

URINARY SCHISTOSOMIASIS AMONG SCHOOL AGE CHILDREN IN EBONYI NORTH SENATORIAL DISTRICT OF EBONYI STATE, NIGERIA.

ABSTRACT

The prevalence of urinary schistosomiasis among school age children in seven primary schools in Ebonyi North Senatorial district of Ebonyi State was investigated in 2012 to determine the rate of urinary schistosomiasis infection among the pupils of the schools using standard parasitological technique of reagent strip. Out of 525 pupils examined, 119(22.7%) were found to be excreting ova of *S. haematobium* in their urine. Out of which, 44 females (17.5%) and 75 males (27.5%) were infected ($p<0.05$). Children between the age of 15 -16 years recorded the highest prevalence of 35.9%. Chi square test showed that they are not statistically significant ($p>0.05$). The distribution of the infection was significantly high in Hill Top Primary School Amoffia Ngbo in Ohaukwu Local Government Area with prevalence of 55.3% when compared to other locations assayed ($p<0.05$). Children whose parents were farmers recorded the highest prevalence (26.4%) when compared to those of other occupations ($p<0.05$). Also children that make use of quarry pit water as their main source of water supply recorded more infection than those that use borehole and pipe-borne water ($p<0.05$). However, health awareness programme, provision of portable water, mass chemotherapy as well as environmental measures that may reduce population density of snail intermediate host of *S. haematobium* will be useful in the control of urinary schistosomiasis in Ebonyi North.

Keywords: urinary schistosomiasis, prevalence, pupils, Ebonyi State.

Introduction

Schistosoma haematobium is the causative agent of urinary schistosomiasis also called Bilharziasis. It is an important digenetic trematode found in Middle East, Asia, Oceania and Africa. It afflicts the poor, rural villagers, especially school aged children, women and fishermen who lack access to safe water and sanitation, and where daily activities bring them into direct contact with infected water sources.

The adult organisms are found in the venous plexuses around the urinary bladder and their released eggs traverse the wall of the bladder causing haematuria and fibrosis of the bladder. The bladder becomes calcified and there is increased pressure on ureters and kidneys otherwise known as hydronephrosis. Inflammation of the genital due to *S. haematobium* may contribute to the propagation of HIV [9]. Schistosomiasis is not only endemic in Nigeria but is also known to be prevalent in all countries of Africa [19]. According to estimates of [17], at least 200 – 300 million are infected with the disease (and another 600 million are at risk of infection) and endemic in 74 developing countries. Estimates suggest that 85% of all schistosomiasis cases are now in sub-Saharan Africa [5].

Nigeria is one of the countries known to be highly endemic for urinary schistosomiasis with estimated 101.28 million persons at risk and 25.83 million infected [15]. The estimates for morbidity and mortality in affected populations are high with school age children.

In Nigeria, pocket of foci of infection have been documented in various parts of the country. In the Northern region, *S. haematobium* is marked particularly by heavy infection rates. These include the territory extending from Katsina, Kano, Zaria and Kaduna to the Western frontier, in the region of Birnin Kebbi, Argungu and Kankiya areas [11]. In these area Schistosomiasis associated with haematuria infection rate up to 60%-95% have been recorded.

Other Northern region include Wulgo region of lake Chad basin, the riverine area along the Niger from Wawa to Pategi and Bida, Niger [6].

In the western region, *S. haematobium* is universally distributed. The highest infection rates are found in Ibadan, Oyo, Abeokuta and Epe area. [6] has also reported the endemic foci in Ogoja province and around Owerri of the Eastern region [1] states that urinary infection due to *S. haematobium* is endemic all over Nigeria, but later work by [6] has narrowed the endemicity in Nigeria down to Western and Northern regions. However several works by [7,15,16,10], all indicate prevalence in the Southern and Eastern parts of Nigeria.

