URINARY SCHISTOSOMIASIS AMONG SCHOOL AGE CHILDREN IN SOME RURAL COMMUNITIES OF ABIA STATE, SOUTH EASTERN NIGERIA

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ABSTRACT

The prevalence of urinary schistosomiasis in school age children in Azumini, a schistosomiasis endemic community in Ukwa East Local Government Area of Abia State was studied. Early morning urine samples were collected in a clean, transparent, screw cap plastic bottle and transported to the laboratory for examination. These samples were examined both macroscopically and microscopically using standard Sedimentation method. A well-structured pre-tested questionnaire was administered and relevant information's were obtained from 720 school age children between January and December, 2012. An overall prevalence of 53.8% was observed in the study. The sex pattern of infection showed a higher prevalence in males (60.5 %) than females (43.9 %). The subjects aged 10 – 14 had the highest prevalence of 70.3%.The sensitivity of haematuria and proteinuria in Schistosoma infected patients were 50.6% and 35.9% respectively. Subjects who were exposed to river as a source of water supply had the highest infection of 80.1% with tap having the least. The result showed that there is a high prevalence of urinary schistosomiasis in the studied community. Poor knowledge of causative agent of the infection and subsequent means of transmission has contributed to the high prevalence recorded. Provision of potable water in the community and proper health education is recommended for the eradication of the disease.

Keywords: Urinary Schistosomiasis, Prevalence*, Schistsoma haematobium*, Ukwa East, Abia State, Nigeria

INTRODUCTION

Schistosomiasis is caused by digenetic trematode flatworms (flukes) of the genus *Schistosoma*. It is quite a chronic and debilitating water-borne parasitic infection that leads to a significant ill health and economic burden. It is believed to be the most common tropical parasitic disease after malaria (WHO, 1993). Around 800 million people are at risk of schistosomiasis and more than 200 million people are infected in 76 countries, 85 % of these cases occur in sub- Saharan Africa particularly amongst the rural poor people (Chitsulo *et al*., 2000), where 120 million people suffered from clinical disease while 20 million exhibit severe morbidity (Steinmann *et al*., 2006).

Schistosoma haematobium, the causative agent of urinary schistosomiasis is the most prevalent species of *Schistosoma* in Africa with *Bulinus* species of snails as the intermediate hosts. Urinary schistosomiasis has been reported to be prevalent and widely distributed in all the geographical zones of Nigeria (Ofoezie and Oladejo, 2006). This situation have been attributed to factors that include the large distribution of its snail host, extensive water contact activities, poor hygienic behavior and other cultural practices (Ugbomoiko, 2000; Agi and Okafor, 2005).

Urinary schistosomiasis has been associated with water resource development projects like dams and irrigation schemes, slow-flowing or stagnant water that allows for breeding of snail intermediate host (Ofoezie, 2002). Urinary schistosomiasis is endemic in most African countries where up to one- third of school children may be actively infected although not always aware of their status (Chidozie and Daniyan, 2008). As a result, epidemiological data often reveal the disease to be more prevalent in school aged-children and therefore this group is often targeted for control.

Information on infection prevalence and intensity is useful both to plan the prevention and control of urinary schistosomiasis and to assess progress in control programmes. Urinary schistosomiasis has been reported in different parts of Abia State (Alozie and Anosike, 2004; Okolie, 2008) and it remains a major health problem in the area.

This work was therefore conducted to ascertain the prevalence of urinary schistosomiasis among school age children in Azumini community a rural local population of Ukwa East Local Government Area of Abia State. The information so obtained will provide an essential background for planning appropriate and cost effective control measures of the disease in the study area.

MATERIALS AND METHODS

Ethics Statement: Ethical clearance was obtained from the Ministry of Health, Abia State, Nigeria and the Local Government Public Health Unit before the commencement of the study. Written informed consents were obtained from the school Head teachers and Abia State Universal Basic Education Board (ASUBEB). Informed consents were given by parents and guardians of the children prior to the study. The parents/guardians were properly enlightened on the aims, objectives, benefits and protocols of the study, and need for voluntary participation and the right to stop participation at any time.

