SCHISTOSOMIASIS INFECTION IN PRIMARY SCHOOLS IN AGULU TOWN OF ANAMBRA STATE, NIGERIA

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ABSTRACT

Investigation was made to reveal the state and level of Schistosomiasis haematobuim infection in the whole of Agulu town in Anaocha local Government Area of Anambra State, Nigeria where a lake (Agulu lake) is implicated in the transmission of the disease. Urine sample was collected from 3029 children for Schistosoma egg identification. This was used to calculate the level of infection in the different schools. Schistosomiasis prevalence was highest (55.2%) in Umuowelle primary school and lowest (4.1%) in Obeagu primary school. Males had higher infection rate than females in the endemic schools. In Umuowelle, Community and Nneogidi primary schools, infection rates in males were 36.4%, 13.3%, 11.3% respectively while infection rates in females were 25.2%, 11.7% and 6.8% respectively. However, the sex differences were not statistically **significant** ***at 5% confidence level (t-test = 2.179, df = 12). Infection levels investigated in all the schools revealed that the age group 10-14 years recorded the highest level while 0- 4 years had the lowest. There was also shifts in peaks of infection within the various age groups, for instance, in the 10 - 14 years age group of Ifiteani primary school, infection peak was in 14 years while in Nneogidi primary school it was in 13 year old pupils.***

Keywords: Agulu town, Agulu lake, Schistosomiasis, Sex, Age groups

INTRODUCTION

The epidemiology of *S. haematobium* in man has been described in terms of age - specific prevalence. School children, who usually represent the age groups at greatest risk and greatest intensity of infections, have often been studied, thus providing convenient baseline data for the whole population (Forsyth, 1969, Wilkins, 1977). Stimmel and Scott (1956) observed that egg output is greatest between noon and 2 p.m. while Bradley (1963) observed that egg output is least variable between noon and 2 p.m. Experiences from field work have led many workers to examine a 10 ml aliquot from the entire urine passed at the peak period and usually data obtained have been used as an index of community egg output. There have been many schistosomiasis surveys in Nigeria since Ramsay (1934) studied intestinal schistosomes in Northern Nigeria. They include Blair (1956), Okpala (1961), Cowper (1973), Anya and Okafor (1986), Ejezie et al (1989), Ozumba *et al* (1989), Adewunmi *et al* (1990) etc. Emejulu et al (1994) had investigated into the prevalence of urinary schistosomiasis in the Agulu lake area of Anambra State, Nigeria. However, their research covered three communities (Agulu, Nri, Adazi nnukwu.) around the lake and random samples of persons were made during their investigation. Emejulu *et al* (1992) also gave a comprehensive report on the intermediate snails hosts *(Bulinus globossus* and *Bulinus truncatus)* of urinary schistosomiasis found in Agulu lake.

In the present study, Agulu town was singled out and a comprehensive investigation which involved screening all the primary school children in the town was carried out. The objectives of the study were to show the level of endemicity in the different villages of the town, infection rates among sex, infection rates between and within age groups and to identify particular individuals with S. haematobium infection. Such a comprehensive record of a disease in a town will help in disease control and will allow comparison with other studies on urinary schistosomiasis from different regions. It is hoped that such comprehensive study will be repeated in the other two afflicted communities (Nri & Adazi nnukwu) around the lake

MATERIALS AND METHODS

The Study Area and Study Population: Agulu town was purposively selected for the study because of previous knowledge of the presence of *S. haematobium* infection in the town (Emejulu 1994, Emejulu *et al,* 1994). Agulu which is in Anaocha Local Government Area is located between latitude

$6^{o}06^{/}$N and longitude $7^{0}03^{/}$E. Coming from the South, the land is generally a steep dive towards the lake. It enjoys tropical type of climate. Agulu has different water bodies. Two big major arms of Agulu Lake are in Agulu town, across which is a bridge and a wide tarred road. Agulu is a very large semi-urban town with twenty villages. There is pipe borne water, bore holes in some parts which are far away from the lake. Of the 20 villages in Agulu, 8 or more use the Agulu Lake as source of water for domestic purposes. Water from the lake is also sold to villages and towns farther from the lake by water tanker drivers. Other sources of water for domestic uses in Agulu are spring water and streams, namely Nemoku and Idemili Streams, Iyi ofu, Iyi Nwaduru, Mmili Ugwu, Agbana and Iyi Nwangwo. The inhabitants of the area are mainly yam and cassava farmers. Some are also traders. Most villages have primary schools located in them. Few without primary schools make use of neighbouring village schools. The map of Agulu town has been presented in Figure 1.

