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EPIDEMIOLOGICAL SURVEY OF URINARY SCHISTOSOMIASIS AMONG PRIMARY SCHOOL CHILDREN IN MICHIKA, ADAMAWA STATE, NORTH-EASTERN NIGERIA

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ABSTRACT

Background: Schistosomiasis is one of the world's most prevalent diseases of public health significant. Despite more than a century of control efforts and the discovery of praziquantel a highly effective antischistosomal drug, the eradication of the disease is still far from realization. **Method:** Four hundred (400) urine samples were collected randomly from the pupils who consented after obtaining some vital demographic data from them. The urine samples were processed using ordinary centrifugal sedimentation technique. The result obtained was tested using Chi-square. **Results:** Of 400 samples, 109 urine samples were positive for *S.haematobium* giving 27.23% urinary schistosomiasis. The result indicates that the age group 14-16 years had the highest prevalence. The infection rate was significantly high ($p < 0.05$) among males (37.6%) than females (14.5%). It was also higher (39.9%) among pupils whose source of drinking water is stream/pond, followed by those whose source is Well (15.5%) and the least was among pupils using borehole water (13.3%). The prevalence of schistosomiasis in relation to schools indicates a significant relationship ($p < 0.05$). Hausari Primary School had the highest prevalence (32.0%), followed by Kankila Primary School with 25.0% and Murva Primary School recorded the least with 20.0%. **Conclusion:** Lack of prompt diagnosis, inadequate knowledge on the causes of schistosomiasis, unsuitable water supply and exposure to water bodies may be the likely predisposing factors responsible for the high prevalence recorded in the study area.

Keywords: Urinary schistosomiasis, Pupils, Michika, North-Eastern Nigeria.

INTRODUCTION

Schistosomiasis is a chronic, parasitic disease caused by blood flukes (trematode worms) of the genus *Schistosoma*. At least, 230million people require treatment every year. Schistosomiasis transmission has been documented in 77 countries. However, those at most risk of infection are in 52 countries [1]. Schistosomiasis is one of the most widespread of all human parasitic diseases, ranking second only to malaria in terms of its socioeconomic and public health importance in tropical and subtropical areas [2].

Schistosomiasis is a disease that affects people residing in the rural and predominantly agricultural areas where many are exposed to the infection because of poverty, ignorance, poor housing, substandard hygienic practices, lack of safe drinking, domestic and recreational water and the availability of few, if any, sanitary facilities[3, 4, 5].

There are two major forms of schistosomiasis – intestinal and urogenital – caused by five main species of blood fluke. Urogenital schistosomiasis is caused by *Schistosoma haematobium*. The classic sign of urogenital

schistosomiasis is haematuria (blood in urine). Fibrosis of the bladder and ureter, and kidney damage are common findings in advanced cases. Bladder cancer is also a possible late-stage complication. In women, urogenital schistosomiasis may be present with genital lesions, vaginal bleeding, pains during sexual intercourse and nodules in the vulva. In men, urogenital schistosomiasis can induce pathology of the seminal vesicles, prostate and other organs. This disease may also have other long-term irreversible consequences, including infertility [2].

The economic and health effects of schistosomiasis are considerable. In children, schistosomiasis can cause anemia, stunting and a reduced ability to learn, although the effects are usually reversible with treatment. Chronic schistosomiasis may affect people's ability to work and in some cases can result in death. In sub-Saharan Africa, more than 200 000 deaths per year are due to schistosomiasis. It is estimated that at least 90% of those requiring treatment for schistosomiasis live in Africa [2].Migration of people from one area to the other seems to enhance the spread of the disease, and schistosomiasis is now occurring increasingly in periurban areas [6].

Prevention and control of schistosomiasis is based on preventive treatment, snail control, improved sanitation and health education. The WHO strategy for schistosomiasis control focuses on reducing disease through periodic, targeted treatment with praziquantel. This involves regular treatment of all people in at-risk groups. Treatment should be complemented with health education, as well as access to safe water and good sanitation [2].This study aimed at determining the prevalence of urinary schistosomiasis as well as the likely predisposing factors for the transmission of the infection in the study area.

