IJABR Vol. 7(1): 24 - 29 (2016)

Original Article

A SURVEY OF *Schistosoma haematobium* INFECTION AMONG SCHOOL CHILDREN IN MINNA METROPOLIS, NIGER STATE, NIGERIA

Abolarinwa, S. O*. and Fabiyi, C. O.

Department of Biological Sciences, Federal University of Technology, Minna, Niger State, Nigeria.

Submitted: April, 2016; Accepted: May, 2016; Published: June, 2016.

ABSTRACT

Schistosomiasis remains a disease of significant public health importance in many rural and peri-urban communities in sub-saharan Africa. A survey was carried out to determine the prevalence and intensity of *Schistosoma haematobium* infections among primary school children in Bosso Local Government Area of Niger State, Nigeria. Urine specimens collected from school children aged between 5-18 years were examined using centrifugation method. The overall prevalence of the disease in the area recorded was 12.6%. Prevalence was significantly ($P<0.05$) higher among males (16.9%) than females (8.2%) in all age groups reaching the peak among the 10 - 14-year age group. Gross haematuria was relatively high among infected pupils (54.0%). The intensity of infection, as measured by egg count/10 ml of urine, showed that males had significantly higher mean egg count than females in all age groups. The egg output was generally low but with high output among few infected individuals: 1-50 eggs/ 10 ml (50.8%), 51-100 eggs/10 ml (27.0%), 101-150 eggs/10 ml (4.8%), 151-300 egg/ 10 ml (12.7%), and > 300 eggs/10 ml (4.8%). The findings of this study will serve as baseline information for developing strategies for effective control of Schistosomiasis in Bosso L.G.A of Niger State.

Keywords: Age, Egg, Disease, Prevalence, Urine

***Corresponding author:** abolarinwa@futminna.edu.ng, +2348038987201.

INTRODUCTION

Schistosomiasis, caused by trematodes of the Genus, *Schistosoma,* is the second most prevalent tropical disease after malaria and a leading cause of severe morbidity in large areas of the world. Mortality due to schistosomiasis is estimated at over 100,000 per year worldwide. The disease affects about 200 million people in 74 developing countries, and between 500-600 million others are at risk of new infection because of poverty, ignorance, poor housing, sub-standard hygienic practices, and sanitary facilities (King 2009; Allegretti *et al.*, 2012). The clinical occurrence and intensity of the disease (due either to intestinal or urinary lesions) vary according to infecting species and the number of adult worm pair harboured in man. Various freshwater snails, depending on the species of schistosome and geographical area, act as intermediate hosts of the parasite.

In Nigeria, both urinary and intestinal schistosomiasis are endemic, although, the urinary form, caused by *Schistosoma haematobium,* is more widespread than the intestinal form caused by *Schistosoma mansoni* (Cowper, 1973; Ngele and Okoye, 2016). The distribution of the disease is closely related to that of the snail intermediate hosts and concentration of human population around limited water sources (Pugh and Gilles, 1978). Thus, the disease is now found increasingly in many urban and peri-urban areas where stagnant pools and drainage provide foci for transmission (Bisseiru, 1984). Reports from previous studies in Nigeria (Awogun, 1990; Arinola, 1995; Akogun & Akogun 1996; and Mafiana & Beyioku, 1998; Adie *et al.*, 2013; Adulugba & Omudu, 2015), also revealed the increasing status of Schitosomiasis as a cause of morbidity in peri-urban and urban communities in the country. The aim of study was to provide bseline information required for the formulation of sustainable and effective control of schistosomiasis which is predicated on sound knowledge of parasitological indices of transmission and epidemiology of the disease.

MATERIALS AND METHODS

Study Area

Minna, the Capital of Niger state, North-central Nigeria, is located within Longitude 6^0 33' E and Latitude 9^0 27 ' N, and covers a land area of 88 km^2. It has an estimated human population of 1.2 million, and characterised by a tropical climate with mean annual temperature, relative humidity and rainfall of 30.20^{0}C, 61.00% and 1334.00mm, respectively. The climate presents two distinct seasons; a rainy season between May and October and a dry season in November - April. The plant cover in the area is typically grass-dominated savannah with scattered trees (Olayemi *et al.*, 2009).

