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Prevalence of Urinary Schistosomiasis among some School Children in Lokuwa, Mubi North Local Government Area of Adamawa State

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Abstract
A study to determine the prevalence of urinary schistosomiasis among some children in Lokuwa, Demonstration Primary School, Mubi North Local Government Area of Adamawa State was conducted. A total number of 150 urine samples were collected and examined microscopically for the eggs of Schistosoma haematobium using sedimentation technique. The result showed that males were more infected with (26.67%) than females with (18.67%). There were no significant differences in prevalence between infection and sex, at $P < 0.05$ (Calculated $P=0.313$). Prevalence also varied with age group. 10 – 13 years (32%); where age groups 6 – 9 years had the lowest infection rate (6%). there was a significant difference in prevalence between infection and age groups, at $P <0.05 = 0.006$. In the same vein, prevalence also varied in relation to source of water exposure/supply, where those who used river or stream water (38%) had the highest infection rate, followed by the lowest rate of infection (7.34%) in favor of those who used, borehole and/or well.

Keywords: *Schistosoma haematobium*, **Urinary infection**, ***Bulinus***, **Urinary system**, **Epidemiology**

Introduction

Urinary schistosomiasis, a parasitic disease caused by a trematode worm *Schistosoma haematobium.* It is a very serious environmental health problem in many tropical countries. About 200 – 300 million people may be suffering from the disease worldwide (WHO, 1993). The disease is endemic in Nigeria (Ogbe and Ogunsekan, 1989; Okafor, 1990; Udonsi, 1990; Anosike *et al*, 1992; Akogun *et al*, 1994; Agi, 1995). Water contact activities and traditional agricultural practices are reported to be the main factors in the distribution of the disease and its snail vectors (Udonsi, 1990).

Urinary schistosomiasis caused by the trematode *Schistosoma haematobium,* is water based parasitic disease, transmitted by fresh-water-snails of the genus *Bulinus.* Human infection occurs through direct penetration of the skin by cercariae, which invade the circulatory system. The adult worms deposit their eggs in the blood vessels which supply the urinary bladder (Adeyeba and Akinlabi, 2002). Schistosomiasis is generally recognized as a chronic and debilitating disease of rural agricultural communities with low standard of living and poor sanitary conditions, though infection has been recorded in some urban communities (Okoli and Odaibo, 1999).

Schistosomiasis is a wide spread parasitic disease that put at risk 400-600 million people worldwide in 74 countries, with over 200 million infected; of which 20 million suffer clinical morbidity (Adeyeba and Akinlabi, 2002). The distribution of schistosomiasis is focal and restricted to areas with peculiar ecological characteristics, which favour snail breeding. Water contact and extensive water use are important factors in transmission (Adeyeba and Akinlabi, 2002). The disease is endemic in many African countries though its importance as a public health problem lacks sufficient recognition in many areas (Barnabas, 2005).

In Nigeria schistosomiasis is widely distributed with numerous endemic foci, particularly in riverine areas where infection rate may be as high as 90% (Crompton, 1999). It has been reported that schistosomiasis is on the increase, particularly in the remote poorly accessible rural communities (Dickson *et al*, 2003; and Edungbola *et al*, 1988). Despite the information on the epidemiology of *S. haematobium* infection in Northern Nigeria, the

prevalence and distribution of the disease remains unknown in this geographical zone particularly in Lokuwa (Mubi North Local Government Area of Adamawa State).

Studies in Northern Nigeria have suggested a linear relationship between urinary schistosomiasis and individual water-related activities (Musa, *et al.*, 2010). Knowledge and the perceptions of the local populace about schistosomoasis and of gender and cultural restrictions could be beneficial to control programmes, as this study will provide basic information necessary to control this disease.

The main aim of this study is to survey the spread of urinary schistosomiasis among some school pupils in Lokuwa (Mubi North Local Government Area of Adamawa State). The specific objectives are: To determine the prevalence of urinary schistosomiasis among Primary School Children/Pupils in Mubi North Local Government Area of Adamawa State, Nigeria; To determine the relationship between Urinary Schistosomiasis and sex, age class, and source of water activities in Lokuwa, Mubi North Local Government Area of Adamawa State; To provide base line data necessary for implementation of a control programme in the Local Government Area and the State at large.