Study Area: The study was conducted out in Azumini community in Ukwa East Local Government Area of Abia State. Azumini is a rural community made up of mainly farmers, fishermen, artisans, petty traders, weavers and a few civil servants. The community is dependent on Azumini River as the major source of water supply. It is a heavy rainforest region located between latitude $4^{0}40^{1}$N and longitude $7^{0}10^{1}$E (Amaechi *et al.*, 2013). The total population of the study area is 48,884 (NPC, 2006). The climate is humid with an average daily maximum and minimum temperature of 28^{0}C and 24^{0}C respectively. Ukwa East has an average rainfall of about 2400 mm and has two seasons in the year. The wet season begins in March and ends in October and the dry season which is between November – February. The average humidity is 90% (Amaechi *et al.,* 2013). Azumini area consists of low lying arable land. Agricultural crops grown include yam, maize, plantain, cassava, oil palm and vegetables. The community lacks basic infrastructures such as electricity, health care facility, safe water supply and proper waste disposal systems. Majority of the inhabitants make use of water mainly from streams, rivers and ponds for all their domestic activities and as the major sources of drinking water.

Sampling: The study was conducted from January to December, 2012 and involved 720 individuals made up of 479 males and 221 females selected randomly from three community primary schools. They were grouped into different age groups. The study involved both parasitological examination of urine and a questionnaire survey.

Each participant was given a clean, dry, labelled screw capped urine container to provide a terminal urine specimen between the hours of 10 am and 12 pm GMT. All the urine samples were returned by the participant as directed and preserved in 5 ml of 10 % formalin at the point of collection, in order to prevent the eggs of schistosomes from hatching. Urine samples were immediately transported to the laboratory for processing.

The physical appearances of the urine samples were identified and noted. The sedimentation method as described by Cheesbrough (2005) was used to concentrate

ova from the urine samples. For each sample, 10 ml of the urine was transferred into a conical tube and centrifuged at 2000 rpm for 1 minute. The supernatant was discarded after which the sediments was transferred to a clean slide and viewed with x10 objective. Eggs of *S. haematobium* present were identified as described by Piekarski (1989). The intensity of infection was also determined. Participants who were found positive were treated in the community health centre with a single dose of Praziquantel at 40 mg/kg body weight. Intensity of infection was classified as heavy (> 500 eggs/10 ml), moderate (51 – 499 eggs/ 10 ml) or light (≤ 50 eggs/ 10 ml).

Haematuria and Proteinuria: Samples were immediately checked for microhaematuria and proteinuria using commercial reagent strips (Medi-Test Combi-9, Analyticon, Biotechnologies, Lichtenfels, Germany). The urine samples were analysed in accordance with the manufacturer's instructions.

Socio-Demographic Data: A pre-tested self administered questionnaire was administered to each participant as to collect socio-demographic data including age, sex and major source of water. This was done with the aid of their teachers.

Data Analysis: Comparisons of prevalence with respect to age and sex were made using Chi-Square tests. The diagnostic values of haematuria and proteinuria were assessed by computing their indices of agreement i.e. sensitivity, specificity, positive predictive value with egg microscopy used as the gold standard. All analyses were done using SPSS for Windows (SPSS Inc, Chicago, IL) version 16.0.

RESULTS

A total of 720 urine samples were examined with a prevalence rate of 53.8 %. The highest prevalence of 70.3 % was found in the age range 10 – 14 years while the least prevalence was recorded in the age range 5 - 9 years (Table 1). Males recorded a higher prevalence of 60.5 % while females had 43.9 % (Table 2).

The study on the water contact activities indicated various sources of water supply in the study area. Most community members (80.1 %) depend solely on water from rivers. This is closely followed by subjects who depend on stream water (53.8 %). Subjects who had access to tap water were observed not to have any trace of the egg of *Schistosoma haematobium* in their urine (Table 3).

The sensitivity of haematuria and proteinuria as compared to the presence of egg in urine, stratified by egg intensity (light, moderate and heavy) showed that the highest prevalence of haematuria (100 %) was found in individuals with heavy infection (≥ 500 egg / 10 ml urine), while the least (46.4 %) haematuria fell within individuals with moderate infection.