Collection of Urine Simples

Urine samples were collected in clean labeled bottles by 12.00 noon each day. Pupils were instructed on how to collect urine into the sample bottles. Terminal urine was emphasized in order to note gross heamaturia. The urine samples collected were transported to the laboratory for prompt examination. Relevant information such as age, sex, history of haematuria and water contact behaviour were obtained from the pupils and recorded in data sheet with identification number corresponding to

those of the sample bottles given to the pupil.

Examination of Urine Sample

Parasitological examination was carried out on the urine samples using the centrifugation method. Ten (10) ml of each urine sample was taken and centrifuged at 1000 revolution per minute for three minutes. The supernatant was discarded and the sediment examined for schistosome eggs. In positive cases, intensity of infection was determined by taking egg count. The results obtained were recorded as egg count /10 ml of urine.

Data Analysis

Data was analysed using simple percentages and frequencies and *chi*-square tests were used to compare and test for significance of mean differences. Statistical significance was achieved if $p < 0.05$.

RESULTS

A total of 500 pupils, comprising of 255 (51.0%) males and 245 (49.0%) females with ages of 5-16 years were examined. A total of 63 (12.6%) of the pupils: 43 (16.9%) males and 20 (8.2%) females, were excreting ova of *S. haematobium* in their urine (Table 1). There was significant ($p<0.05$) difference in the sexes. Prevalence was higher among pupils of Bosso Primary School (16.8%) than those of Maikunkele Primary School (5.4%) (Table 2). Age-group specific prevalence of infection was highest among the 10 – 14 age-groups. More males than females were infected in all age groups (Table 1). Intensity of infection shown by mean egg count/ 10 ml of urine was moderate among infected pupils; most of the infected pupils excreted less than 100 eggs/ 10ml of urine (Fig 1).

Table 1. Prevalence and intensity of *S. haematobium* infection by age group and sex of School Children in Minna, Nigeria.

	MALES			FEMALES			AGGREGATE		
Age(yr)	No.Exam.	No. +ve (%)	Mean egg count/10ml	No Exam.	No. +ve (%)	Mean egg count/10 ml	No. Exam.	No. +ve (%)	Mean egg count
5 - 9	102	10(9.8)	68.4±61.6	96	7(7.2)	47.4±58.9	192	17(8.6)	59.8 ±60.5
10-14	142	30(21.1)	75.8±84.5	137	13(9.5)	83.8±86.1	279	43(15.4)	78.2 ±85.0
15-19	11	3(27.3)	140.0±113.9	0	0	0	23	3(13.0)	140. ±113.9
Total	255	43(16.9)	78.6±82.3	245	20(8.2)	71.7±77.7	500	63(12.6)	76.2 ±80.9

Table 2 Distribution of *S. haematobium* infection in relation to School and study population in Minna, Nigeria

School	Males		Females		Aggregate	
	No. Exam.	No. (%) + ve	No. Exam.	No. (%) + ve	No. Exam.	No. (%) + ve
Bosso Primary	148	37(25%)	168	16(9.5%)	316	53 (16.8%)
Maikunkele Primary	107	6 (5.6%)	77	4 (5.2%)	184	19 (5.4%)
Total	255	43 (16.9%)	245	20 (8.2%)	500	63 (12.6%)

