Bayero Journal of Pure and Applied Sciences, 5(1): 155 – 158
Received: January 2012
Accepted: June 2012
ISSN 2006 – 6996

PREVALENCE OF SCHISTOSOMIASIS AMONG SECONDARY SCHOOL BOARDING STUDENTS IN POTISKUM METROPOLIS, YOBE STATE, NORTH-EASTERN NIGERIA

***Bigwan, E.I.[1], Tinja, B.[2, 3] and Damen, J. G.[1]**
[1]Department of Medical Laboratory Science, University of Jos, Plateau State, Nigeria
[2]Pathology Department, General Hospital, Potiskum, Nigeria
[3]Federal College of Medical Laboratory Technology, Jos
* Correspondence author:emabigwan@gmail.com

ABSTRACT
Schistosomiasis remains one of the world's most prevalent diseases of public health importance. Despite more than a century of control efforts and the introduction of highly effective antischistosomal drug the eradication of the disease is still far from actualization. Six hundred (300 stool and300 urine) samples were collected randomly from the students who consented after obtaining some vital demographic data from them. The stool samples were processed using formol ether concentration techniques while the urine samples were processed by ordinary centrifugal sedimentation technique. The result obtained was tested using Chi-square. Of 600 samples, 30 urine samples were positive for S.haematobium giving 10.0% urinary schistosomiasis, while 6 faecal samples were positive for S. mansoni giving 2.0% intestinal schistosomiasis and an overall 6.0% of schistosomiasis.The result indicates that there is an increase in prevalence with increase in age. The infection rate was significantly higher ($p < 0.05$) among males (8.5%) than among females (1.0%).Infection was higher (11.2%) among students whose normal source of drinking water is stream, followed by those whose source of drinking water is well (4.0%) and the least among those using tap water (2.2%). The prevalence of schistosomiasis in relation to schools indicates a significant relationship ($p < 0.05$).FGSS had the highest prevalence (11.5%), followed by GSSTSS with 5.5% and GGSS recorded the least with 1.0%. 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 prevalence rate recorded in the study area.
Keywords: Prevalence, Schistosomiasis, Boarding students, Potiskum, North-Eastern Nigeria.

INTRODUCTION

Schistosomiasis is the most common parasite transmitted through contact with fresh water. It is endemic in more than 70 low income countries where it occurs in rural areas and the fringes of cities. Over 650 million people globally are at risk of infection, with more than 200 million people infected. Of these, 120 million are estimated to have symptoms, with 20 million people experiencing serious consequences. The economic effects and health implications of schistosomiasis are extensive. Higher disease rates occur in children (Gryseels *et al.*, 2006) with infection frequently found in those less than 14 years in many risk areas (WHO, 2007).

Schistosomiasis remains a public health problem in several parts of the world, particularly in Africa, with ≥200 million people infected in 2009 (Steinmann *et al.,* 2006). Data on treatment are collected to measure the progress being made towards achieving the target set by World Health Assembly Resolution 54.19, adopted in 2001, which aims to reach ≥75% all school-aged children who are at risk of morbidity from schistosomiasis and soil-transmitted helminthiasis(WHO,2001;WHO,2011a).

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 risk group populations. Groups targeted for treatment are: school-aged children in endemic areas; adults considered to be at risk in endemic areas, e.g. pregnant and breastfeeding women, people with occupations involving contact with infested water; such as fishermen, farmers, irrigation workers, women whose domestic tasks bring them into contact with infested water and entire communities living in endemic areas. Schistosomiasis particularly affects agricultural and fishing populations. Women doing domestic chores in infested water, such as washing clothes, are also at risk. Hygiene and play habits make children especially vulnerable to infection (WHO, 2011b).

Schistosomiasis is one of the major public health problems facing developing countries, with school age children at greatest risk (Uneke *et al*., 2007). This study aimed at assessing the prevalence of the infection in some selected schools in the metropolis since school children are one of the major risk groups for the transmission of the infection. The result obtained will serve as an epidemiological marker for future studies in the area. Although there is a national programme for its control, there is the need for a more robust and extensive survey in communities to provide a detailed map on the

distribution of the disease in the country, in order to prioritize control measures, as well as to monitor the effectiveness of the control measures.

