⁸. This can be attributed to both climatic and environmental conditions favorable to the transmission in their own study.

Helminthic infection was greater than protozoal infection, an observation that contrasts with that reported by Chaudhly *et al*¹³ in their own study. The protozoa seen in our study were mostly the non pathogenic protozoa, this may be explained by the high consumption of fruits and vegetables which abound in the local markets; although respondents claim to wash their fruits and vegetables before eating this may not be done properly or done with contaminated water.

The difference observed in prevalence between the schools was significant and this may be due to the fact that the schools were spread between semi-urban and rural communities. Prevalence was significantly affected by age of the respondent ($p > 0.05$), those between age groups 5 and 8 years recorded the lowest prevalence. It is suggested that this may be due to the local cultural habit where older children and adults resort to defecating in the open field in contrast to younger children who are guided to use the available toilet facilities in the home. This finding contrasts with the survey done in Pakistan which the authors concluded that older children had better hygiene education than younger ones.¹³

The source of drinking water was related to the prevalence of intestinal parasitism and it was observed that the highest prevalence of 35.5% was seen among respondents who use well water. This is because most respondent have poorly covered wells located and shared by the community as the only source of drinking water thus strengthening the transmission chain.

In relation to the type of toilet facilities it was observed that those that use open field had the highest prevalence of 41.9%; the study area being largely

agrarian society subsistence farming is practiced by all family members on the same field used as open toilet. In addition most of the schools have improperly maintained toilet facilities or no toilet at all. This is buttressed by Hookworm being the most prevalent parasite. This study also found out that prevalence of intestinal parasitism among primary school children in the study area was influenced by shoe wearing habit as those that wear shoes had a lower prevalence compared to those that do not. This maybe directly related to the socio-economic status of their parents. Most parents could not afford buying shoes for their wards or at most provide rubber slippers which make penetration by the most prevalent parasite easy.

In conclusion this study highlights the prevalence of intestinal parasitism among primary school children in Wukari, Nigeria. The overall prevalence of 36.5% is high and calls attention to the relevant authorities concerned to control the scourge by providing basic amenities and emphasizing good hygiene practices among primary school children.

Acknowledgement

The authors wish to show my sincere gratitude to the Director, Primary Education Board Wukari for the permission to carry out the work in the primary schools selected for the study. Also our gratitude goes to the Director, Primary Health of the same L.G.A for his own contribution during the course of the study. we want to appreciate the laboratory staff of General Hospital Wukari.

References

1. World Health Organization. Prevention and control of intestinal parasitic infection. Report of WHO Expert Committee 1987: p1-189.
2. Coulibaly JT, Fürst T, Silué KD, et al. Intestinal parasitic infections in school children in different settings of Côte d'Ivoire: effect of diagnostic approach and implications for control. *Parasit Vectors* 2012;5:135-145.
3. Tanner M. Evaluation of public health impact of schistosomiasis. *Trop Med Parasitol* 1989;40:143-148.
4. Evans DB Jamison DT. Economics and the argument for parasitic control. *Science* 1994; 64: 1866-1867.
5. Elekwa DE, Ikeh EI. A survey of the incidence of intestinal parasites among primary school children in relation to the socio economic factors in Jos. *Nigeria Medical Practitioner* 1996; 31:60-62.
6. Adekunle L. Intestinal parasites and nutritional status of Nigeria children. *Afr J Biomed Res.* 2002; 5:155-159.
7. Ijagbone IF, Olagunju TF. Intestinal helminth parasite in school children in Boripe Local Government Osun State Nigeria. *Afr. J. Biomed. Res* 2006; 91:63-66.
8. Runsewe-Abiodun TI, Adebisi O. Study on prevalence and nutritional effect of helminthic infection in pre-school children in Nigeria. *Nigeria Medical Practitioner* 2008; 54:16-20.
9. Allen AV, Ridley DS. Further observation on the formol ether concentration technique for fecal parasite. *J Clin*

- Pathol. 1970; 23:545-546.
10. Ikeh EI, Obadofin MO, Brindero B, et al. Intestinal parasitism in rural and urban areas of north central Nigeria. *The Internet Journal of Microbiology* 2006; 2[1] DOI: 10.5580/1e43.
 11. Brooker S, Bethony J, Hotez PJ. Human hookworm Infection in the 21st Century *Adv Parasitol.* 2004; 58:197-288.
 12. Raji P, Belay G, Erko BI, Legesse M, Belay M. Intestinal parasitic infection and malnutrition amongst first cycle primary school children in Adama, Ethiopia. *Afr. J. Prim Health Care Fam Med* 2011;3:198-203
 13. Chaundhry ZH, Afzal M, Malik MA. Epidemiological factors affecting prevalence of intestinal parasites in children of MuzaalFarabad district. *Journal of Zoology* 2004; 36:67-71.