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The Prevalence of Urinary Schistosomiasis among School Children in Nkarasi and Edor Communities in Ikom Local Government Area of Cross River State, Nigeria

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Abstract

This study was carried out to assess the prevalence of urinary Schistosomiasis among primary school children in Nkarasi and Edor Communities. Both are adjoining communities in the Ikom Local Government Area of Cross River State, Nigeria. Urine specimens were collected based on convenience and consent from 246 male and female pupils aged between 5 and 15 years in primary 1 to 6 classes between 10 a.m. and 1 p.m. during each visit. The study was conducted between February and April, 2012. On-the-spot detection of proteinuria and haematuria was carried out on the urine specimens using Combur 9 urinalysis strips. In the laboratory, 10 millilitres aliquot of each urine specimen was placed in a centrifuge tube and spun at 3,000 revolutions per minute for 5 minutes. From the sediment; wet preparations were made on clean slides and examined for eggs of *Schistosoma haematobium* using x 10 and x 40 objective lenses. Out of 246 pupils, 134 (54.5%) were screened from Nkarasi Primary School (NPS) while 112 pupils (45.5%) were screened from Edor Primary School (EPS). Only 2 pupils (both male) from NPS were positive for eggs of *S. haematobium*. This result shows a prevalence rate of 1.5% at NPS. Also, 2 pupils (one male and one female) from EPS were positive for eggs of *S. haematobium* with a prevalence rate of 1.8%. An overall prevalence rate of 1.6% (4:246) was recorded for urinary schistosomiasis in both communities. There was no statistically significant difference in the prevalence of urinary schistosomiasis in both communities ($P > 0.05$; $X^2 = 9.84$). Female pupils were more infected than their male counterparts in Edor community. No infection was recorded among the 70 female pupils in Nkarasi community, whereas male pupils aged 9 to 12 years were infected at a prevalence rate of 5.3%. Overall, there was no statistically significant difference in the prevalence of infection among male and female pupils in both communities ($P > 0.05$; $X^2 = 4.32$). Generally, there was a low egg count between 6 and 25 eggs per 10 millilitres of urine. Chi Square showed no statistically significant difference in mean egg count between male and female pupils ($P > 0.05$; $X^2 = 6.68$). The highest values for proteinuria (43.5 mg/dl) and haematuria (14.5 ery/µl) were detected among the 13 to 16 years age-group. This study has recorded a low prevalence of urinary schistosomiasis among school children in these two communities. It also shows that the prevalence of the disease in Ikom is low, compared with other Local Government Areas in Northern Cross River State, where the disease is endemic. A sustained public health campaign will help to further reduce the prevalence of this disease in the study area and the adjoining communities.

Keywords: Children, Haematuria, Prevalence, Proteinuria, Schistosomiasis, School.

INTRODUCTION

Schistosomiasis is a parasitic disease caused by the penetration of human skin by cercaria of a digenetic trematode of the Genus Schistosoma. Transmission of the disease has been reported from 78 countries, while preventive chemotherapy for the disease is required in 52 endemic countries with moderate to high transmission (WHO, 2016). Urinary and intestinal forms of the disease exist. Urinary or urogenital schistosomiasis is caused by *Schistosoma haematobium* while intestinal schistosomiasis is caused mainly by *S. mansoni* and *S. japonicum*. In Africa, some cases of human infection have been ascribed to *S. intercalatum* and *S. mattheei* (CDC, 2012; Schmidt *et al.,* 2010). Available literature indicates that urinary schistosomiasis is more endemic in Nigeria than intestinal schistosomiasis. High records of endemicity of urinary schistosomiasis have been recorded in many foci in all the six geopolitical regions in Nigeria. In Cross River State, urinary schistosomiasis is endemic in more than half of the 18 Local Government Areas (Adie *et al.,* 2013). Ignorance of its etiology led to a misconception among the local folks in the endemic areas that the disease is a variant of menstruation in male subjects (Amazigo *et al*., 1997).