Materials and Methods

Study Area

Mubi North Local Government Area lie within Northern Guinea Savannah Zone of Nigeria and located at latitude 9˚30' and 11º North of the equator, longitude 13˚ and 13º 45' East of the Greenwich Meridian and about 305 meters above sea level. The dry season in this area commences early October and last up to April. The wet season begins from May and attains its peak between July and August, and declines in September; the mean annual rainfall is 1050 mm. The relative humidity is extremely low 20-30% between March and May and start increasing as from June and reaches a peak of about 80% in July through September, the relative humidity starts to decline from October following the cessation of rains. The maximum temperature can reach 40˚C particularly in April while minimum temperature is about 18˚C between December and January. The varieties of livestock include cattle, sheep, goats and pigs. The dwarf goats are the most common breeds (Adebayo and Tukur, 1999).

Mubi North Local Government Area consisting of eleven political wards has a population figure of about 151,072 (National Population Commission, 2006). Mubi North Local Government Area is bounded to the South by Mubi South Local Government Area to the West by Hong Local Government Area and to the North by Michika Local Government Area and to the East by the Republic of Cameroon.

The area is riverine in nature, with rich fertile soil for the cultivation of rice, maize, sugar-cane and cotton. The area is endowed with seasonal natural streams. The predominant occupation of people in the area is farming especially rice and other crops with a few civil/public servants and business men and women. There is general lack of basic health and sanitary infrastructure such as clean drinking-water. The few water bore-holes are either none functional or are deliberately ignored in preference for water from the seasonal streams and unprotected wells because of the ease with which water is usually fetched from these sources. Residents come into contact with these water bodies on daily basis for various reasons ranging from bathing, washing, seasonal fishing, and irrigation or simply to fetch water for domestic use. During the dry season most members of the community engage in trading and irrigation farming. Whereas during the rainy season most resort to farming and less of trading activities, (Adebayo and Tukur, 1999).

Materials

The materials used for this research/study examination were as follows;
Centrifuge machine, centrifuge tubes, boric acid, coverslips, microscope slide, microscope, conical flask, hand gloves, sterile leak-proof container (sample bottles), pen or marker for labeling, cooler for conveying samples, syringe and needle, masking tape, normal saline, lens tissue, exercise book, detergent, germicide (Izal), water, plastic bowl.

Sample Collection

One hundred and fifty (150) urine samples between 6 – 16 years were randomly collected from the school children in Lokuwa, between the hours of 7-

11:00 am. Each person was given a 20 ml clean container for the collection of urine.

A questionnaire was administered to each of the subjects in order to determine their knowledge and perceptions about urinary schistosomiasis in relation to their cultures. The subjects were also asked for their age and water contact behaviour. Urine samples collected were preserved by adding boric acid/normal saline. Thereafter samples were transported to laboratory in a cooler for examination, (Ugbomoiko, 2000).

Laboratory of urine sample

In the laboratory, 10 ml of thoroughly mixed/agitated urine from each sample was centrifuged at 2,000 rpm for 3 minutes as described by (Ejezie, 1981). The supernatant was discarded/tipped off and the sediment/deposit/residue examined using x10, x40 objectives for eggs/ova of *Schistosoma haematobium*. Data collected were analyzed, using simple percentage and ANOVA to determine the association between infection by sex, age, class, and source of water activities.

Results and Discussion

One hundred and fifty (150) urine samples were collected from school children at Lokuwa Ward, Mubi North Local Government Area. These were examined for *Schistosoma haematobium* eggs and the results obtained are summarized below. Out of the one hundred and fifty (150) urine samples of children examined, 68(45.34%) were positive for *schistosoma haematobium* eggs /ova. And out of 75 males examined, 40(26.67%) were positive, whereas out of 75 females examined, 28(18.67%) were also positive for *Schistosoma haematobium* eggs.