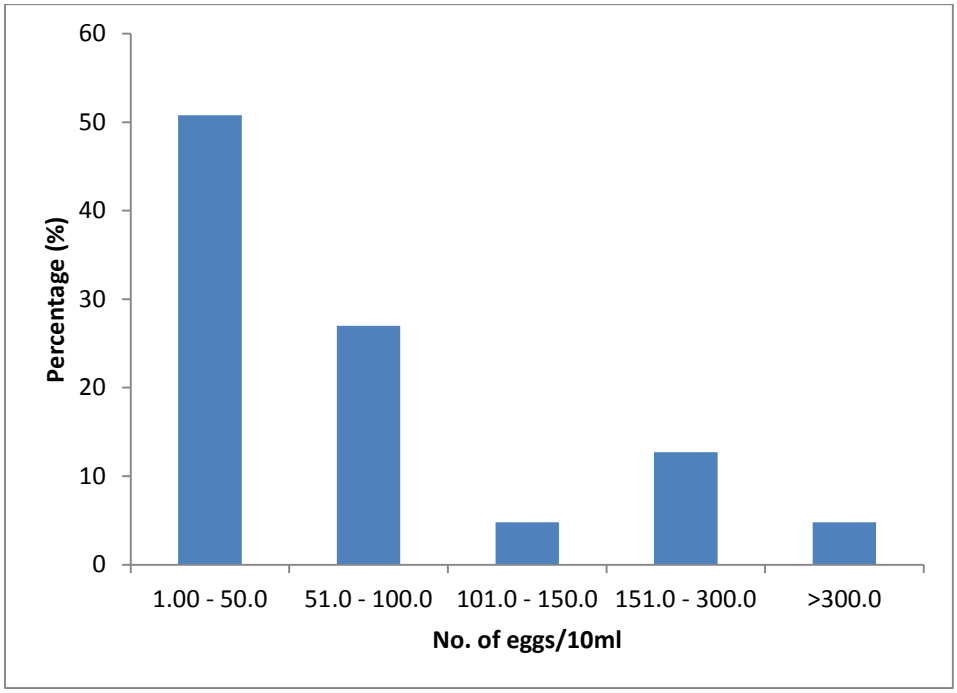

Figure 1: Intensity of Schistosomiasis infection among School children in Minna, Nigeria

DISCUSSION

The prevalence obtained in this study indicates probable endemicity of urinary schistosomasis among primary school children in Minna, Nigeria. Studies indicate that School aged children are known to have the highest rate of water contact and, hence, highest rate of schistosome infection (Lengeler *et al.*, 1991; Akogun and Akogun, 1996). It is common sight to find pupils playing in irrigation canals and ponds during hot, dry season months, in Nigeria.

The schistosome prevalence rate recorded in this study is similar to that obtained by Tobin *et al.* (2013) who recorded a prevalence of 10.7% among school children in a rural community in Etsako L.G.A. Edo State, Nigeria. Adie *et al.* (2013) recorded an overall prevalence of 10.2% for Cross River state Nigeria while Chaine and Malek (1983) obtained a prevalence of 10.4% in a community-based study in Senegal. In contrast, prevalence of 91% was recorded by Gilles *et al.* (1965) among school children in lbadan. Arinola (1995) in a study in Ibadan obtained a prevalence of 21.1%, while, Mafiana and Beyioku (1998) in a 10 years follow up study in Abeokuta recorded a drop in prevalence from 55% in 1985 to 11.9% in 1998. Factors such as age, occupation of parent, frequency of water contact dictated by household need are probably responsible for variation in prevalence from locality to locality. In this study, it was observed that streams served as the major source of water for households during the dry hot months of October to April. During this period, such streams are reduced to small pools around which people congregate to wash and play. This type of aquatic habitat is known to favour proliferation of snail intermediate hosts of schistosomes. However, during the wet months of June – September, flood flash tends to wash the snails into less anthropogenically influenced water bodies, where conditions may not be favourable for the proliferation of intermediate snail hosts. Coupled with this, human-water contacts tend to reduce as households now make use of rain water. This trend, therefore, suggest the likelihood of seasonal pattern in transmission of the disease in some localities. However, further studies are needed to shed more light on the determinants of significant variations in schistosome prevalence from one locality to another. Nevertheless, provision of portable drinking water will help to drastically reduce water contact and consequently interrupt transmission of the disease. This strategy in combination with Health education of the children in particular is suggested as a prompt cheap means of control.

REFERENCES

Adie, H. A., Okon, O. E., Arong, G. A., Braide, E. I. and Ekpo, U. F. (2013). Spatial Distribution of Urinary Schistosomiasis in Cross River State, Nigeria Using Geographical Information System and School Based Questionnaire. *Pakistan Journal of Biological Sciences,* 16: 1166 - 1172.