MATERIALS AND METHODS

Study Area

Potiskum is the Local Government headquarters of Potiskum Local Government Council, Yobe State North-Eastern Nigeria. It is located in the western part of Yobe on the A3 highway at 11°42′33″N 11°04′10″E / 11.70917°N 11.06944°E . It has an area of 559 km² and a population of 205,876 at the 2006 census (http://www.ngex.com/nigeria/places/states/yobe.htm). It is situated in the savannah region of Nigeria. The schools selected for the study are situated in the metropolis. The schools selected are Fika Government Secondary School (FGSS); Government Senior Science Technical Secondary School (GSSTSS) and Government Girls Secondary School (GGSS).Most of the inhabitant of the area indulge in farming activities, trading, rearing of animals and civil service. The students play vital role in the socio-economic activity of the area especially during their holidays.

Ethical Considerations

Approvals and permissions were granted by Zonal Education Inspectorate Office, Potiskum and the authorities of the selected schools before the commencement of the study.

Sample Collection

A semi structured questionnaire was administered randomly to consented students to obtain vital demographic data which include: sex, age, source of drinking water supply and name of their school. Three hundred (300) faecal samples and Three hundred (300) urine samples were collected from Three hundred students in a clean, wide mouth, screw capped, transparent, dry and disinfectant- free containers between May to August, 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 (Cheesbrough, 1998;WHO,1980 and Ochei and Kolhatkar, 2007).Early morning faecal samples were received. The samples were transported and processed immediately at the Pathology Department, General Hospital, Potiskum.

Sample Processing

Macroscopic and microscopic examinations were carried out on all the samples. Urine samples were centrifuged and examined for the eggs of *Schistosoma haematobium* while Stool samples were processed using formol-ether concentration method for identification of characteristic eggs of *Schistosoma mansoni* according to standard procedures (Cheesbrough, 1998 and Ochei and Kolhatkar, 2007). Conclusive diagnosis was made with the identification of the characteristic eggs in the samples.

Statistical Analysis

Data obtained were analysed 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 600 samples (300 urine and 300 faecal samples), 30 urine samples were positive for *S.haematobium*,while 6 faecal samples were positive for *S. mansoni* giving 10.0% urinary schistosomiasis, 2.0% intestinal schistosomiasis and an overall 6.0% of schistosomiasis in the study area as shown in Table 1.There were no cases of mixed infections recorded in the study.

Table 2 shows the prevalence of schistosomiasis in relation to age groups. The result indicates that there is an increase in prevalence with increase in age. Age group 13 -15 years had the lowest rate (4.0%) while the age group19 -22 years recorded the highest prevalence with 7.2%.The distribution of the infection showed a significant difference ($p < 0.05$).

Table 3 shows the prevalence of schistosomiasis according to gender of the students in the three schools. The infection rate was significantly higher ($p < 0.05$) among males (8.5%) than among females (1.0%). Infection was higher (11.2%) among students whose normal source of drinking water is stream, followed by those whose source of drinking water is well (4.0%) and the least among those with tap water as their source of drinking water (2.2%) as shown in table 4.

Table 5 shows the prevalence of schistosomiasis in relation to schools (Location).The result indicates a significant relationship ($p < 0.05$).FGSS had the highest prevalence (11.5%), followed by GSSTSS with 5.5% and GGSS recorded the least with 1.0%.

Table 1: Prevalence of schistosomiasis in relation to sample type

Sample	Number examined	Number positive	Prevalence (%)
Urine	300	30	10.0
Stool	300	6	2.0
	600	36	6.0

[X^2= 16.03 DF= 1 P < 0.05]

Table 2: Prevalence of schistosomiasis in relation to age group

Age group	Number examined	Number positive	Prevalence (%)
13-15	150	6	4.0
16-18	200	12	6.0
19-22	250	18	7.2
Total	600	36	6.0

[X^2= 6.00 DF=2 P < 0.05]

Table 3: Prevalence of schistosomiasis in relation to sex

Sex	Number examined	Number positive	Prevalence (%)
Male	400	34	8.5
Female	200	2	1.0
Total	600	36	6.0

[X^2= 28.48 DF=1 P < 0.05]

Table 4: Prevalence of schistosomiasis in relation to sources of water supply

Source	Number examined	Number positive	Prevalence (%)
Tap	410	9	2.2
Stream	20	8	40.0
Well	170	19	11.2
Total	600	36	6.0

[X^2= 6.18 DF=2 P < 0.05]

Table 5: Prevalence of schistosomiasis in relation to schools (Location)

School	Number examined	Number positive	Prevalence (%)
FGSS	200	23	11.5
GSSTSS	200	11	5.5
GGSS	200	2	1.0
Total	600	36	6.0

[X^2= 18.51 DF=2 P < 0.05]

Key: **FGSS**- Fika Government Secondary School
GSSTSS- Government Senior Science Technical Secondary School
GGSS- Government Girls Secondary School.

