Current Status of Schistosomiasis amongst School Children in Igedeland, Benue State, Nigeria.

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Abstract

The current status of *S. haematobium* and *S. mansoni* infections among school aged children in Oju and Obi LGAs of Benue State was investigated between July to October, 2012. 786 urine and stool samples were examined using the sedimentation technique. In Oju the prevalence of *S. haematobium* and *S. mansoni* was 77 (19.3%) and 23 (5.8%) respectively. Males had a prevalence of 54(20.8%) which was significantly higher than females 23(16.4%). (χ^2=7.81, df = 3, P < 0.05). The prevalence rate for *S. mansoni* infection of males in Oju was 18 (7.0%) and females 5 (3.69%). Age group 11-15years had the highest infection rate of (18.8%) for *S. haematobium* and 15.2% for *S. mansoni*. The prevalence rates varied with age reaching the peak among age group 5-10 years (21.4%) for *S. haematobium* and 7.6% for *S. mansoni* infection. The overall indices of infection were generally highest in the 11-15years age group. Children between 5-10years contributed 93.7% of the daily egg output. Our findings justify the urgent need to develop an integrated community-based intervention that addresses the water and sanitation needs of the communities.

Key words: Current status. Schistosomiasis, Igedeland.

Introduction

Schistosomiasis is a major disease of public health importance and has been ranked second only to malaria as a source of human morbidity caused by parasitic agent (Goselle *et al.,* 2010, Nanvya *et al.,* 2011). Currently, 200 million people are infected world-wide with 120 million with symptoms and 20 million with severe illness (Mafiana *et al.,* 2003) with varying pathological presentations. Some 400 million more people are at risk of becoming infected and an estimated 80% of the most severely affected individuals is now concentrated in Africa (Chitsulo *et al.,* 2000, Adulugba and Omudu 2013). Schistosomiasis principally affects people engaged in agriculture or fishing but in many areas a large population of children are infected by the age of fifteen. It has recently been estimated that school-aged children experience a considerable burden of schistosomiasis which may have both immediate and long-term consequences on their health, growth and education (Omudu *et al.,* 2012).

Several studies in Benue State have reported urinary schistosomiasis prevalence ranging from 15% - 41% (Mbata *et al*., 2009, Houmsou *et al*., 2010). Previous studies on the intermediate host of this disease in Oju by Omudu and Odeh (2004) reported the presence of the snail intermediate host in water bodies in the area. This study was conducted to ascertain the current status of schistosomiasis and transmission indices among school aged children as well as provide information needed to develop strategies aimed at reducing the burden of the disease in Oju and Obi Local Government Areas of Benue State, Nigeria.

Materials and Method

Study Area.

This study was conducted in Oju and Obi Local Government Areas of Benue State, Nigeria (Fig. 1). Oju is located between longitude 8^0 15^1E and 9^0 45^1 E and latitude 6^0 30^1 N and 6^0 50^1 N. while Obi is located between longitude $8^0 15^1$ E and $8^0 35^1$ E and latitude $6^0 45^1$N and $7^0 00^1$N. Both Local Government Areas are primarily an expanse of village settlements and rural market towns. The residents both speak "Igede". Climate in the areas can be described as tropical sub-humid type with two distinct wet and dry seasons. Rainfall averages 7 months annually with total ranging between 1,200mm and 2000mm between the months of April and October. Temperature is relatively high throughout the year averaging 28 -32^0C with an occasional peak at 37^0C between March and April.

