Helminth Parasitic Diseases Status of School Children within the Anambra River Basin Irrigation Project Area

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Abstract

The incidence of parasitic disease, especially infection with helminths, among school children within Anambra River Basin Irrigation Project Area in Ayamelum Local Government Area of Anambra State is reported. A cross section survey revealed the prevalence of hookworms, ascariasis, trichuriasis, trichuriasis, enterobiasis and taeniasis in school children. Analysis of the prevalence data showed that *Ascaris lumbricoids* (24%) is the dominant helminth parasite in the area while Taenia infection (6.7%) is the least prevalent helminth infection. Symptoms of many other parasitic diseases abound in the form of skin nodules (onchocerciasis), itching, rashes, abdominal problems and elephantiasis. Age of children affected the level of prevalence of the parasitic diseases e.g. younger children were more infected than the older children in many cases (except hookworm disease and filariasis). Poor sanitary conditions emanating from poor sewage disposal facilitates, poor potable water supply, full participation in irrigated rice farming and poor housing are factors affecting the parasitic disease status of the school children and possibly the whole communities.

Keywords: Helminths, Irrigation, Farming, Environment,

Introduction

One of the easiest ways of understanding the general health of any community or group of communities is to measure the health status of their children especially those of school age. A combination of factors such as poor environmental quality, limited access to preventive and curative healthcare etc. encourage the incidence of parasitic infections (Davis, 1983). Poverty, malnutrition, low income, high birth rates, illiteracy exacerbate the problem of parasitic diseases in tropical countries like Nigeria. In small villages of Nigeria, the parasitic disease burden on school children has been shown to be high even though many of the infections may not cause disease or mortality. They nevertheless have compromising effects on the immunocompetence of the affected children. Thus rendering the children easily susceptible to most of the endemic diseases like malaria flariasis, schistosomiasis and guinea worm.

Studies over the last two decades have shown that despite the low case fatality-rates, exposure to many parasitic disease lead to severe disability (De-Roy, 1987, Smith et al, 1989 and Ilegbodu et al., 1991). This coupled with low nutritional status affect the overall health outlook of the children.

The overall effects of developmental projects on the already bad situation concerning transmission of parasitic diseases is well known. This often relate to the alteration of man – habitat balance and also to population mobility, in addition to such factors as the course of water flow, vegetation cover and changes in the peoples value systems and habits. For children, the increased exposure due to social, recreational or occupational needs led to an upsurge of parasitic infections. Studies on parasitic disease burdens of school children in organized farming establishment is rarely found in the literature especially in Nigeria. With the long term existence to the irrigated rice farming project around Omor and adjourning villages, a good opportunity of acquiring baseline information for similar projects across Nigerian presented itself. The various physical activities of children also expose them to contaminated environment and it is always difficult, for instance to enforce that when away from home, they should continue to wear protective clothings against the bites of insect vectors of parasites.

In Anambra River Basin Irrigation project Area, network of canals criss cross-large expanse of rice farms even into the hinterland. The young and old are all involved in rice farming. The canal water is a recreational area for both children, nomadic, Fulani cattle rearers and their cattle and it is also the main source of water supply for surrounding communities where wells could not be afforded. Latrines are discouraged in the communities because of the low water table.

In view of the forgoing situations, this study was carried out to access the extent of helmith infections among children in this irrigation project area. Thus, this study was designed to gather information on helmith parasitic diseases status of the school children in communities within the Anambra River Basin Irrigation project area and also to give information on the nature and patterns of the infections.

Materials and Methods

The study area and sample size: The Anambra River Basin Irrigation project area covers areas within latitudes 6^0 05^1 to $6^0 10^1$ N and Longitude $6^0 04^1$and $7^0 03^1$E. Towns covered by this irrigation project include communities in Ayemelum Local government Area of Anambra State. These include Omor, Omasi, Umumbo, Ifiteagwari, Anaku, Igbakwu, Umueje and Umerum.

The communities selected for investigation of helmimth parasites among school children include Umumbo, Omor, Omasi Ifieogwari and other communities around the irrigation project areas such as Adani and Umulokpa.

A total of three hundred and fifty children were sampled in the investigation. Four primary and three secondary schools were selected for investigation. The sampling method adopted was the lottery method according to Christenson et al (1987).

Collection of Specimens: Two labeled wide mouth plastic specimen bottles were given to each child. Mature pupils in primary schools and students in secondary schools were taught how to collect and transfer their faecal samples into the specimen bottles while this was done for younger pupils. Care was taken to collect materials from both inside and surface of the faeces.