DISCUSSION

The study showed an overall prevalence of schistosomiasis in the study area to be 6.0% with 10% urinary schistosomiasis and 2.0% intestinal schistosomiasis.The result obtained in this study is lower compare to findings of Damen *et al*. (2006) who recorded 19.0% among students in a Local Government Area of Kaduna State ; Agere *et al*.(2010) recorded 28.8% *in* Jalingo and Ardokola ,Taraba state**,** while the results in this study were higher than the findings of Okpala *et al*.(2004) who reported 0.67% in Jos and Goselle *et al.(*2010) recorded 4.6% in Jos. The endemicity of the diseases in many rural areas were attributed to ignorance, poor living condition, inadequate sanitation, water supply, personal and environmental hygiene as well as water contact activity with snail infected rivers, streams and Pond (WHO, 2003).The study agreed with several findings that schistosomiasis is endemic in tropical and sub-tropical countries of the world of which Nigeria is part of it.

Infection with Schistosomes were found to be higher among students of the age group 19-22 years with 7.2%, followed by 16-18 years with 6.0% and 13-15 years with 4.0% as shown in Table 2.The result reveals that as age increases the infection rate increases there by showing a significant differences between age and the prevalence of the infection ($p < 0.05$).This findings agrees with Agere *et al*. (2010) *in Jalingo and* Biu *et al*. (2009). It disagrees with the findings of Damen *et al*. (2006) and Goselle *et al.* (2010) who reported a decrease in prevalence with increase in age. The increase in the infection rate in this study as age increases may be attributed to more contaminated water contact over time among the students as the engage in activities such as irrigation farming, fishing and swimming.

This study also revealed a statistically significant higher prevalence in males compared to the females which agrees with the findings of Damen *et al*. (2006); Biu *et al*. (2009); Goselle *et al*. (2010). The males often engaged in activities such as swimming, fishing, and irrigation especially during holidays or during their outing days more than their female counterpart. This practice exposes the boys more to risk of infection through contact with the infective stage (cercaria) of the parasite in contaminated water. So also, there are some socio–cultural beliefs that restrain females from swimming in the locally available rivers and ponds.

A higher prevalence (40.0%) was observed among students with a history of using stream/pond water as source of their drinking and domestic purposes, followed by those using well water with 11.2% and the least (2.2%) among those using tap water. There was a significant differences ($p < 0.05$) in the prevalence of the infection in relation to the different sources of water supply. This was in agreement with the findings of Damen *et al*.(2006).This may be attributed to the fact that the snail intermediate hosts thrive more in ponds, streams or slow flowing rivers as such those using such water bodies for drinking, domestic purposes, fishing ,swimming and farming are more at risk of exposure to the infection .

The study reveals that the infection is endemic in all the schools.FGSS had the highest prevalence with 11.5%.followed by GSSTSS with 5.5% and GGSS recorded the least with 1.0%.The distribution of the infection in relation to the three schools showed a statistically significant relationship($p < 0.05$).

The differences in the distribution of the infection in relation to the various schools(locations) may be due to some peculiarities associated with the schools.FGSS and GSSTSS being boys schools and the presence of some ponds or rivers close to the schools provided a higher tendency of the male students going there during their outing days or absconding there at any time to swim, thus exposing them to the infection.GGSS had the least prevalence and this may be due to the fact that being a girls school they have less contact with their surrounding communities while in school and even while on holidays some socio-cultural factors may restrain them from longer water contact activities such as swimming in open places such as streams, rivers or ponds, fishing and irrigation farming.

The success of eradication of Schistosomiasis would be achieved through the integration of complementary strategies such as intensive diseases surveillances, chemotherapy, health education, water supply, fight against poverty and sanitation in the area and the country at large.

Recommendations

Based on the findings from this study, it is recommended that: Further research should be carried out in the entire Yobe metropolis to ascertain the prevalence of the infection and the presence of the snail intermediate hosts in the area. This will provide data for a holistic approach for the prevention and control programmes in the area. Screening of students for schistosomiasis should be included as part of medical report for newly admitted students.

