Prevalence of intestinal parasites among primary school children in Makurdi, Benue State- Nigeria

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Citation

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Abstract

In order to identify the prevalence of intestinal parasitic infections and to determine the impact of some factors such as age, sex and complaints related to these infections, this cross sectional study was carried out on 1000 stool specimen of primary school children in Makurdi, Benue State-Nigeria. Using direct smear and formol ether sedimentation techniques to process the faeces, 585(58.5%) of the samples were found positive for various intestinal parasites with Hookworm species accounting for 34.2%; Ascaris lumbricoides 16.1%; Trichuris trichiura 15.9%; Enterobius vermicularis 6.2%; Strongyloides stercolaris 1.7%; Taenia spp 3.9%; Hymenolepis nana 1.8%; Schistosoma mansoni 0.6%; Entamoeba histolytica 2.2%; Entamoeba coli 1.5%; Giardia lamblia 1.3%. Cases of polyparasitism were also detected but none of the pupils had more than three parasite species. Sex and age did not affect the pattern of infection (P>0.05) since the parasites were similarly found in both sexes and all age groups though with observable varying degree. Results also showed that the average school pupil in Makurdi carry heavy intestinal parasites burden. It is concluded that sanitary measures and deworming program should be conducted in primary schools to decrease the rate of intestinal parasitic infections.

INTRODUCTION

Intestinal parasitic infections are among the most common infections worldwide[9, 6, 3]. However, the prevalence of intestinal parasitic infections varies considerably from place to place in relation to the pattern of transmission of the disease[7]. Public health specialists are concerned that these infections impair children's growth and development[12,13].

Estimates by WHO shows that about 3.5 billion are affected with intestinal parasites[11]; 450 are ill as a result of these infections, the majority being children[10]. The helminthes Trichiuris trichiura, Ascaris lumbricoides and the hookworms as well as the protozoa Entamoeba histolytica have been observed to cause infection in 800, 1400, 1200 and 48 million people respectively worldwide. Multiple infections by these parasites, e.g hookworm, roundworm and amoeba also occur[9,5]. The public health importance of gastro-intestinal tract parasites is due to their high morbidity in school children and women during their child-bearing years. Children are the most affected due to the heavy infections they harbour and because of their vulnerability to nutritional deficiencies[7,8]. This study was undertaken to determine the prevalence of intestinal parasites and infection patterns among school children in Makurdi and also determine the various complaints of intestinal parasitic infections in the affected children.

MATERIALS AND METHODS

STUDY AREA

The study was carried out in Makurdi, capital of Benue State, Nigeria between January and June 2006. The climate of the area is tropical and the vegetation characteristic is predominantly guinea savanna with an annual rainfall of about 1000 mm. The temperature range between 21.7° C to 24.7° C and a maximum of 29.7° C to 33.7°C. There are two distinct seasons the wet and dry seasons. The former lasts between April and October, while the latter from November to March.

STUDY POPULATION

Prior to the start of the research work, permission was sought from the school authorities and parents of the enrolled pupils were duly informed. The stool samples of 1000 pupils aged between 6-17 years were examined. The faecal samples were processed using direct wet preparations in normal saline with Lugol's iodine, further examination was done by the formol ether sedimentation technique[1]. To evaluate symptoms related to intestinal parasitic infections, a questionnaire was administered to each examined pupil and each pupil provided information on related symptoms like:

headache, nausea, abdominal pains, lack of appetite, perianal itching, salivation during sleeping, pains, intestinal dismotility.

STATISTICAL ANALYSIS

Frequency distribution tables, percentage prevalence and intensity of infection attributed to different intestinal parasitic infections are estimated using standard formulae. Chi-square test was used to compare differences in prevalence between age groups and gender. Data were evaluated by SPSS for windows (version 12.0) and the significant level was set at = 0.05

RESULTS

GENERAL PREVALENCE OF INDIVIDUAL PARASITES AMONG SCHOOL CHILDREN IN MAKURDI

The overall prevalence of intestinal parasite infections was 58.5% of 1000 children examined. Hookworm infection recorded the highest prevalence 34.2% followed by Ascaris lumbricoides 16.1% and Trichiuris trichiura 15.9% while Entamoeba histolytica and Giardia lamblia recorded the least prevalence with 1.5% and 1.3%. respectively .(Figure 1).