Table 1: Prevalence of Urinary Schistosomiasis in Relation to Sex

Sex	Number Examined	Number Infected (%)	Number Not Infected (%)
Male	75	40(26.67)	35(23.33)
Female	75	28(18.67)	47(31.33)
Total	150	68(45.34)	82(54.66)

Frequency =1.024 and Significance = 0.313

Firstly, the prevalence recorded of infection in relation to sex as shown on table 1 indicated that; males had the highest prevalence of infection (26.67%), while females had the lowest prevalence of infection (18.67%). However, ANOVA at P = 0.05 showed that there was no significant difference in prevalence between the infection and sex (ANOVA calculation = P <0.05 = 0.313).

Table 2: Prevalence of Urinary Schistosomiasis in Relation to Age

Age group	Number examined	Number Infected (%)	Number Not Infected (%)
6 – 9	29	9(6)	20 (13.34)
10 – 13	103	48(32)	55(36.66)
14 – 16	18	11(7.34)	7(4.66)
Total	150	68(45.34)	82(54.66)

Frequency = 7.936 and Significance = 0.00

Secondly, the highest prevalence of infection as shown on table.2 was recorded of age group between 10 – 13 years with prevalence of infection (32%), followed by age group 14 – 16 years with prevalence of infection (7.34%) while age group 6 – 9 years had the lowest prevalence of infection (6%). ANOVA at P = 0.05 showed that there was a significant difference in prevalence between the infection and the age group (ANOVA calculation = P <0.05 = 0.006).

Table 3: Prevalence of Urinary Schistosomiasis in Relation to Source of Water Exposure/Supply

Source of Water	Number Examined	Number Infected (%)	Number not Infected (%)
River/Stream	86	57(38%)	29(19.33%)
Borehole/Well	64	11(7.34%)	53(35.33%)
Total	150	68(45.34%)	82(54.66%)

Frequency =1.257 and Significance = 0.264

Thirdly, the highest prevalence of infection as shown on table 3 was recorded of those that were exposed to River/streams with prevalence of infection (38%), while those that were exposed to borehole and/or well had the lowest prevalence of infection (7.34%). However, ANOVA at P = 0.05 showed that there was no significant difference in prevalence between infection and source of water supply/exposure (ANOVA calculation = P < 0.05 = 0.264).

Table 4: Prevalence of Urinary Schistosomiasis in Relation to Parents' Level of Education and their Response to their Families

Educational Level	Number Examined	Number Infected (%)	Number Not Infected (%)
Tertiary Education	58	27(18%)	31(20.66%)
Secondary Education	49	23(15.34%)	26(17.34%)
Primary Education	42	18(12%)	24(16%)
No Formal Education	1	Nil	1(0.66%)
Total	150	68(45.34%)	82(54.66%)
Frequency = 0.543	Sig = 0.462		

Table 5: Prevalence of Urinary Schistosomiasis in Relation to Class

Class	Number Examined	Number Infected (%)	Number not Infected (%)
Three (3)	40	15(10%)	25(15.66%)
Four (4)	40	18(12%)	22(14.67%)
Five (5)	50	24(16%)	26(17.33%)
Six (6)	20	11(7.34%)	9(6%)
Total	150	68(45.34%)	82(54.66%)

Frequency =1.825 and Significance = 0.179

Finally, the prevalence recorded of infection in relation to class as shown on table 5 indicated that; class five (5) had the highest prevalence of infection (16%), followed by class four (4) with prevalence of infection (12%), then class three (3) with prevalence of infection (10%) and finally, class six (6) had the lowest prevalence of infection (7.34%). However, ANOVA at P = 0.05 showed that; there was no significant difference in prevalence between the infection and class (ANOVA calculation = P <0.05 = 0.179).