Adulugba, A. O. and Omudu, E. A. (2015) Epidemiological studies on some parasitological and ecological aspects of schistosomiasis in Agatu, Benue State, Nigeria. *Nigerian Journal of Parasitology*, 36(1): 38 - 43.

Akogun, O. B. and Akogun, M. K. (1996). Human behaviour, water usage and schistosomiasis in a small settlement near Vola, Nigeria. *Annals Tropical Medicine and Parasitology.* 90 (3): 303 - 311.

Allegretti, S. M., de Oliveira, C. N. F., de Oliveira, R. N., Frezza, T. F. and Rehder, V. L. G. (2012). The Use of Brazilian Medicinal Plants to Combat *Schistosoma mansoni*, Schistosomiasis, Prof. Mohammad Bagher Rokni (Ed.),InTech, Available online at: *http://www.intechopen.com/books/schistosomiasis/theuse-of-brazilian-medicinalplants-to-combat-schistosoma-mansoni. Retrieved on 24th November 2013.*

Arinola, O. G. (1995). Prevalence and severity of urinary schistosomiasis in Ibadan, Nigeria. *East African Medical Journal,* 72(11): 746-8.

Awogun, L. A. (1990). A comparison of the prevalence and intensity of *Schistosoma haematobium* and *Schistosoma mansoni* among secondary school children in. Kwara State. *Nigerian Journal of Parasitology*, 9(1): 51 - 54.

Bisseiru, N. (1984) Epidemiology and control of Schistosomiasis. *Journal of Prevention, Diagnosis and Treatment,* 6(3): 75 - 83.

Chaine T. C. and Malek E. A. (1983). Urinary Schistosomiasis in the Sahelian region of the Senegal river basin. *Tropical and Geographical Medicine*. 35(3): 249 - 257.

Cowper, S. G. (1973). Bilharziasis (Schistosomiasis) in Nigeria: A review. *Tropical and Geographical Medicine*, 25: 105 - 118.

Gilles H. M., Lucas, A., Adeniyi, J. C., Linder, R., Anand, S. V., Braband, H., Cockshott, W.P., Cowper, S. G., Muller, R. L., Hira, P. R. and Wilson, A. M. N. (1965). *Schistosoma haematobium* infection in Nigeria II; Infection at a Primary school in Ibadan. *Annals Tropical Medicine and Parasitology,* 59 (4): 441-450.

King, C.H. (2009). Towards elimination of schistosomiasis. *New England Journal of Medicine*, 360 (2): 106 - 109.

Lengeler, C. D., de Savigny, H., Mshinda, C., Mayombana, S., Tayari, S., Hatz, C., Degrémont, A and Tanner, M. (1991). Community-based questionnaires and health statistics as tools for the cost-efficient identification of communities at risk of urinary schistosomiasis. *International Journal of Epidemiology*, 20: 796 - 807.

Mafiana, C. F, and Beyioku Y. O. (1998). *Schistosoma haematobium* infection in Abeokuta. *African Journal of Medical Science,* 27(1-2): 5 - 7.

Ngele, K. K. and Okoye, N. T. (2016). Prevalence of schistosomiasis infection among primary school pupils in Agwu LGA, Enugu State, Nigeria. *Nigerian Journal of Parasitology,* 37(1):11 - 15.

Olayemi, I. K., Ande, A. T., Isah, B. and Idris, A. R. (2009). Epidemiology of Malaria in relation to climatic variables in Minna Nigeria. *African Journal of Medical Sciences,* 2 (1): 5 - 10.

Pugh, R. N. H. and Gilles, H. M. (1978). Malumfashi Endemic Disease Research project III Urinary schistosomiasis a longitudinal study. *Annals Tropical Medicine and Parasitology*. 72(5): 471 - 482.

Tobin, E. A., Eze, G, U., Isah, E, C. and Okojie, P, W. (2013). Prevalence of urinary shistosomiasis among school children in a rural community in South-South, Nigeria. *West African Journal of Medicine*, 32(2):115 – 20.