Figure 1

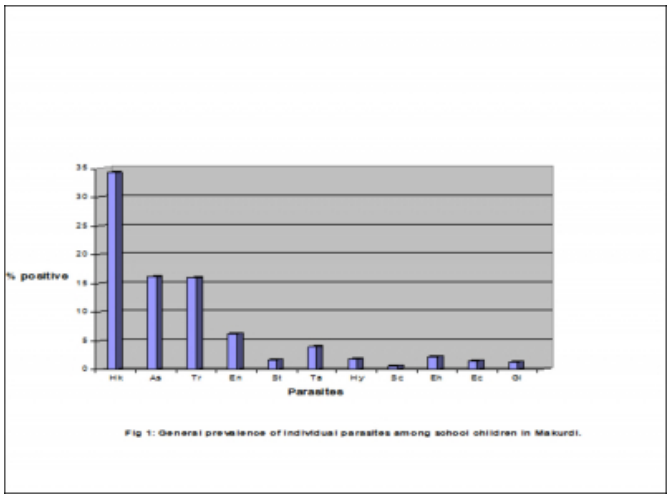

Fig 1: General prevalence of individual parasites among school children in Makurdi.

Key:

Hk = Hookworm, Ta = Taenia spp, St = Strongyloides stercoralis , Ec = Entamoeba coli

Gl = Giardia lamblia, As = Ascaris lumbricoides , Hy = Hymenolepis nana ,Tr = Trichuris trichiura ,Sc = Schistosoma mansoni

En =Enterobius vermicularis Eh = Entamoeba histolytica

PATTERN OF SINGLE AND POLYPARASITISM IN SCHOOL CHILDREN

During the survey multiple infections were encountered but none of the pupils had more than three parasites at once. Prevalence of double infections was 30.42% and that of triple infection was 3.24% (Table1). The common double infections encountered were those of Hookworm + Ascaris lumbricoides (73); Hookworm + Trichuris trichiura (54); Ascaris lumbricoides + Trichuris trichiura (51). The triple infections encountered were those of Hookworm + Ascaris lumbricoides + Hymenolepis nana (8); Ascaris lumbricoides + Entamoeba histolytica + Trichuris trichiura (11).

Figure 2

Table 1: Pattern of single and multiple parasitisms in school children

Type of infection	Number of pupils	percentage
Single	388	66.32
Double	178	30.42
• Hk+As	73	12.47
• Hk+Tri	54	9.23
• As+Tri	51	8.71
Triple	19	3.24
• Hk+As+Hym	8	1.36
• As+E.h+Tri	11	1.88

DISTRIBUTION OF INTESTINAL PARASITES BY AGE

The prevalence of intestinal parasites by age showed that the age group 12-14 recorded high prevalence rates for the helminths except for Enterobius vermicularis which was higher in the 6-8 age groups. The leading parasitic infections among this age group were: Schistosomiasis 50.00% ascariasis 46.58% ,hookworm infection 44.44%, taeniasis 41.02%, trichuriasis 39.62%, and with some protozoan such as E.histolytica 54.54% and E coli 46.00%. The lowest prevalence of the different species was observed among the 15-17 years age groups. This was not significant (X^2=43.22, P>0.05) because the parasites were found in all age groups. A summary of the results is given in Table 2.

Figure 3

Table 2 : Distribution of intestinal parasites by age among primary school children in Makurdi.

	Parasites species (%)										
Age groups	Hookworm	*Ascaris*	*Trichiuris*	*Enterobius*	*Strongyloides*	*Taenia spp*	*H.nana*	*S.mansoni*	*E.histolytica*	*E.coli*	*G. lamblia*
6-8 (n=159)	28 (31.57)	19 (17..11)	28(25.68)	9 (22.50)	2 (12.5)	1 (5.00)	3 (25.00)	0 (0.00)	0 (0.00)	1 (10.00)	2 (25.00)
9-11 (n=342)	90 (37.19)	29 (28.12)	29 (26.60)	15 (37.50)	11 (68.75)	2 (9.52)	2(16.66)	2 (33.33)	7(63.63)	3 (30.00)	3 (37.50)
12-14 (n=424)	102 (42..14)	55 (49.54)	43 (39.64)	14 (35.0)	2 (12.5)	11 (52.38)	5 (41.66)	3 (50.00)	2 (18..18)	4 (40.00)	2 (25.00)
15-17 (n = 75)	21 (18.67)	8 (7..20)	9 (8..25)	2 (5.00)	1 (6.25)	7 (33.33)	2 (16.16)	1 (16.66)	2 (18..18)	2 (20.00)	1 (12.50)
Total	241	111	109	40	16	21	12	6	11	10	8

DISTRIBUTION OF INTESTINAL PARASITES BY SEX AMONG PRIMARY SCHOOL CHILDREN IN MAKURDI.