Table 1: *Schistosoma haematobium* infection in Azumini, Ukwa East LGA according to age groups

Age group	Number examined	Number infected	Prevalence (%)
≤ 4	91	38	41.8
5-9	134	52	38.8
10-14	209	147	70.3
15-19	187	97	51.9
≥ 20	99	53	53.5
Total	**720**	**387(53.8)**	

Table 2: *Schistosoma haematobium* infection in Azumini, Ukwa East with respect to sex

Sex	Number examined	Number infected	Prevalence (%)
Male	479	290	60.5
Female	221	97	43.9

Table 3: Source of water supply with respect to prevalence in Azumini community, Ukwa East, Abia State, Nigeria

Water supply	Number examined	Number infected	Prevalence rate
Tap	15	0	0
Well	153	13	8.5
River	297	238	80.1
Stream	251	135	53.8
Others	4	1	25.0
Total	720	387 (53.8)	

Table 4: Sensitivity of haematuria and proteinuria as compared to the presence of eggs in urine

Intensity egg/10 ml	Presence of Haematuria (%)	Presence of Proteinuria (%)
Light (1-50) n=199	104(52.3)	76(38.2)
Moderate (51-499) n=179	83(46.4)	62(34.6)
Heavy (≥ 500) n=9	9(100.0)	1(11.1)
Total: n =387	196(50.6)	139(35.9)

DISCUSSION

The results of this study show that the areas studied are endemic with urinary schistosomiasis. The result observed in the study agrees with the findings of Anosike *et al*. (2002) and Agi and Okafor (2005) in Odau community in the Niger Delta and Ebonyi State respectively. The high prevalence reported in the study may be an indication of the rate of *S. haematobium* transmission in various foci of the communities studied. The natural water bodies such as rivers were found to be the main transmission foci in these communities. They served as a meeting point for the *Schistosoma,* intermediate host and infected persons. The degree of exposure of the school children to water bodies through some indigenous water contact activities such as swimming and bathing, and the presence of the intermediate snail hosts in the local area were all factors that favoured the transmission of the infection in the area. The typical high prevalence observed amongst school children with males having a higher rate of 60.5 % prevalence than their female counterparts having 43.9 % prevalence. Similar trends have been observed in endemic areas as earlier reported (Ofoezie *et al*., 1998; Okoli and Odaibo, 1999; Okolie, 2008). The high prevalence observed in males is due to the fact that males tend to go to the river on a regular basis to fetch water for domestic use, play or bath and even fish unlike the females that may not attach any importance to such water contact activities but will prefer to always be at home attending to house chores. The highest prevalence of 70.3 % occurred in the age group 10 – 14 years. This is consistent with the findings of Alozie and Anosike (2004). This is probably due to the regular water contact activities observed within the children of this age group. The high infection rate noticed among the inhabitants who depend largely on rivers (80.1 %) and stream (53.8 %) as water sources could be attributed to the fact that snail host show preference for slow flowing or stagnant bodies of water. A similar report was observed by Ofoezie (1998). WHO (2002) has advocated provision of safe drinking water from borehole and tap for a successful control of schistosomiasis. The correlation between urinary egg count and haematuria as determined by chemical reagent strips was also examined in the study areas. It was observed that haematuria had a greater frequency (50.6 %) than proteinuria (35.9 %). Several studies have shown that increasing grades of haematuria and proteinuria had a positive correlation which was direct with an increasing egg output (Mott *et al*., 1983). The use of reagent strip has proven to be particularly useful in screening school- age population in Nigeria. Studies have shown that chemical reagent strips were both specific and sensitive for detecting urinary blood associated with *S. haematobium* infections. The strips are fast to read, simple and cheap and so can be used by primary health care workers with minimal training to achieve control. The result obtained in this study has proven the endemicity of urinary schistosomiasis in the study area. Poverty and ignorance are contributory factors to the spread of the infection in the study area.

It is however recommended that Government at all levels should endeavor to provide basic infrastructure to reduce the spread of the infection and also enlighten the populace on the dangers of regular water contact with infected rivers and streams.

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