METHODS

Study area

The study was carried out in Michika town, Michika Local Government Area, Adamawa State, Nigeria. The region lies between latitude $10^{o}30'$ and 10^{o} 55' North of the equator and longitude $13^{o}15'$ and $13^{o}30'$ East of the Greenwich meridian. Michika is bounded in the North by Madagali Local Government, in the west by Borno State, Asikira Uba in the south, Mubi north in the East and Cameroon republic. It has a land area of 1421 – 99 km^2 [7]. River Moda in Michika Local Government area is one of the tributaries of Yedzaram which takes its source from Gella hills, south of Mubi which flows toward South-north direction and it eventually drains into the Lake Chad.

Study Population

A total of 400 pupils were enrolled in the study and the schools surveyed in this study are: Kankila Primary School, Murva Primary School and Hausari Primary School. Pupils in primary 2 to 6 were included in this study while those in the lower classes were excluded because they were under aged and difficult to manage.

Ethical Considerations

Permissions were obtained from the Education Secretary, Michika Local Government as well as the Headmasters/Headmistress of the selected schools before the commencement of the work.

Sample Collection/ Proccessing

Semi-structured questionnaires were administered randomly to the pupils with the assistance of their teachers to obtain some vital demographic data which include: sex, age, source of water supply and name of their school. Four hundred (400) terminal urine samples were collected from the pupils in a clean, wide mouth, screw capped, transparent, dry and disinfectant- free containers between November and December, 2010.The students were trained to collect the urine between the hours of 10.00am and 2.00pm after an exercise and ensuring the first and the last few drops were included [8,9,10]. The samples were

transported and processed immediately at the Microbiology Laboratory, General Hospital, Michika.

SAMPLE PROCESSING

Macroscopic and microscopic examinations were carried out on all the urine samples. Samples were centrifuged and examined for the characteristic eggs of *Schistosoma haematobium* in accordance to standard parasitological procedures [8, 10]. Conclusive diagnosis was made with the identification of the characteristic eggs in the samples.

STATISTICAL ANALYSIS

Data obtained were analyzed statistically using Chi-square. A value of $p<0.05$ was considered significant while proportion values of $p>0.05$ was not significant.

RESULTS

Of 400 urine samples, 109(27.25%) urine samples were positive for *S.haematobium* in the study area. The prevalence of urinary schistosomiasis as related to age group shows that the highest prevalence was recorded within the age group 14-16 years with 18(30.5%) followed by age group 8-10 years with 41(27.0%) and the lowest was within the age group 11-13 years with 50(26.5%) as shown in Table 1. The result showed that there is a significant relationship between the prevalence and the age groups ($P< 0.05$).

Table 2 shows the prevalence of schistosomiasis according to gender of the pupils in the three schools. The infection rate was significantly higher ($p < 0.05$) among males 83 (37.6%) than among females 26(14.5%). Infection was higher 79(39.9%) among students whose normal source of drinking water is stream/pond, followed by those whose source of drinking water is well 22(15.5%) and the least among those with borehole water as their source of drinking water 8(13.3%) as shown in Table 3.

Table 4 shows the prevalence of schistosomiasis in relation to schools (Location).The result indicates a significant relationship ($p < 0.05$). Hausari Primary School had the highest prevalence 64(32.0%), followed by Kankila Primary School with 25(25.0%) and Murva Primary School recorded the least with 20(20.0%).

DISCUSSION

The study reveals that the area is endemic to urinary schistosomiasis. Of the 400 urine samples screened, 109(27.3%) harbored the ova of the parasite. This prevalence is much higher than the result obtained by Damen *et al*.[11] who reported a prevalence of 19.0% in a similar study in Jama'a Local Government Area, Kaduna State, North-Western Nigeria while Okpala *et al*.[12] recorded a lower prevalence of 0.33% among pupils in Apata and Laranto areas in Jos, Plateau State, North-Central Nigeria.

The prevalence in relation to age group shows that pupils within 14-16 years were mostly affected in this study with the prevalence of 18(30.5%), followed by the age group 8-10 with 41(27.0) and the least was recorded among the age group 11-13 with 50(26.5%).This study was in consonance with the findings of Duwa *et al*. [13] who reported a highest prevalence among age group 14-16 years, while Abdullahi *et al*.[14], Bello and Edungbola[15] reported the highest prevalence among lower age groups. The highest prevalence among the age group 11-14 in this study may be attributed to the active participation or involvement of the pupils in water contact activities such as swimming, irrigation farming, fishing, washing, bathing and some other recreational activities than in the lower age groups.