The distribution of parasites species among sex groups is given in Figure 11. Males recorded high prevalence with Ascaris lumbricoides 95(19%); Trichuris trichiura 88(17.6%); Strongyloides stercolaris 12(2.4%); Entamoeba histolytica 15(3%); Giardia lamblia 8(1.6%) while females recorded high prevalence with hookworms 175(35%); Taenia spp 21(4.2%) and Schistosoma mansoni 4(0.8%). However, these differences were not significant (X^2=8.29; P>0.05)

Figure 4

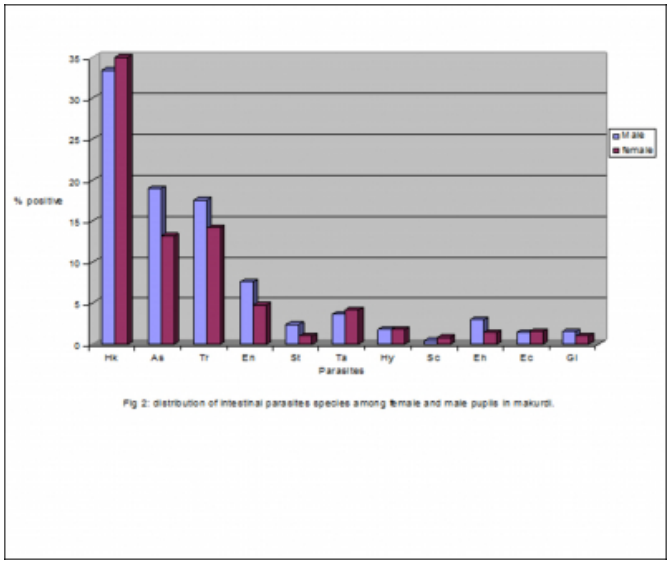

Fig 2: distribution of intestinal parasites species among female and male pupils in makurdi.

PREVALENCE OF COMMON SYMPTOMS ENCOUNTERED AMONG INFECTED AND NON-INFECTED SCHOOL CHILDREN.

The most frequent complaints related with any intestinal parasites was headache 66.20%; nausea 48.62%; abdominal pain 39.20%; lack of appetite 32.3%; perianal itching 19.7%; salivation during sleeping 23.5%; pains 36.43%; intestinal dismotility 6.8%. (Table 3).

Figure 5

Table 3: Prevalence of common symptoms encountered among infected and non-infected school children

Complaints	infected children (%)	Non-infected children (%)
Headache	662(66.2)	246(24.6
Abdominal pain	392(39.2)	148(14.8)
Lack of appetite	323(32.3)	226(22.6)
Nausea	456(45.6)	172(17.2)
Pain	364(36.4)	133(13.3)
Perianal itching	197(19.7)	83(8.3)
Intestinal dismotility	88(8.8)	16(1.6)
Salivation during sleeping	230(23.0)	174(17.4)
Irritability during sleeping	-	69(6.9)
Teeth grinding	53(5.3)	7(0.7)

DISCUSSION

Hookworm infection, the highest observed in this study occurs mostly in tropical and subtropical regions of the world usually involving school children associated with unsanitary conditions such as lack of sanitation facilities especially latrines. This results in the contamination of the soil with eggs and larval of the parasite to which these children are exposed; however the common habit of walking and working barefoot result in higher exposure of these children to the infective larvae. The sandy soil and rainfall observed in the study area contribute to the development of oval and larval stages of the parasite and its possible transmission to man. It is known that sandy soil allows oxygen needed for the development and movement of larvae in the soil, and rainfall provides soil moisture which aid migration of infective larvae to the soil surface and penetration of the host's skin. It is also shown that the optimum temperature for the development of hookworm larvae is between 7° and 31°C and is observed in the study area.

The occurrence of polyparasitism in this study compares favourably with that of [3] during the study of the prevalence of intestinal parasites in school children of primary school age. The commonest was the combination of Hookworm and Ascaris lumbricoides; Hookworm and Trichuris trichiura; Ascaris lumbricoides and Trichuris trichiura which seems to

be the norm in many Nigerian parasite supporting communities. This may be due to the fact that an already established parasite through its activities may create an environment within the host which will be suitable for just a few other parasites since only 3.24% had up to three parasites in this survey.