The health complications due to schistosomiasis like anaemia, UTI and nephritic syndrome has affected children of school age adversely, reducing their school hour and ability to learn. This work therefore is aimed at determining the prevalence of urinary schistosomiasis amongst children of school age in Ebonyi North Senatorial District.

MATERIALS AND METHODS

STUDY AREA: The approximate population of the state is 2.093 million (Population census, 2006). There are thirteen Local Government Areas in the state which is divided into three senatorial districts: Ebonyi North, Ebonyi Central and Ebonyi South. Ebonyi North is made up of four local Government areas;—Abakaliki, Ohaukwu, Ebonyi and Izzi local Government Areas. The major inhabitants are the Ngbo and Izzi people. While the Izzi people occupy three Local Government Areas of Abakaliki, Izzi and Ebonyi; Ngbo people only occupy Ohaukwu LGA.

The major economic activity of these people is agricultural farming like rice farming which keeps them in constant contact to water surfaces with very few people engaged in white collar

jobs. The major sources of water supply to the people are from Rivers, dams, Streams, Stagnant ponds, Quarry pit water, few shallow hand dug wells which are found in few rich families and boreholes provided by Government in some areas. These ponds, streams, quarry pit water, Dams and rivers harbor most of the snail intermediate hosts from where the effective stage of the parasite called cercariae emerge ready for transmission.

The people are infected as they come in contact with water from contaminated ponds and streams during farming, fetching water, washing and swimming. The mode of infection is by the penetration/piercing of the skin by the cercaria infective stage.

METHODOLOGY (sampling Technique) A total of 525 pupils were sampled from seven primary schools namely Central School Ngbo(57), Hill Top Primary School Ngbo(76), Amaeffia Community Primary School Ngbo(74), Igbeagu Central School Izzi(60), Junction Primary School Nwezenyi(61), Oguzoronweya Primary School Ozibo(97) and Okaria Nkaleke Community Primary School(100). The children's ages range between 6-17yrs and their sex were also noted. The teachers and pupils were enlightened on the relevance of the study especially the public health significance. The method of urine collection was also explained to them. After this the pupils were randomly selected. The children were given serial number and containers were distributed noting on the container their age and sex. Collection was done and immediately taken to the laboratory for immediate examination. The urine sample was collected in the morning time of about 7am local time and there were asked to collect the mid stream and terminal of their urine before they returned to their teachers and then to the researcher who then took it to the federal teaching hospital for analysis.

LABORATORY METHODS

Macroscopic Method: This involves noting the appearance of the urine samples. The color and appearance of each urine sample was noted. Each urine sample was poured into clean 10ml centrifuge tube and properly labeled.

Microscopic Method: This was done in line with [4] for Sedimentation technique for *Schistosoma haematobium*. Thus 10ml of urine was poured into the centrifuge test tube. The urine samples were centrifuged at 1000g rpm for 5minutes. After centrifugation, the supernatant fluid was decanted and the sediment was mixed and a drop was placed on a clean, grease free

slide. It was covered with a cover glass and examined using x10 objective and x40 objective of the microscope in search of the *S haematobium* ova.

RESULTS

The result revealed that in a total of 525 pupils who were examined for *Schistosoma haematobium* infection, 119 pupils were found to be excreting ova of *Schistosoma haematobium* in their urine. This gave a prevalence of 22.7% in this study.

In all, 44 females (17.5%) and 75 males (27.5%) were infected ($X^2=7.49$; $df=1$; $p<0.05$). Children of age range 15 -16 years recorded the highest prevalence of 35.9%. Though, chi square test shows that it is not statistically significant($X^2=8.995$; $df=1$; $p>0.05$).The distribution of the infection was significantly high in Hill Top Primary School Amoffia Ngbo in Ohaukwu Local Government Area with prevalence of 55.3% when compared to other locations ($X^2=103.538$; $df=1$; $p<0.05$. Children whose parents were farmers recorded the highest prevalence of (26.4%) when compared to those of other occupations ($X^2=18.626$; $df=5$; $p<0.05$). Also children that make use of quarry pit water as their main source of water supply recorded more infection than those that use borehole and pipe-borne water respectively($x^2=186.808$; $df=3$ $p<0.05$).