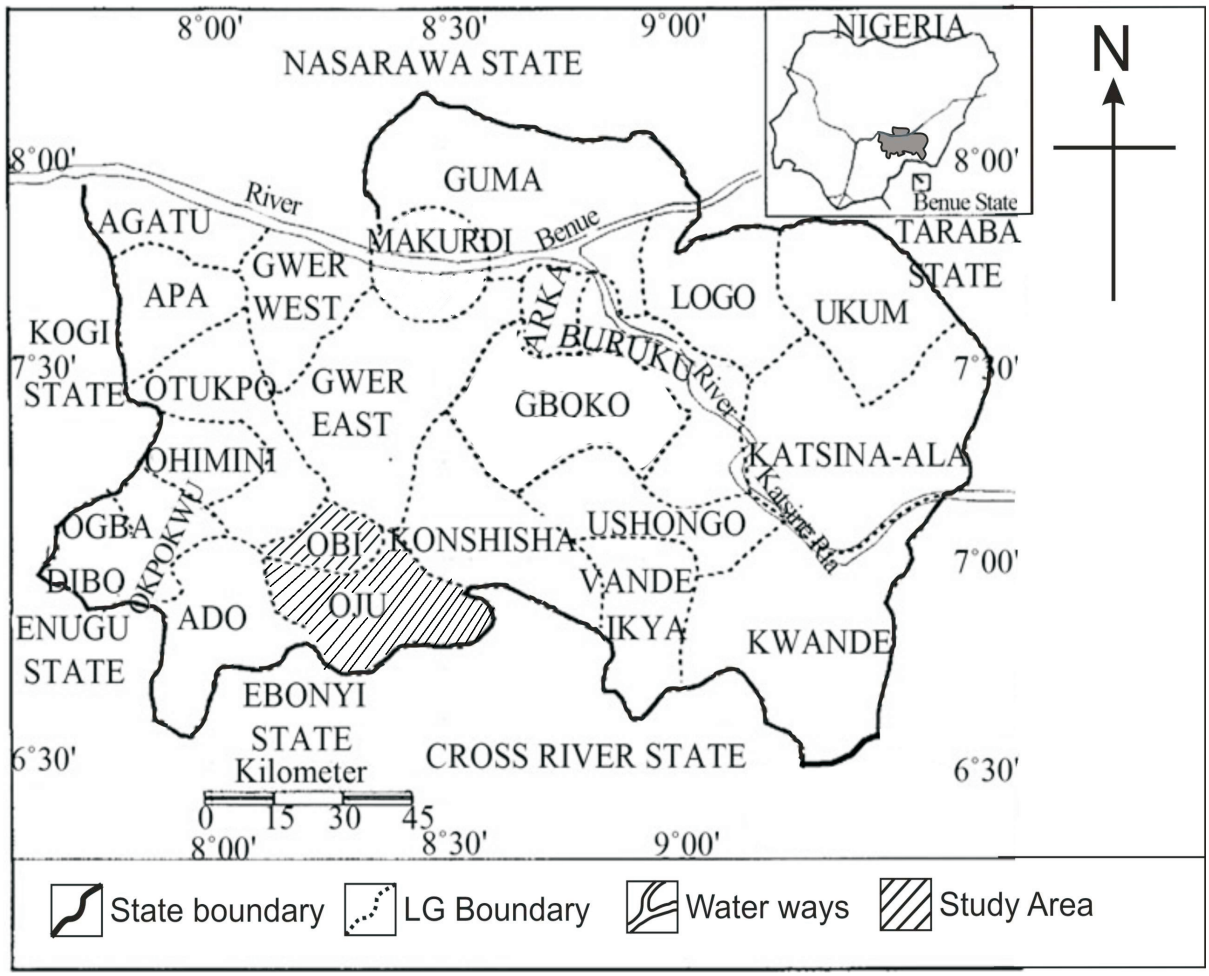

Fig 1: ***Map of Benue State showing the study area.***

Study Population and Design

A school-based cross-sectional selection of pupils between July and October, 2012 was conducted. Pupils were randomly selected from age range 5-17years old in each school. For effective coverage Obi was grouped into four zones; *Echori, Adiko, Ijegwu* and *Ogore,* while Oju was grouped into*; Ezza Idelle, Oho-Oboru, Ibilla* and *Ukpa*. A total of 786 urine and stool samples were collected from both male female pupils. 400 urine and stool samples were collected from pupils in Oju while 386 urine and stool samples were collected from pupils in Obi. Permission of the parents of the pupils was obtained before the commencement of the study. The study protocol was approved by the Research Department of the Benue State Ministry of Health. Each child was provided with two pre-labeled 60ml universal sample bottles for

urine and stool collection. The pupils were instructed on how to produce the samples. The samples were transported to the Laboratory of the Biology Department of the College of Education, Oju for analysis, and were preserved using sodium hypochlorite. A structured questionnaire was used to collect demographic data from the pupils.

Parasitological Examination

The urine sample was agitated and then 10ml was taken from the deposit of each specimen bottle after allowing to sediment for about an hour and centrifuged for 3 minutes at 2000rpm at room temperature. The sedimentation technique as described by (Ukaaga *et al.,* 2002) was used to analyze the urine samples, while the formol-ether concentration method as described by (Adulugba and Omudu 2013) was used to process the stool samples.

The data was analyzed using simple percentages and differences in proportion were evaluated using the chi-square test. Statistical significance was achieved at $P < 0.05$.

Results

The overall prevalence of *S. haematobium* in this study was 18.1%, with males having a higher prevalence of 23.2%. This was significantly different from infection rate in females (χ^2=7.82, df =3, $P < 0.05$). In Obi, schools in Ijegwu recorded the highest prevalence of 30.5%, while in Oju; schools in Ezza-idele recorded the highest prevalence of 24.2% (Table 1). The prevalence of *S. haematobium* and *S. mansoni* was higher in Obi LGA than Oju LGA, these higher prevalence was however not statistically significant (χ^2=6.82, df = 1, $P > 0.05$). The overall prevalence of *S. mansoni* in this study was 8.0%, with males having a higher prevalence of 9.4%. There was no observed significant different in infection among the sexes (χ^2=7.82, df = 3, $P > 0.05$). In Obi, schools in Adiko recorded the highest prevalence of 16.2%, while in Oju; schools in Oho-oboru had the highest prevalence of 9.1% (Table 2).