Our finding indicates that younger children (below 14 years) recorded higher prevalence of infection than older ones. Pupils in these age groups often spend more of their leisure time out doors, playing and or foraging in garbage dumps and eating discarded food remains on the street. They are also more often in contact with sand and eat indiscriminately with unwashed hands. In sharp contrast the low prevalence of infection observed in the 15-17 years age group may be due to the fact that at this age young people become more hygiene-conscious about their looks as compared to the lower age group and hence are able to avoid as much as possible what would lead to one being infected. This is consistent with the findings observed in Kaduna and Abia States respectively[7,8].

The distribution of parasites among sex groups showed that more males were infected than females. This agrees with the findings of [5] during an epidemiological study of gastrointestinal helminths among pupils in urban and sub-urban communities in Nigeria. This high prevalence associated with males may be due to the fact that they are more often engaged in predisposing activities such as football, barefoot and also playing in streams or ponds.

In this current study, most of the complaints by the children population were not significantly related with the intestinal parasitic infections ($r = 0.42$, $P>0.05$). For example abdominal pains (39.2%), lack of appetite (32.3%) and headache (66.2%), pain 36.4% were noted in 83.2% of the children examined. There was no significant difference in the prevalence of these symptoms in infected and non-infected children.

CONCLUSION

It is well known that intestinal parasitic infections are more common in children. These infections deteriorate the psychological and physical development of the children and various symptoms such as malnutrition, emaciation, abdominal pains, mental backwardness, poor growth. Some of these features were observed physically among some of these children sampled and some indeed complained of these symptoms associated with intestinal parasites. Children with intestinal parasitosis become an infection focus for the community. If left untreated serious complications and even death may occur due to these intestinal parasitic infections. Therefore, it is recommended that local health officers should visit the school regularly for routine deworming and health education to improve conditions. People should be also informed about the signs, symptoms and prevention methods of these parasitic diseases.

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References

1. Cheesebrough, M. Medical Laboratory Manual for Tropical Countries. 2nd Edition University Press Cambridge (1992). Pp 20-357.
2. Crompton, D.W.T and Savioli, L. Intestinal parasitic infections and urbanization.Bull.Wld.Hlth. Org. (1993), 71: (1) 1-7.
3. Enekwechi, L.C and Azubuike, C.N. Survey of the prevalence of intestinal Parasites in school children of primary school age. W. Afr. J. Med. (1994), 13(4) 227-230.
4. Feachem, R.g., Jamison, D.T. Disease and Mortality in Sub-Saharan Africa. Oxford University Press. (1991).750pp
5. Ikon, G.M and Useh, M.F. Epidemiology of gastro-intestinal helminthosis among pupils in urban and Sub-urban communities in Nigeria (1999) J. Med. Lab.Sci.8:1-6.
6. Kang, g., Matthew, M. S., Rajaw, P.D., Daniel, D.J., Mathan, M.M., Mathan, V. I,Muliyil. Prevalence of intestinal parasites in rural Southern India.Trop Med .Int.Hlth (1998). 3(1): 70-75.
7. Luka, S.A., Ajogi, I.,Umoh, J.U. Helminthosis among primary school children in Lere Local Government Area, Kaduna State, Nigeria. The Nigerian journalof Parasitology (2000). 21:109-116.
8. Smith, J.D. Animal Parasitology, 3rd edition, Cambridge University Press, Cambridge. 549pp.
9. Ukpai, O.M. and Ugwu, C.D. The prevalence of gastro-intestinal tract parasites primary school children in Ikwuano Local Government Area of Abia State, Nigeria.The Nigerian Journal of Parasitology (2003). 24:129-136.
10. WFP/UNESCO/WHO. School Feeding Hanbook. Rome, World Food Programme (1999).
11. WHO. Intestinal parasite control: Burden and Trends. Document No. WFP/UNESCO/WHO, (1998b) 98:24.
12. Munis, P.T., Ferreira, M. Intestinal parasitic infection in young children in Sao Paulo, Brazil. Annals of Trop. Med. Parasitol, (2002). 92: 209-217.
13. Rumona, C.D., Awashi, S. effect of treatment for intestinal helminth infection on growth. Bio.Med. J. (2000). 24, 320(7251): 1697-1701.

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