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Hookworm and Ascaris Infections among School-Aged Children in Ehime Mbano Local Government Area of Imo State, Nigeria

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Abstract

Parasitic helminthes are of great concern to man in developing countries, hence investigation on the prevalence of Ascaris and Hookworm was carried out to enlighten people of the harm associated with the infection and possible ways of controlling and reducing the infection. 96 volunteers between 6-12 years of age were used for the study. The fecal samples were collected and examined using saline and iodine on wet mount and keto thick smear technique period before 44.8% infected out of 96 children was 43 children of which 27 (28.1%) were infected with *A. lumbricoides* as single infection 05 (5.2%) were infected with Hookworm and 11 (11.4%) had mixed infection of *A. lumbricoides* and Hookworm infection. The prevalence rate was higher in male 28 (58.3%) than female 15 (31.3%), thus a significant difference ($P<0.05$). The 10-12 years of age exhibited higher prevalence 24 (50%) than 6-9 years of age 19 (39.6%). It was recommended that prompt health education, good hygienic practices, provision of latrines and mass chemotherapy will go a long way in reducing the infection rate.

Keywords: *Ascaris lumbricoides*; Hookworm; Parasitic Infection

Introduction

Parasitic helminthes are the most common cause of chronic infection in humans in most developing countries [1,2]. Many communities are in dire need of essential amenities like good portable water, basic good health and education. Lack of these basic amenities are common in rural communities and urban slums in Nigeria. To this effect children growing up in such communities are expected to be infected and re-infected constantly in their life time.

The public health implication of this infection includes stunted growth, malnutrition, impairment of intestinal and cognitive development in school aged child [3].

High infestation of helminthic infection among children in developing countries especially in sub-Saharan Africa [4] mirrors severe shortage in health care, education, transport and poverty [5]. The attention and emphasis on improvements in child survival and the increase in the number of children living beyond the age of five in many developing countries like Nigeria, has now shifted to health and nutrition of school children [2,6]. This in turn has yielded excellent cost effective opportunity for educational, economic and development gains [7].

In Nigeria, basic education is received in the Primary schools, where the enrollees are of school age and the group frequently and severely infected with helminthes. Thus could thwart the efforts of countries like Nigeria where over 70% of school aged children are involved in primary school [8]. Evidence abound of low school based health services like treatment of schistosomiasis and intestinal nematode infections which can be delivered at low cost and contribute to the improvement of the general wellbeing of the children in terms of improvement in growth, nutritional status, cognitive ability and school attendance [9-14]. In Nigeria Intestinal parasites have continued to prevail because of low level of living standards, poor environmental sanitation and ignorance of simple health promoting factors. Although the prevalence rate of individual parasite vary considerable in different parts of the country. Several studies show that *A. Lumbricoides* is the most prevalent intestinal parasite, followed by hookworm, *T. trichma* and *Strongyloides sterocoralies* [15]. Helminth infection is acquired mostly in unclean environment of poor sanitation and unhygienic habits. Globally more than 3-5 billion people are infected with intestinal worms and the most vulnerable are often children between age 5 years and 15 years [16]. Health and wellbeing of children is very important in attaining academic excellence. This study was carried out to determine the prevalence rate of *Ascaris lumbricoides* and hookworm infection among school aged children in Ehime Mbano LGA of Imo State in view of reducing the prevalence rate to the barest level. Thus the need to investigate the prevalence of Ascaris and Hookworm infections among school children in Ehime Mbano LGA of Imo State, Nigeria. With the bid to prefer solution on how to reduce the prevalence rate among school aged children.

Methodology

Study area

The study was carried out in Ehime Mbano Local government Area of Imo State which has estimated population of about 130, 931 as at 2006 census with land mass of 169 square km Ehime Mbano lies [17]. The inhabitants of the area are mainly farmers, traders, artisans and civil servants. The sanitary condition of the area is poor as some communities still defecate in bushes and during the raining season this is easily washed into the nearby water body.