Urine samples collected were about half full in each of the specimen bottles which are capable of taking about 50ml of urine. Both samples were collected between 9.00am and 12.30pm. 10% formaldehyde solution was added to the faecal samples while about 1ml of 1% v/v of domestic bleach was added to 10ml of each urine sample as preservative when these samples could not be examined the same day as recommended by Teschareon (1983).

Faecial analysis

1. ***Direct feacal examination:*** A drop of eosin solution was placed on a slide and about 2mg of faeces placed on it. This was mixed with eosin using a wire loop and then covered with a cover glass and examined under the microscope.

2. ***Formol ether concentration***: This method was based on the method in Ritchie (1948) and Erdman (1981). Using a glass rod, about 1 gram of faeces was emulsified in 40ml of 10% formol water contained in a screw cap tube. Samples from the surface and center of the faeces were included. About 3ml of 10% v/v formol water was further added. The tube was capped and the content mixed thoroughly by shaking for about 20 seconds. The emulsified faeces was sieved by being passed through a two layered gauze. The sieved suspension was collected in a beaker and then transferred to a 15ml conical centrifuge tube and about 4ml of ether added. The tube was centrifuge at 3000 rpm for one minute. After centrifuging, the layer of faecal debris from the sides of the tube were loosened and the tube rapidly inverted to discard the ether, faecal debris and formol water. The tube was returned to its upright position and the fluid from the sides of the tube was allowed to drain to the bottom of the tube. A plastic bulb pipette was used to mix the sediment. The whole sediment was transferred to a glass slide and then examined under the microscope.

Table 1: Distribution individual helminth parasite and rate of parasitic infection on each school distribution or period

Schools	No Examined	No Infected	Hookworm	Ascaris	Taemia	Trich	Entero	Total	Mean for schools
PPS Umumbo	50	37	4	19	3	7	7	40	8.00
CS Adani	50	25	3	11	3	6	8	31	6.20
CS Omor	50	22	4	8	2	9	7	30	6.00
CS Omasi	50	28	2	14	2	10	8	36	7.20
CSS Umunibo	50	46	21	12	36	14	7	60	11.40
CSS Ifite Ogwari	50	34	8	13	7	10	4	42	8.40
CSS Akaiyi Umulope	50	26	5	9	1	7	1	23	4.60
Total for Parasite	350	218	47	86	24	63	42	262	
Mean for Parasite			6.71	12.29	3.43	9.00	6.00		

***LSD** (0.05) for schools = 0.49; **LSD** (0.05) for parasites = 0.21*

Analysis of the urine samples: Each of the urine samples was thoroughly shaken and about 10ml of urine was collected with a syringe and transferred to 15ml conical centrifuge tubes. They were centrifuged at 2000 rpm for five minutes. The supernatant was decanted from each tube and about one-fifth of the urine left shaken with the sediment. This was placed on a side after iodine solution was added. The slide was then examined under the microscope.

Results

Distribution of Individual Parasite among the schools and the rate of Parasitic Infection in each school: There were significant differences in the rate of infection among the parasites ($p<0.05$). The mean rate of infection ranged from 3.43 for *Taenia* to 12.29 for *Ascaris (*Table 1). However, the rate of infection with *Ascaris* did not differ significantly from others and the infection rate of *Taenia* did not differ statistically from *Enterobius* and Hookworm.

There were also significant differences in the rate of infection among the schools with the mean rate of infection ranging from 4.6 for C.S.S Akiyi Umulokpa to 11.4 for C.S.S Umumbo. The rates of infection in C.S.S Umumbo differ significantly from other schools. Close values for the rates of infection with individual parasites in relation to sex is observed from Table 2. Girls as well as boys are infected similarly by the individual Parasites in all the schools.

Discussion

Various parasitic infections on school age children has been reported in different areas of the world (Bundy and Coper, 1989; Ivoke, 1990; Noke et al, 1994; Booth and Bundy, 1995; Larva et al, 1995 Hadju et al, 1996).