Table 1: Distribution of *Schistosoma haematobium* infection among primary school pupils in Ebonyi North in relation to age groups.

Age group	No of pupils examined	No of pupils infected	% of infection
<6.	11	2	18.2%
7-8	53	12	22.6%
9-10	105	30	28.6%
11-12	172	30	17.4%
13-14	134	29	21.6%
15-16	39	14	35.9%
17	11	2	18.2%
Total	525	119	

$X^2=8.995$; $df=1$; $p>0.05$

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114 **Table 2: Distribution of *Schistosoma haematobium* infection among pupils in the seven**
 115 **primary schools in Ebonyi North in Relation to Location**

Location	No examined	No infected	% of infection
Amaeffia Comm. prim. School	74	3	4.1%
Central School Ngbo	57	21	36.8%
Hill-Top Pri. School Amoffia	76	42	55.3%
Igbeagu Central School	60	4	6.7%
Junction Pri. School	61	0	0.0%
Oguzoronweya Comm. Pri. School	97	33	34.0%
Okaria-nkaleke Comm. Pri. School	100	16	16.0%
Total.	525	119	

116 $X^2=103.538;df=1; p<0.05.$

117 **Table 3: Distribution of *Schistosoma haematobium* infection among pupils in Ebonyi North**
 118 **in relation to Gender.**

SEX (Gender)	No examined	No infected	% of infection	% to total infection
FEMALE	252	44	17.5%	37%
MALE	273	75	27.5%	63%
TOTAL	525	119	22.7	100%

119 $X^2=7.494;df=1;p<0.05$

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126 **Table 4: Relationship between infection and occupation of parents in the overall**
 127 **population.**

128	Occupation	Total	No with infection	%	No without infection
129	Artisan	2.0	0.0	0.0	2.0
130	Civil servants	20.0	0.0	0.0	20.0
131	Farmers	424.0	112.0	26.4	312.0
132	Mechanic	1.0	0.0	0.0	1.0
133	Traders	75.0	7.0	9.3	68.0
134	Teachers	3.0	0.0	0.0	3.0
135					
136	Total	525	119		406

137 $X^2=18.626$; $df=5$; $p<0.05$

138 **Table 5: Relationship between infection and type of water source in use in the overall**
 139 **population.**

141	Water source	Total	No with infection	%	Without infection
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143	Borehole	274.0	0.0	0.0%	274.0
144	Pond	24.0	13.0	54.2 %	11.0
145	Quarry pit water	14.0	13.0	92.9%	1.0
146	Stream	213.0	93.0	43.7%	120.0
147	Total	525.0	119.0		406.0

148 $X^2=186.808$; $df=3$; $p<0.05$

149 **DISCUSSION AND CONCLUSION**

150 *Schistosoma haematobium* infection was recorded in children examined in the six of the seven
151 primary schools surveyed in Ebonyi North with a prevalence of 22.7%. This finding suggested
152 that urinary schistosomiasis may be a public health problem in Ebonyi North senatorial zone of
153 Ebonyi State. The study equally agreed with a number of previous finding that *Schistosoma*
154 *haematobium* infection was endemic in Nigeria where school age children were at a greater risk
155 of infection [11,12,7].