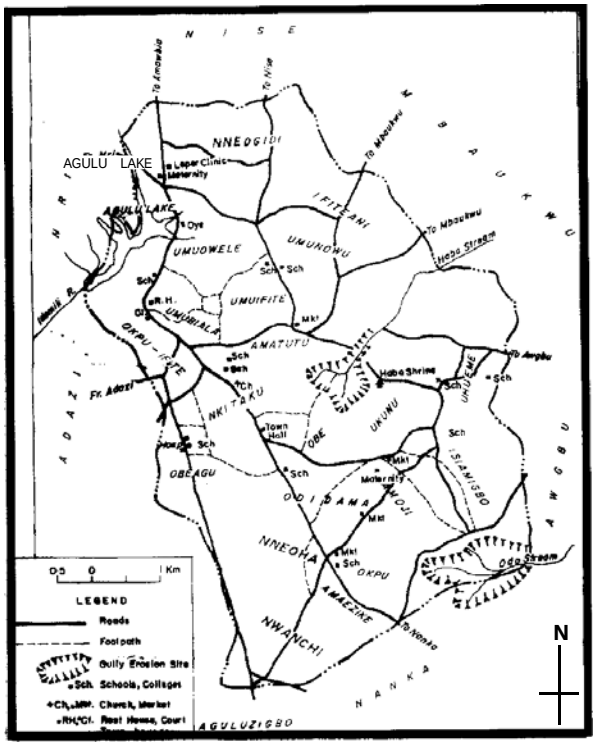

Figure 1: Map of Agulu town in Anambra State, Nigeria

Urine Collection and Analysis: All the primary school children from the 15 schools in Agulu were involved in this study. Thus urine was collected from 3029 children. Wide mouthed screw cap containers with numbers for identification were used to collect urine samples from each person in the different schools on visitation. This was done during the dry season months for 16 weeks (November 1999 – February 2000). The time of collection of urine was between 12.00 pm and 2.00 pm. This is the period for greatest egg output (Stimmel and Scott, 1956; Bradley, 1963). The visitations were made to one school on two different days of every week and the urine samples taken straight to the laboratory for analysis that particular day. Visitation was however made to practicing school 5 times because it had over 500 pupils. A simple centrifugal sedimentation procedure (5 min. at 5000 rpm) of 10ml aliquot urine sample drawn from each specimen was used (Clivier and Uemura, 1973). *Schistosoma haematobium* ova in the sediment poured on a McMaster slide were counted under 10x-microscope eyepiece. The following calculations were made:

Prevalence rate = % infected = Number Infected in a school / Total Examined in the School x 100.

School Infection level = Total number infected in a school / Total number examined in the school x Total infected in all schools / Total number examined in all schools x 100.

Specific age infection level = Total infected in a particular age / Total number examined in that age X Total number infected in a school / Total number examined in the school x 100.

Age group infection level= Average of specific age infection level of a particular age group.

Overall sex infection level= Total sex inf. in a school / Total sex examined x Total number infected in school / Total number examined in the school x 100.

RESULTS

Schistosomiasis Infection in the Schools: The level of infection of the disease for each school among all the schools in the whole town is shown in the Table 1. Among all the 15 schools in Agulu town, Umuowelle Primary School recorded the highest schistosomiasis infection level of 8.8% followed by Ugwuaba Primary School with 6.9%. Community, Nneogidi, Practicing, Ifiteani and Obeagu Primary Schools recorded 5.6, 4.7, 3.9, 3.7, and 0.7 infection level respectively. The remaining eight schools had no individuals infected with urinary schistosomiasis, thus 0% for each of them.

Schistosomiasis Infection Level by Sex and Specific Ages in the various Age Cohorts: The disease infection levels by sex and specific ages in the affected schools are shown in Figures 1 and 2. In all the age groups of various schools, the disease was higher in males than in females. In both sexes the highest age group infection level was recorded in the group 10 – 14 years. However, within and between each age group, there is shift in peaks of infection among the sexes. In all the schools, only Umuowelle and Community primary schools had individual of 0 - 4years with positive cases of urinary schistosomiasis. Within this age group, the peak of infection was in 4years individuals in both schools.