Schistosoma is also called *Bilharzia* and is named after Theodor Bilharz, who discovered the parasite (Cooks, 1996). Schistosomiasis is a disease of warm climate and it occurs predominantly in rural communities. It is an important water-related disease with serious health and socioeconomic implications (Adamu *et al*., 2001). The epidemiology of urogenital and intestinal schistosomiasis is linked with the practice of releasing *Schistosoma* eggs via urine and feces into natural water bodies. Such water bodies (lakes, ponds, streams, rivers, dams, irrigation channels, etc.) must harbor suitable molluscs which serve as intermediate hosts for the parasites. *Schistosoma haematobium* is harbored by several species of snails of the Genus *Bulinus*. An established intermediate host of *S. haematobium* in Northern and Western parts of Nigeria is *Bulinus globossus* (Hira, 1970).

Pathophysiologic events in the course of schistosomiasis are related to the type, stage and intensity of the disease. During the cercarial penetration of the skin, there is a characteristic allergic skin reaction called swimmer's itch. This occurs within 24 hours of skin penetration (Edington & Giles, 1976). In urinary schistosomiasis, proteinuria and haematuria are characteristic features which are related to the intensity of infection; especially in children (Cheesbrough, 1987). Severe and chronic urinary schistosomiasis is associated with bladder cancer (Cooks, 1996).

Parasitological demonstration of *Schistosoma* eggs in urine or feces is the gold standard method of diagnosis. Serological techniques are available for the detection of *Schistosoma* specific antigens or antibodies in body fluids such as blood or urine (WHO, 2016). The drug of choice for the treatment of all forms of schistosomiasis is Praziquantel. Other drugs include Metrifonate and Oxamniquine. Methods for the prevention and control of schistosomiasis are usually directed at the elimination of the snail host. Use of molluscicides, predators and removal of aquatic vegetation have been employed with various levels of success.

THE STUDY AREA

Nkarasi and Edor are two rural communities in Ikom Local Government Area of Cross River State in Southern Nigeria. The local people depend mostly on land. Their occupational activities include farming, fishing, honey-gathering and fishing; all these activities are carried out in small scale for subsistence. Drinking water is obtained from streams, rivers, rain and boreholes.

Collection Of Urine Specimens

After the introduction of the Research Team to the Village Heads of both Communities, consent was given to conduct the study in the area. One Primary School was enlisted for the study from each Community. Pupils in Primary 1 to 6 Classes were given universal containers to pass urine between 10 a.m. and 1 p.m. after a brief period of exercise at break time. This study was conducted between February and April 2012. Demographic and clinical data of each child (e.g. age, gender, class, source of drinking water, haematuria, dysuria, etc.) were obtained and recorded. Using Combur 9 urinalysis strips, an on-the-spot detection of proteinuria and haematuria was carried out on the urine specimens.

Processing Of Urine Specimens

After recording the macroscopy, each urine specimen was mixed gently. Ten millilitres aliquot of each urine specimen was transferred into a centrifuge tube and spun at 3,000 revolutions per minute for 5 minutes. The supernatant was discarded and a wet preparation was made from the urine deposit on a clean slide. The preparation was examined for eggs of *S. haematobium* using x10 and x40 objective lenses.

STATISTICAL ANALYSIS

Data generated in this study were subjected to Chi Square test for the determination of statistical significance.

Table 1. The occurrence of *S. haematobium* eggs according to age and gender of pupils in the Edor Primary School

Gender	Male			Female		
Age groups (Years)	**Number examined**	**Number with eggs**	**Percentage prevalence**	**Number examined**	**Number with eggs**	**Percentage prevalence**
(5-8)	5	-	-	9	-	-
(9-12)	49	1	2.0	39	1	2.6
(13-16)	6	1	-	4	-	-
Total	60	1	1.7	52	1	1.9

Table 2. The occurrence of *S. haematobium* eggs according to age and gender of pupils in the Nkarasi Primary School

Gender	Male			Female		
Age groups (Years)	**Number examined**	**Number with eggs**	**Percentage prevalence**	**Number examined**	**Number with eggs**	**Percentage prevalence**
(5-8)	22	-	-	28	-	-
(9-12)	38	2	5.3	37	-	-
(13-16)	4	-	-	5	-	-
Total	64	2	3.1	70	-	-