Sample collection

96 fecal samples were collected from four primary schools namely St. Micheals primary school Umukabia, Central school Umuakagu,

Central school Umuezeala Owerre and Central school Umueze ll. The sample bottles were the wide mouthed type, with provisions for name, age and sex. The volunteers who participated in the study were instructed to bring their early morning stool samples devoid of urine. The samples were collected and taken to the laboratory and the analysis was carried out using direct wet preparation in normal saline and lugol's iodine. Furthermore a little portion of feaces was mixed with 2 drops of 0.85% saline solution on a slide, and a drop of iodine was added and examined under the microscope. A portion of the fecal sample was examined using kato thick smear techniques. Eggs counts per slide were converted into eggs per gram of feces (EPG) by multiplying number of eggs on a slide with 24.

1. The eggs of *A. Lumbricoides* were identified using the under listed criteria measures 45-75 mm long by 33-50 mm wide and bile stained in colour. It is broadly ovoid with a thick transparent shell composed of three layers.
2. While eggs of hookworm measures 55-65 mm averagely 60 mm long by 36-40 mm diameter, it is oral in shape with thin vitelline layer and colourless with broadly rounded exberuties (Figure 1).
3. Justification for the use of Kato-Katz technique, mild infection can be detected, microscopic examination is made easier bars materials for preparing the diagnostic kits are easy to obtain orally and preparation can be performed in the field.

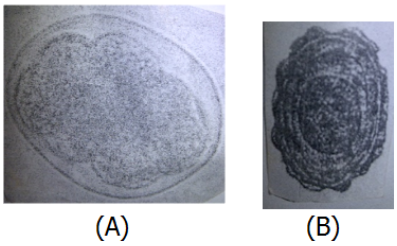

Figure 1: Structure of (A) Hookworm and (B) *Ascaris lumbricoides*.

Results

The results of the investigation revealed that out of the 96 samples examined, only 43 (44.8%) samples were positive for *A. lumbricoides* and hookworm infections. *A. lumbricoides* had the prevalence of 27 (28.1%), mixed infection of Ascaris and hookworm 11 (11.4%) and by hookworm 5 (5.2%) (Table 1).

In Table 2, the results revealed that out of the 48 male school aged children tested 28 (65.1%) were infected with Ascaris & hookworm infection while 20 (41.6%) were not infected. Out of the 48 female school aged children tested, only 15 (31.3%) were infected while 33 (68.7%) were not infected.

The male pupils had the highest infection as shown in Table 2. Out of the 43 pupils infected 28 (65.1%) were male while 15 (34.9%) were females.

Infection	No(%)+ve	N0.(%) – ve
Ascaris lumbricoides	27 (28.1%)	40 (41.6%)
Hookworm	05 (5.2%)	13 (13.5%)
Mixed infection	11 (11.4%)	-
Total	43 (44.8%)	53 (55.2%)

Table 1: Prevalence of Infection among school children in the four selected schools.

Sex	No. Examined	No (%) + ve	No (%) – ve
Male	48	28 (58.3%)	20 (41.6%)
Female	48	15 (31.3%)	33 (68.7%)
Total	96	43 (44.8%)	53 (55.2%)

Table 2: Prevalence of infection according to sex.

In Table 3, the age related prevalence among the school children used for the research are presented. In the 6-9 age group, out of the 48 children examined, only 19 (39.6%) tested positive for Ascaris & Hookworm infection while 29 (60.4%) tested negative. Within the 10-12 age group 24 (50.0%) tested positive likewise 24 (50.0%) were negative. In summary 43 (44.8%) were positive for Ascaris and Hookworm infection while 53 (55.2%) were not infected. It has been shown that 19 (39.6%) were infected in the 6-9 age group, 24 (50%) in the 10-12 yrs age group and the total prevalence was 44.8% against 55.2% not infected.

Age group	No Examined	No + ve	No - ve
6-9	48	19 (39.6%)	29 (60.4)
10-12	48	24 (50.0%)	24 (50.0%)
Total	96	43 (44.8%)	53 (55.2%)

Table 3: Age Related Prevalence of Infection among the school children.