Table 1: Agulu town schools schistosomiasis infection level

School	Villages located	No. Examined	No. Infected	% Infected	Infection level %
Agunkwo P/S	**Amaorji**	70	0	0	0
Cent P/S	**Odidama, Obe**	200	0	0	0
Chukwuka P/S	**Uhueme, Ukunu**	241	0	0	0
Community P/S	**Umunowu**	291	76	34.7	5.6
Ezenyanwu P/S	**Odidama, Okpu Amaezike, Nneoha**	223	0	0	0
Nwanchi P/S	**Nwanchi**	110	0	0	0
Obe P/S	**Obe**	223	0	0	0
Obeagu P/S	**Obeagu**	169	7	4.1	0.7
Onike P/S	**Okpu**	140	0	0	0
Practicing P/S	**Nkitaku, Umubiala, Okpuifite, Amatutu**	532	128	24.1	3.9
Udoka P/S	**Ukunu, Isiamaigbo**	189	0	0	0
Ugwuaba P/S	**Umuifite**	185	80	43.2	6.9
Umuowelle P/S	**Umuowelle**	201	111	55.2	8.8
Ifiteani P/S	**Ifiteani**	141	33	23.4	3.7
Nneogidi P/S	**Nneogidi**	186	55	29.6	4.7
Total		**3029**	**490**	**16.2**	

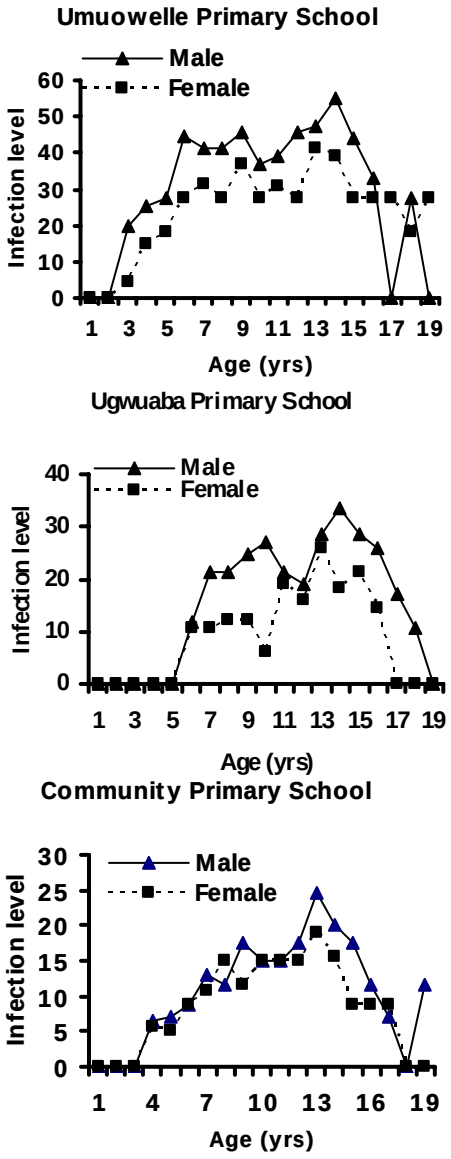

Figure 1: Schistosomiasis infection level by sex and specific ages in Umuowelle, Ugwuaba and Community Primary Schools

Among the 5 - 9years group, all the schools recorded infection peak in 9years individuals for both males and females except Ifiteani Primary School with male peak infection in 8years pupils. In the 10 – 14 years group, Umuowelle, Ugwuaba and Ifiteani Primary Schools had male peak infection in 14 years and female peak infection in 13years individuals. Community, Practicing and Nneogidi Primary Schools had both male and female age infection peak in 13 years individuals while Obeagu Primary School had its male peak in 12 years and female peak in 13 years pupils.

Among 15 -19 years age group, the male peaks were in 15 years individuals in Umuowelle, Ugwuaba, Community, Ifiteani and Obeagu Primary Schools. Nneogidi Primary School recorded its male peak in both 15 and 18 years individuals, while Practicing Primary School had its male peak infection in 16years individuals. The female infection peaks were also in 1 years pupils in Ugwuaba, Nneogidi, Practicing, Ifiteani and Obeagu Primary Schools, while Umuowelle had its female peak in 15, 16 and 17 year pupils and Community Primary School had its infection peak in 17 years old pupils.

DISCUSSION

Urine screening showed the presence of urinary schistosomiasis in 7 schools in the town. Observations on the infection in the 7 schools indicated that there was a significant variation in the rate of the infection between schools within same and different villages in the town. Umuowelle Primary School recorded the highest infection rate, followed by Community Primary School Umunowu Village. This could be attributed to their nearness to the lake. The overall school prevalence rate was higher than the figure reported by Ejezie and Ade-Serrano (1981) in Nigeria but lower than the figures established by Scott *et al.* (1982) and Okpala (1961). These variations may be due to the type and