156 From the result, a total of 525 pupils were examined for the presence of *Schistosoma*
157 *haematobium* in urine, 119 pupils or (22.7%) were found to have the infection. The high
158 prevalent rate of urinary schistosomiasis in this present study is consistent with a reported study
159 already made by [15,13,2]. It is equally consistent with reported prevalence in other areas of
160 Nigeria. Like, [6] in a school survey in the western region of Nigeria recorded a 20% prevalence
161 rate in children under 14 years. [2] in the survey of the inhabitants of Ebonyi, Benue river valley
162 south eastern Nigeria showed a prevalence rate of 23.5% from randomly selected villages. Also
163 [15] in a survey of urinary schistosomiasis among school age children in Ebonyi state recorded
164 235 (or 26.8%) infection out of the 876 pupils examined with Ohaukwu local government which
165 is part of Ebonyi North recording significantly high prevalent rate of 49.9%. All these further
166 confirmed that adequate attention was not given to the control of the disease in many parts of
167 Nigeria [12,14] and for certain reasons it is not yet considered a priority in National and local
168 health policies and programmes. The persistent high prevalence of *Schistosoma haematobium* is
169 an indication that much intervention is needed. In this study, it was observed that males had a
170 higher prevalence rate of 27.5% as compared to female with prevalent rate of 17.5%. The
171 difference in gender specific prevalence of *S. haematobium* infection among the children was
172 statistically significant ($x^2 = 7.494$; $df = 1$; $p < 0.05$). This is in agreement with several studies
173 with similar relationship. Pugh and Gilles, (1978) in course of the malumfashi Research Project
174 observed that males accounted for 83% of the infection. [3,18,13] in their separate studies
175 revealed that male subjects were infected more than the female subjects. Perhaps, this is due to
176 more frequent water contact by males who engage in swimming hobby more than their female
177 counterpart and since tradition, socio-cultural and religious customs prohibits females especially
178 those in menstrual cycle from bathing and swimming in certain streams, the females have less

water contact than the males. [15] and [8]. However, this finding is in contrast to [10] which stated that there was no sharp difference between the rate of the infection between the males and females.

The study equally revealed that even though pupil of age group 15-16 years recorded higher prevalent of 35.9% than other age group, the difference among the age groups is not statistically significant ($X^2 = 8.995$; $df = 1$; $p > 0.05$) and this indicates that the infection cuts across all age group and does not depend on age. This is in conformity with the work of [10] but in contrast to [13] who reported high prevalent rates among age group of 10-11 years and 8-13 years.

It was equally revealed that there is significant difference between one school location and the other in relation to infection rate ($x^2 = 103.538$; $df = 1$; $p < 0.05$) with Hill Top Primary School Amoffia Ngbo recording highest prevalence of 55.3% closely followed by Ngbo Central School with prevalence of 36.8% and Oguzoronweya Community Primary School with 34% prevalence

The high infection rate in Hill Top Primary School and others may be attributed to the presence of several quarry pits and several streams harboring the intermediate host (snails) in which these children engage in swimming and washing.

The major occupation of the people of this area which includes farming especially rice equally helps to increase level of water contact that can predispose the victim to infection. This report is in conformity with the study carried out by [15] which recorded high prevalence among school age children in this location. Schools in Urban and peri- urban areas like Igbeagu and Junction Primary Schools recorded low prevalence probably because of availability of potable water and boreholes with low number of streams. Amafia Community School's low level of infection can equally be attributed to the use of bore holes as main source of water supply which were not common in other area of the study. The study equally revealed that children whose parents were farmers recorded the highest prevalent rate when compared with other occupation ($X^2=18.626$; $df=5$; $p<0.05$). This is in agreement with [13] and can be attributed to the fact that this children assists their parents thereby rendering them susceptible to infection through close contact to water source as they engage in the farm work. Also, children that make use of stream, pond and quarry pit water recorded more infection than those that use borehole and pipe borne water $X^2=186.808$; $df=3$ $p<0.05$.

209 CONCLUSION

210 In conclusion, this study has established a high prevalent rate of urinary schistosomiasis infection
211 in Ebonyi North, particularly Ohaukwu and Ebonyi Local Government Areas. The high prevalent
212 rate (22.7%) in this study is attributed to lack of portable water, unawareness of the risk factors,
213 unsanitary conditions, poverty, inadequate or total lack of public health facilities and poor or lack
214 of health policies and intervention programme by the government.

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