Acknowledgements

We thank the Head of pathology department and the staffs of the General Hospital Potiskum for granting the usage of their facilities and assistance for the analysis. Our appreciation also goes to the Zonal Education Inspectorate Office, Potiskum and the authorities of the three schools for granting the permission to carry out the study in the study area.

REFERENCES

Agere, I. J.; Istifanus, W. A., Kela, S.L.(2010).Water usage and transmission of *Schistosoma haematobium* in Jalingo and Ardokola Local Government Area of Taraba State, Nigeria. *Nigerian Journal of Science, Technology and Environmental Education*, 3(1):87-95

Biu, A.A., Kolo, H.B., Agbadu, E.T. (2009).Prevalence of *Schistosoma haematobium* infection in school aged children of Konduga Local Government Area, Northeastern Nigeria. *International Journal of Biomedical and Health Sciences,* 5(4):181-184

Cheesbrough, M. (1998). *District Laboratory Practice in Tropical Countries part 1*. 1st ed. Cambridge University Press. India pp 191-237

Damen, J.G.,Banwat, E.B.,Egah, D.Z.,Shabi, M.E.(2006).Schistosomiasis among Students in a Local Government Area of Kaduna State in Northern Nigeria. *Highland Medical Journal*, 4(1):33-37

Goselle, N. O., Anegbe, D., Imandeh, G. N., Dakul, D. A., Onwuliri, A. C. F., Abba, O. J., Udeh, O. E., Abelau, A. M. (2010).*Schistosoma mansoni* Infections amongst School Children in Jos, Nigeria.Science *World Journal, 5 (1):42-45*

Gryseels B, Polman K, Clerinx *et al*. (2006). Human Schistosomiasis*. Lancet* 368:110618

http://www.ngex.com/nigeria/places/states/yobe.htm. Accessed on 20 th December, 2011

Ochei, J. and Kolhatkar A. (2007).*Medical Laboratory Science Theory and Practice*. 6th reprint. Tata McGraw-Hill New Delhi pp918-923

Okpala,H.O.,Agwu, E.,Agba,M.I.,Chimezie,O.R.,Nwobu,G.O., Ohihoin,A.A.(2004). A Survey of the Prevalence of Schistosomiasis among Pupils in Apata and Laranto areas in Jos, Plateau State. *Online J Health Allied Scs.* 1:1.http:cogprints.org/3717/1/2004-1-1.pdf.Accessed on 19 th August, 2007

Steinmann, P., Keiser, J., Bos, R., Tanner, M., Utzinger, J. (2006). Schistosomiasis and Water Resources Development: Systematic Review, Meta-analysis, and Estimates of People at risk. *Lancet Infectious Diseases,* 6: 411-425.

Uneke, C. J., Oyibo, P. G., Ugwuoru, C. D., Nwanokwai, A. P., Iloegbunam, R. O. (2007): Urinary Schistosomiasis Among School Age Children In Ebonyi State, Nigeria. *The Internet Journal of Laboratory Medicine.* 2 (1).Available from http://www.ispub.com/ostia/index.php?xmlFilePath=journals/ijlm/vol2n1 schisto.xml. Accessed 29 th December, 2011

WHO (1980).Examination of Urine for Eggs of *Schistosoma haematobium.Manual of Basic Techniques for a Health Laboratory*.pp 179-180, Geneva

WHO (2001) Schistosomiasis and Soil-transmitted Helminth Infections. Geneva, World Health Organization, 2001 (World Health Assembly Resolution 54.19). (Also available from http://www.who.int/worm control/about us/en/ea54r19.pdf.).Accessed 20th December, 2011

WHO (2003). Artemether Protects Against Schistosome Infection. Publication 62:1-2.

WHO (2007). Schistosomiasis. Fact Sheet No 115. Geneva. Available at: http://www.who.int/entity/mediacentre/factsheets/fs115/en.Accessed 23th December, 2011

WHO (2011a). Schistosomiasis.*Weekly Epidemiological Record*, 9(86): 73–80 http://www.who.int/wer.Accessed 23th December, 2011

WHO (2011b) Schistosomiasis.http://www.who.int/mediacentre/factsheets/fs115/en/index. html .Accessed on 14th October, 2011.