Discussion

The results of the study revealed a relatively high infection of Ascariasis & hookworm infection among school children in Ehime Mbano LGA of Imo State. The survey covered 96 pupils aged 6-12 years from four primary schools. Infection with *A. lumbricoides* only had a prevalence rate of 28.1% as against mixed infection of *A. lumbricoides* and hookworm 11.4% and 5.2% observed with Hookworm infection while the overall prevalence level of 44.8% was high when compared with the findings of Rwang et al. in Obehie Ukwa West LGA of Abia state. This posits that the hygienic habits & sanitary conditions of an area can influence the distribution of infection. The results show that prevalence infection was lower among the 6-9 years age group. In the same manner the level of prevalence was higher among the male 58.3% against 31.3% in females.

The overall result of the study is consistent with the findings of [18] and in Ebenebe Town, Anambra state, which states that intestinal helminthiasis caused by *A. lumbricoides* and hookworms are common in rural areas of Nigeria. The common prevalence of Ascariasis observed in this study has also been observed in other studies in Southern Nigeria [19] and Hookworm infections are also prevalent in Nigeria depriving children of the much needed nutrient required for development and growth [20]. Similarly the prevalence of feco orally

transmitted intestinal helminth reported in the study is closely related to the habits mentioned in [21].

However, the prevalence rate in the study differed from those of [22] which reported that hookworm has the highest prevalence rate. Thus the lower prevalence of hookworm as against Ascarisis could be as the result of the improvement in the use of protective wears like foot wears which hinders contamination. In the study, the prevalence of the infections increased with age and is similar to the findings of [23] that attributed it to indiscriminate and care free habits of not washing their hands properly before eating as well as after playing in the school and working in the farm. To further buttress this [24] noted that unclean hands play vital roles in transmission of Ascariasis.

In summary *A. lumbricoides* the most occurring Helminthes in single infection (28.1%) and the mixed infection of 11.4% found in this study could have achieved the high prevalence through its simple life cycle, which merely require moist soil, however the sandy soil can be conditioned for the survival by the dumping of domestic refuse discarded from homes. Umukabia experiences adequate rainfall hence conducive environment for the eggs to hatch to the infective larva stage found in contaminated water or vegetable, hence hygienic handling of food and the water we drink will go a long way in reducing the transmission rate. The higher prevalence rate in male could be as a result of high active involvement in farming and sometime playing football on barefoot in contaminated field harboring the infective larva stage.

Conclusion

Ascariasis and hookworm infection is still prevalent in most rural communities and semi-urban areas with poor sanitary condition. Effective health education at the formative age can improve hygienic practices and reduce negative habits like eating foods and snacks wrapped with ordinary paper from doubtful sources and eating unwrapped fruits.

Finally improved sanitation and personal hygiene are vital in the control of the disease, availability of adequate water supply, construction of latrines are significant components in the control of Ascariasis and hookworm infection. Regular deworming of children by government and non-governmental organization should be practice particularly in developing countries. Also dietary supplement particularly iron tablets and prevention of soil pollution and proper sanitary disposal of faeces particularly in the rural areas is advised and will reduce the disease transmission.