The infection rate in this study was significantly higher ($p < 0.05$) among males 83 (37.6%) than among females 26(14.5%).This agreed with earlier findings reported by Damen *et al*.[11], Abdulahi *et al*.[14]. This may be due to socio-

cultural practices such as bathing, washing, swimming, irrigation farming and fishing in the available ponds and rivers which exposes the males more often to contact with contaminated water bodies than their female counterparts who were being restraint from active engagement from such activities.

Infection was higher 79(39.9%) among pupils whose normal source of drinking water is stream/pond, followed by those whose source is Well 22(15.5%) and the least among those with borehole water as their source of supply8(13.3%).There was a significant association between the prevalence of the infection with sources of water supply($p < 0.05$). The result obtained in this survey was in consonance with the findings of Damen *et al*.[11] and Bigwan *et al*.[16]. This may be attributed to the fact that the snail intermediate hosts survive in ponds or streams and this serve as a foci for transmission of the infection to people who use this source often either for vocational, domestic or recreational activities.

The prevalence of schistosomiasis in relation to schools (Location) in this study indicates a significant relationship ($p < 0.05$). Hausari Primary School had the highest prevalence 64(32.0%), followed by Kankila Primary School with 25(25.0%) and Murva Primary School recorded the least with 20(20.0%).This study agreed with the findings of Bigwan *et al*.[16] in a similar work among Secondary School Students in Potiskum, North-Eastern Nigeria who reported that the differences in the distribution of the infection in relation to locations(schools) may be due to some peculiarities associated with those schools (locations) such as the availability and proximity of ponds, rivers or streams to the schools or where they recite which attracts them there for recreational or agricultural purposes.

CONCLUSION

The study reveals that urinary schistosomiasis is endemic in the study area. The prevalence was higher in males than females. Lack of portable drinking water within the communities in the study area and the availability of water bodies such as River Moda, ponds and streams in the area provide avenue for water contact activities such as swimming, washing, irrigation farming, and fishing which contributes to the increased prevalence of the infection. Prompt prevention and control strategies by the government and non governmental agencies through health education, awareness campaigns, provision of portable water, mass chemotherapy and provision of adequate sanitary facilities can help in reducing or eradicating the infection in the area.

RECOMMENDATIONS

Schistosomiasis control programmes should involve integrating prevention and control strategies such as health education about the life cycle of the parasites, proper disposal of urine and faeces, mass chemotherapy using Praziquantel and provision of portable water. The government and other non governmental agencies should provide pipe borne water and sponsor public enlightenments/campaigns programmes aim at the prevention and control of the infection in the study area. Screening of pupils for schistosomiasis should be included as part of medical report for the newly admitted.

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Table 1: Prevalence of urinary schistosomiasis in relation to age group

Age group (yrs)	No. examined	No. Positive	Prevalence (%)
8 – 10	152	41	27.0
11 -13	189	50	26.5
14 -16	59	18	30.5
Total	400	109	27.3

X^2= 14.992 DF= 2 P < 0.05

Table 2: Prevalence of urinary schistosomiasis in relation to sex

Sex	No. examined	No. Positive	Prevalence (%)
Male	221	83	37.6
Female	179	26	14.5
Total	400	109	27.3

X^2= 29.820 DF= 2 P < 0.05

Table 3: Prevalence of urinary schistosomiasis in relation to source of water

Water source	No. examined	No. Positive	Prevalence (%)
Stream/pond	198	79	39.9
Dug well	142	22	15.5
Borehole	60	8	13.3
Total	400	109	27.3

X^2= 77.860 DF= 2 P < 0.05

Table 4: Prevalence of urinary schistosomiasis in relation to the various schools

Name of school	No. examined	No. Positive	Prevalence (%)
Kankila Primary School	100	25	25.0
Murva Primary School	100	20	20.0
Hausari Primary School	200	64	32.0
Total	400	109	27.3

X^2= 31.947 DF= 2 P < 0.05