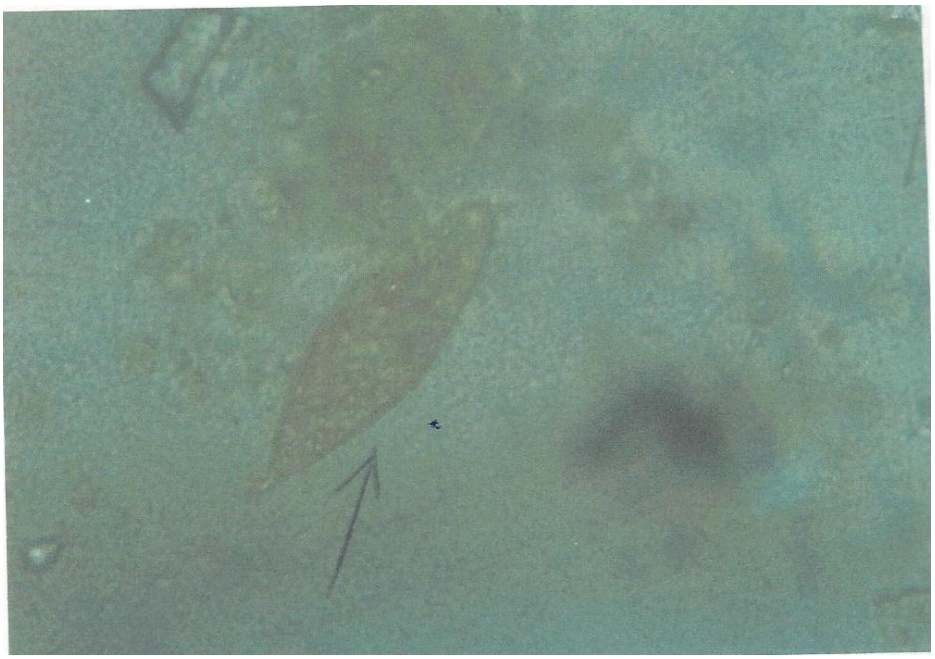

Plate 1 shows an egg of S. haematobuim detected in a urine specimen during the study.

RESULTS

Out of 246 pupils screened from both communities, only 4 were positive for eggs of *S. haematobium*. This shows an overall prevalence of 1.6% for urinary schistosomiasis in the study area. Table 1 shows the occurrence of *S. haematobium* eggs according to age and gender of pupils in the Edor Primary School. The data show that among the male pupils, infection occurred within the 9-12 age group at a prevalence rate of 2.0%. Among the female pupils, infection also occurred within the 9-12 age group at a prevalence rate of 2.6%.

The overall prevalence of urinary schistosomiasis among the pupils in Edor Primary School was 3.6% (4:112). No infection was recorded among 70 female pupils in Nkarasi Primary School. The overall prevalence of urinary schistosomiasis among pupils in this school was 1.5% (2:134).

DISCUSSION

An overall prevalence of 1.6% for urinary schistosomiasis in the study area is an indication of low endemicity. Higher prevalence rates had been reported by previous workers in many locations in Cross River State. Ejezie *et al.,* (1991) recorded a prevalence rate of 43.5% in Adim community in Biase Local Government Area. Prevalence of infection was recorded within 9-12 years age group in this study. This finding corroborates the previous work of Ejezie and Adeserrano (1981), who reported that peak infection by *S. haematobium* occurred within the same age group among school children in Ajara community of Lagos State in Nigeria. In Edor community, the prevalence rates among male and female pupils were 2.0% and 2.6%, respectively. The high prevalence rate among female pupils suggests that they were more exposed to infection than their male counterparts. This may be as a result of socio-cultural beliefs and practices which involved the female pupils more in fetching water from streams and rivers. Such water sources may harbor infective cercaria.

In conclusion, this study shows that there is a low prevalence of urinary schistosomiasis in Edor and Nkarasi communities. The pupils were not aware of any link between their water sources (streams and rivers) and transmission of schistosomiasis. It is hereby suggested that provision of alternative sources of water for domestic use (e.g. tap or bore-hole) will reduce the contact of the local dwellers with cercaria-infested waters. Public enlightenment programs in the study area will also help to curb the transmission of this infection.

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