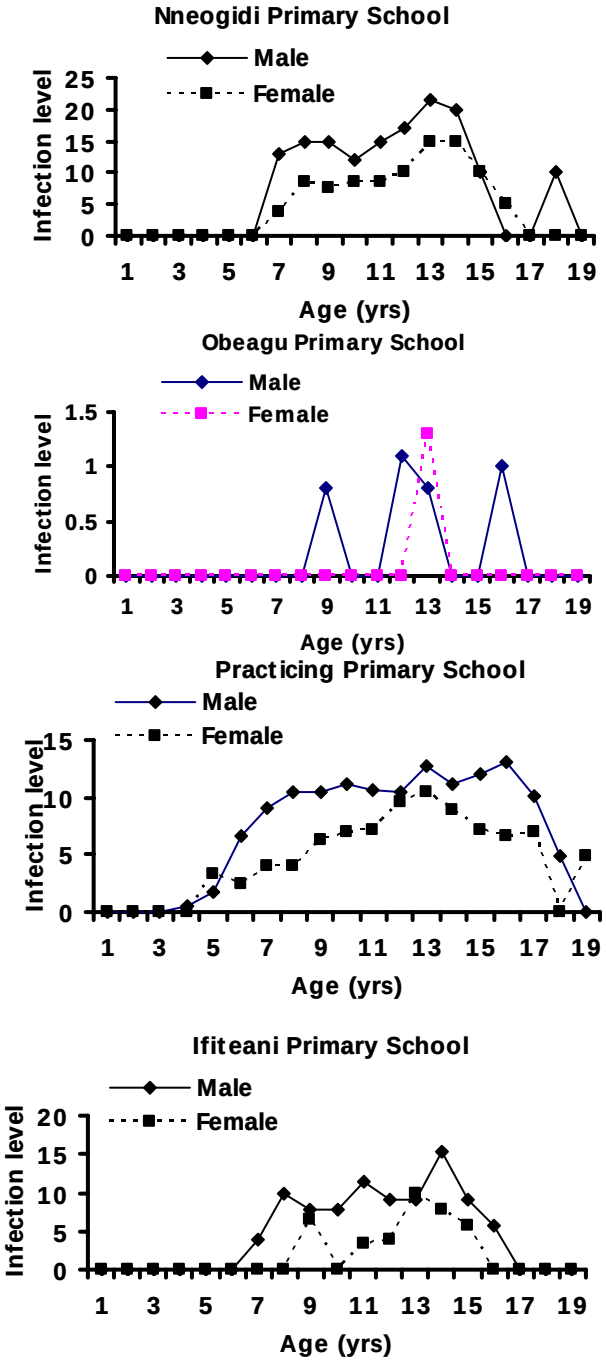

Figure 2: Schistosomiasis infection level by sex and specific ages in Nneogidi, Practicing, Obeagu and Ifiteani Primary Schools

nature of water and human activities in relation to the disease transmission in the studied area.

More males were shown to have higher rate of infection than females in the endemic schools but the difference was not statistically significant. This is in agreement with the findings of Pugh *et al*. (1980) and Scott *et al.* (1982) in Northern Nigeria and Lake Volta Ghana respectively but is at variance with the findings of some other studies. For example, Anya and Okafor (1986) in parts of former Anambra State of Eastern Nigeria and Okpala (1961) in Epe, Western Nigeria, reported higher prevalence of the infection among females. Such differences may be attributed to the degree of exposure to various transmission foci. Sexual differences in prevalence rates and intensity were not found to be significant by Forsyth and Bradley (1966) and Wilkins (1977), but Edington *et al.* (1970) found the reverse, recording the rate to be significantly higher in males than females in Ibadan, Western Nigeria.

The age group differences in infection rates with usually age group 10-14 being more susceptible to infection appears to be a common feature of urinary schistosomiasis (Okpala, 1961; Bradley and McCullough, 1973). Bradley and McCullough (1973) explained that people begin life uninfected and generally become infected as they expose themselves over the first 10 years of life. Then by the age of 10years most children have been infected for a variable number of years and have acquired substantial concomitant immunity, so that the 10-14 age group are both heavily infected and protected from further infection. However, Anya and Okafor (1986) reported the age with peak infection as 15-19years in males and 20-29 years in females. These groups they explained were farmers and were always in contact with small pools of infected water due to the nature of their work. The present study also showed that within an age group there were shifts in peaks of infection. This highlights the specific ages that are more infected than others. These high peaks of infection index among certain specific ages in an age group could also be attributed to more exposure to infected site. The lowest infection rate among the age group 0-4years could be attributed to their not visiting the infected site. The few that are infected must have acquired it through infected water brought to the house. The specific age infection level also showed that even individuals of 4years old in Umuowelle Primary School had higher infection than some 18years individual. It can therefore be suggested that the 18year individuals had acquired immunity to infection.

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