References

1. Awasthi S, Bundy DA, Savioli L (2003) Helminthic infections. BMJ 327: 431-433.
2. Rwang PG, Effiom OE, Ukah SU, Matur MM (2014) The Prevalence of Ascaria and Hookworm Infections Among school children in Obehie, Ukwa-West Local Government Area, Abia State, Nigeria. Nigerian Journal of Parasitology 35: 65-69.
3. Ingram KI, Tassell MJ, Gaunt AJ, Kaltsoyannis N (2008) Covalency in the f element-chalcogen bond. computational studies of M[N(EPR2)2]3 (M = La, Ce, Pr, Pm, Eu, U, Np, Pu, Am, Cm; E = O, S, Se, Te; R = H, (i)Pr, Ph). Inorg Chem 47: 7824-7833.
4. Babamale OA, Ugbomoiko US, Nurudeen SA, Rukayat OH (2015) Hookworm infections among the school aged children in Okuta community Kwara state, Nigeria. Nigerian Journal of Parasitology 36: 33-37.
5. World Bank (1993) World Development Report: Investing in Health. Oxford University Press, New York.
6. Crompton DW (1999) How much human helminthiasis is there in the world? J Parasitol 85: 397-403.
7. Bundy DA, Guyatt HL (1995) The health of school age children: report of a workshop. Parasitology Today 13: 438 -443.
8. Del Rosso JM, Marek T (1996) Class action, improving school performance in the developing world through better health and nutrition. The World Bank washing.
9. Ola JA, Oyeledun B (1999) School health in Nigeria National Strategies pp. 81-84 in World Health Organization (Ed). Improving health through schools: National and International Strategies. WHO Geneva, Switzerland.
10. Stephenson LS, Latham MC, Adams EJ, Kinoti SN, Pertet A (1993) Weight gain of Kenyan school children infected with hookworm, Trichuris trichiura and Ascaris lumbricoides is improved following once- or twice-yearly treatment with albendazole. J Nutr 123: 656-665.
11. Stoltzfus RJ, Albonico M, Chwaya HM, Tielsch JM, Schulze KJ, et al. (1989) Effect of the Zanzibar school based deworming program on iron status of children. Am J Clin Nutr 68: 179-186.
12. Beasley NM, Hall A, Tomkins AM, Donnelly C, Ntimbwa P, et al. (2000) The health of enrolled and non enrolled children of school age in Tanga, Tanzania. Acta Trop 76: 223-229.
13. Drake LJ, Bundy DA (2001) Multiple helminth infections in children: impact and control. Parasitology 122 Suppl: S73-81.
14. Simeon DT, Grantham-McGregor SM, Callender JE, Wong MS (1995) Treatment of Trichuris trichura infections improves Growth, spelling, scores and school attendance in some children. J Nutr 125: 1875-1883.
15. Sam-Wobo SO (1999) Intestinal Helminthiasis in some rural communities Of Ogun State. M.Sc. Thesis of the Department of Biological Sciences, University of Agriculture, Abeokuta.
16. Luong TV (2002) Prevention of Intestinal worm infection through improved sanitation and hygiene.
17. http/en.m.wiki pecha.org.
18. Chukwuma MC, Ekejindu IM, Agbakoba NR, Ezeagwuma DA, Anaghalu IC, et al. (2009) The prevalence and risk factors of Geohelminth infections among primary school children in Ebenebe town Anambra state, Nigeria. Middle East Journal of Science Resources 4: 211-215.
19. Ogbe MG, Edet EE, Isichei MN (2002) Intestinal helminth infection in primary school children in areas of operation of Shell Petroleum development Company of Nigeria (SPDC), Western Division in Delta state. The Nigerian Journal of Parasitology 23: 3-10.
20. Udonsi JK, Amabibi MI (1972) The human environment occupation and possible water borne transmission of the human hookworm Necator Americans in evidence coastal communities of the Niger Delta, Nigeria. Public Health 106: 63-71.
21. WHO Expert Committee (2002) Prevention and control of schistosomiasis and soil-transmitted helminthiasis. World Health Organ Tech Rep Ser 912: i-vi, 1-57.
22. Aisen MSO, Adams MA, Wagbatsoma VA (2002) Intestinal lelminthiasis in Umokpe, an Onchocercerciasis endemic Community on Wermectin treatment. Journal of Parasitology 32: 153-158.
23. Dada-Adegbola HO, Oluwatoba AO, Falade CO (2005) Prevalence of multiple intestinal helminths among children in a rural community. Afr J Med Med Sci 34: 263-267.
24. Olsen A (2003) Experience with school-based interventions against soil-transmitted helminths and extension of coverage to non-enrolled children. Acta Trop 86: 255-266.