Table 2: Individual parasitic infection in relation to sex

SEX	No Examination	No Infected	% Infection
	HOOKWORM		
Male	175	22	12.6
Female	175	25	14.6
	ASCARIS		
Male	175	47	26.9
Female	175	39	22.3
	TEAENIA		
Male	175	9	5.1
Female	175	15	8.6
	TRICHURIS		
Male	175	35	20
Female	175	28	16
	ENTEROBIUS		
Male	175	24	13.7
Female	175	18	10.2

It is understood that infection is related to factors such as the parasite pathogenicity, the host in relation to its susceptibility, and then the environmental conditions. Many factors occur for this situation. For instance, man, in an attempt to make himself more

comfortable is forced to explore new grounds for expansion in agriculture and infrastructural establishments. To achieve this in most cases, forest covers are cleared, roads, bridges, canals and similar structures are constructed. These changes in the environment consequently result in the presence of parasites in such places which in most cases wouldn't support the parasites. This situation observed by Ezigbo (1983), amplifies the changes in the ecological stability leading to increase in the prevalence rates and development of stable patterns in protozoa and helminth parasites epidemiology.

In most developmental projects, like in the study area, the rural communities suffer as a result of their inability to influence health policies in their locality to favour them (Davis, 1983). Ezigbo, (1983) descried lack of involvement to biologists and parasitologist in developmental programmes. This may have equally been the case in the establishment of the Anambra River Basin irrigated rice project. It is worthy to note here in this regard that proper amenities by way of equipping communities included in this irrigation project against the negative outcomes of the new development was either lacking of insufficient. On the part of the community members, it has also created an "agricultural tension" where every member of the community is involved. In all the communities sampled, children six years of age were already involved in field agriculture. With the low level of immunity of children to parasites and their habit, they are therefore at risk of parasitic infections as a result of contact with the contaminated environment. Exposure and contacts as a matter of fact has been recognized as the major means of infection with all parasites (Anya and Okafor 1986; Barnish and Ashford, 1989, Ivoke 1990; Amazigo 1991; Adams et al 1994).

Among all water contacts parasites, infection with *Schistosoma* and *Dracunculus* are very popular (Ivoke, 1990, Emejulu et al 1994). Infection with many other parasites through water contact cannot be ruled out depending on the water use system. Whether water contact parasites such as *Schitosoma* and *Dracunculus* are present in these communities will just be a matter of time. This is because all conditions are nearly provided for their arrival and establishment. Canal water is contaminated directly or indirectly through careless sewage disposal. Careless sewage disposal or contact with contaminated sewage has been the prime source of *Enterobius, Ascaris* and *Trichuris* infections as reported in Chad, Peru, Afghanistan and Taiwan (Chen, 1946: Nelson, 1972; Meakin et al 1981 Bundy and Cooper, 1989).

Seo et al (1979), emphasized the relationship between sewage disposal and *Ascaris* infection. *Trichuris* infection may also have principally originated in the same way since according to Halloran et al (1989), the two parasites share the same transmission routes and the same geographical distribution increasing the probability of simultaneous infections.

These diseases are wide spread and illustrate the verity of mechanisms through which developmental projects created health problems to benefiting communities.

Disease specific median reduction levels in morbidity are improved by water supplies and or sanitation for Ascariasis up to 29%, for Schistosomiasis and Dracunculiasis up to 77% and 78% respectively (Esrey et al, 1991).

For hookworm and ascariasis, the reduction in disease severity is usually greater than in incidence or prevalence. Thus improved water supply for personal and domestic hygiene is important in reducing the rates of these helminth infections. Sanitation facilities when provided would decrease morbidity and motility due to these parasites and will reduce the severity of hookworm infection.

In the U.S.A. the prevalence of Ascaris spp. among all age group was reduced by 71% for people with flush toilets and indoor plumbing compared with a group that had lavatories but no well water (Anon, (1988).

Of 11 studies on hookworm infection and environmental factors, 5 reported positive findings involving water supply and sanitation, while 3 involving sanitation only. To achieve better health impact, attention should be paid to safe excreta disposal and proper use of water for personal and domestic hygiene rather than to drinking water quality.

Sanitation facilities should be installed and culturally appropriate to ensure acceptance. Access to water supply should

be as close to home as possible. Health education should be encouraged.

There has not been an establishment rule about sex differences in relation to infection of most parasites (McGarvey, 1992). These differences where they exist may be role related as observed in some parts of Nigeria in *Schistosoma* and *Dracunculus* infections (Anya and Okafor, 1986; Ivoke, 1990; Emejulu et al 1994). Infection due to sex differences as recorded in this work does not show variation. Boys as well as girls are infected similarly by all parasites.

In summary, enlightenment of basic hygiene need to be stressed through available media in the study area to reduce morbidity with helminthes on people and government legislation need to be established to discourage public toilet system.

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