Therefore, the study showed that the overall prevalence of the disease was 45.34%, with males (26.67) being more infected than females (18.67). This agreed with an earlier work carried out by Akogun *et al* (1994), and Adeyeba and Akinlabi, (2002); which was reported that out of the students examined with *Schistosoma haematobium* positive, males (29.5%) were more infected than females (12.2%). Oniya and Jeje, (2010), reported that out of the children examined with *S.haematobium* positive, males (28.32%) were more infected than females (24.77%). The reason is because boys are less restricted than females and therefore, have more freedom to stay out and play in the river, stream and/or pond as compared to the females who are required to stay more at home to help in domestic duties. The rate of infection among pupils in Demonstration Primary School, Lokuwa – Mubi North Local Government Area varied based on their ages, where pupils between 10 – 13 years, age group had the highest infection rate (32%), followed by pupils age group 14 – 16 (7.34%). This may be due to the fact that, pupils of this age groups are capable of going out either to play, bath, swim or to fish in contaminated water bodies. Some pupils do go to their parents' rice farms, this is also a possible area of having contact with the disease. Whereas, pupils aged 6 – 9 years had the lowest infection rate (6%).

This is because pupils of this age group are mostly not allowed to go far let alone about going around water bodies or rice farms, that is to say, they are always or mostly under their parents' care.

Infection rate with regards to parents' level of education indicated that pupils whose parents had been to tertiary institutions had the highest rate (18%), followed by those pupils whose parents went to secondary schools with the infection rate (15.34%) then the lowest rate of infection was seen in pupils whose parents had primary education (12%). This is because of differences in financial status of parents, that is not to some extend determined by somebody's level of education and the extend/degree to which parents inculcate the basic methods of health education they have acquired to their children/wards.

Finally rate of infection varied according to class base on this study. Class five (5) had the highest infection rate (16%), next to this in infection rate was class four (4) which had (12%) followed by class three (3) (10%) while, class 6 had (7.34%). The reason for the differences witnessed in relation to class is due to differences in their age group, kind of parents, the pupils' response to learned basic hygiene methods, maturity, season of the year, presence or absence of stagnant water bodies and so on.

Conclusion and Recommendations

Conclusively, more studies on intestinal schistosomiasis should **be** carried out to confirm for total eradication of both (urinary and intestinal schistosomiasis), when a control strategy is embarked upon. Also a survey of the incidence of the disease should be conducted in nearby primary schools and a mass chemotherapy with anti-schistosomal drugs like praziquental and oxamiquine to be given to infected individuals. The following recommendations could be made:

Based on the results obtained, the following recommendations may be useful for the management of urinary schistosomiasis in the study area.

Health education of children in the study area, regarding mode of transmission and method of protection is necessary and this should constitute the main method of intervention;

Workshops and seminars should be organized or introduced to train the village heads, parents and teachers on this subject matter who will in turn educate pupils in schools, children at home and the general/entire community;

Parents should try and improve their financial standard by engaging in genuine and multiple means or source of livelihood or income;

There should be provision of a good source of water supply for drinking, bathing, washing and other domestic usages by the government and/or philanthropist(s). And for this to be achieved, more boreholes and taps should be evenly distributed and maintained by both the government and benefiting communities, so that the villages and communities that don't have the needed source of water would have adequate water source;

Farmers especially "rice farmers" and "fishermen" should also improve their farming as well as their fishing techniques by using protective farm equipment/tools such as overall rain coat, rain boot, hand gloves, transparent mask etc. to avoid water to body contact from their farms and fishing sites that might have been infected by the snail vectors;

The control of snail intermediate host will no doubt reduce the rate of transmission as well as reduction in prevalence of infection. Snail host should therefore be controlled by Mollusicide e.g. by using copper sulphate or lime, as suggested by Nwaorgu, (1998). Since untreated and infected water can transmit cercariae, a tadpole-like larval stage of trematode worms (flukes) that develop in the body of a mollusk (the secondary host) and subsequently infect a primary host in which they mature into adult worms);

All pipe borne water should be treated, particularly when the site of supply has snail host. And to effect this; at least a parasitologist, should be employed in each water plant for proper investigation of the disease-causing agents.

Government, philanthropist and/or parents should help the infected pupils/children by deworming them regularly.

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