The prevalence of *S. mansoni* with respect to age is shows that in Obi and Oju, age group 16-20years had the highest infection rate of 20.0% and 15.6% respectively (Table 3). There was no observed significant different in infection among the age groups (χ^2=5.99, df = 2, $P > 0.05$). The prevalence of *S. haematobium* in respect to age is shown Table 4 revealing that in Obi LGA the age group 5-10 years had the highest infection rate of 21.4% while in Oju age group 11-15 had the highest prevalence of 18.8%. There was no observed significant different in infection among the age groups (χ^2=5.99, df= 1, $P > 0.05$).

Table 1: *Prevalence of S. haematobium among Primary School Pupils in Obi and Oju.*

Community	Male		Female		Total	
OBI	No. Exam	No. Positive (%)	No. Exam.	No. Positive (%)	No. Exam.	No. Positive (%)
Ogore	63	6(9.5)	37	10(27.0)	100	16(16.0)
Ijegwu	65	23(35.4)	30	6(20.0)	95	29(30.5)
Echori	53	14(26.4)	33	6(18.8)	86	20(23.3)
Adiko	59	19(32.2)	46	12(26.1)	105	31(29.5)
Total	**240**	**62(25.8)**	**146**	**3(23.3)**	**386**	**96(24.8)**
OJU						
Oho-oboru	72	19(26.4)	38	4(10.5)	110	23(20.9)
Ichakobe-Ibilla	65	7(10.7)	32	12(37.5)	97	19(19.6)
COE Ukpa	58	12(20.7)	40	0(0.0)	98	12(12.4)
Ezza-Idelle	63	16(24.6)	30	7(23.3)	95	23(24.2)
Total	**260**	**54(20.8)**	**140**	**23(16.4)**	**400**	**77(19.3)**
GRAND TOTAL	**500**	**116(23.2)**	**286**	**26(9.1)**	**786**	**142(18.1)**

(χ^2=7.81, df = 2, $P > 0.05$)

Table 2: *Prevalence of S. mansoni among Primary School Pupils in Obi and Oju.*

COMMUNITY	**MALE**		**FEMALE**		**TOTAL**	
OBI	No. Exam	No. Positive (%)	No. Exam.	No. Positive (%)	No. Exam.	No. Positive (%)
Ogore	63	2(3.2)	37	0(0.0)	100	2(2.0)
Ijegwu	65	10(15.3)	30	3(10.0)	95	13(13.4)
Echori	53	16(11.3)	33	2(6.1)	86	8(9.3)
Adiko	59	11(18.6)	46	6(13.0)	105	17(16.2)
Total	240	29(12.1)	146	11(7.5)	386	40(10.4)
OJU						
Oho-oboru	72	10(13.8)	38	0(0.0)	110	10(9.1)
Ichakobe-Ibilla	65	39(4.6)	32	1(3.1)	97	4(4.1)
COE Ukpa	58	0(0.0)	40	1(2.5)	98	1(1.0)
Ezza-Idelle	63	5(7.7)	30	3(10.0)	95	8(8.4)
Total	260	18(6.9)	140	5(3.6)	400	23(5.6)
GRAND TOTAL	**500**	**47(9.4)**	**286**	**16(5.2)**	**786**	**63(8.0)**

(χ^2=7.81, df = 2, P < 0.05)

Table 3: *Prevalence of S. mansoni in relation to age and sex of pupils in Obi and Oju*

Age Group	**MALE**		**FEMALE**		**TOTAL**	
OBI	No. Exam	No. Positive (%)	No. Exam.	No. Positive (%)	No. Exam.	No. Positive (%)
5-10	119	9(7.6)	77	6(7.8)	196	15(7.6)
11-15	108	7(6.5)	57	1(1.8)	167	8(5.0)
16-20	13	4(30.8)	12	1(8.3)	25	5(20.0)
Total	240	20(8.3)	146	8(5.5)	386	28(7.3)
OJU						
5-10	141	3(2.1)	88	2(3.1)	229	6(2.6)
11-15	96	7(7.8)	42	2(2.5)	138	9(6.5)
16-20	23	521.7)	10	0(0.0)	33	5(15.2)
Total	260	15(5.8)	140	5(3.0)	400	20(50.0)
Grand Total	500	35(7.0)	286	13(4.6)	786	48(6.1)

(χ^2=5.99, df = 3, P > 0.05)

Table 4: Prevalence of *S. haematobium* in relation to age and sex of pupils in Obi and Oju

Age Group	**MALE**		**FEMALE**		**TOTAL**	
OBI	No. Exam	No. Positive (%)	No. Exam.	No. Positive (%)	No. Exam.	No. Positive (%)
5-10	119	27(22.7)	77	15(19.5)	196	42(21.4)
11-15	108	16(14.8)	57	7(12.3)	167	23(13.9)
16-20	13	29(15.4)	12	2(16.7)	25	4(16.0)
Total	240	45(18.8)	146	24(16.4)	386	69(17.9)
OJU						
5-10	141	16(10.6)	88	6(6.8)	229	22(9.6)
11-15	96	18(18.8)	42	8(19.1)	138	26(18.8)
16-20	23	3(13.0)	10	3(3.0)	33	6(18.2)
Total	260	37(14.2)	140	17(12.1)	400	54(13.5)
Grand Total	**500**	**82(16.4)**	**286**	**41(14.3)**	**786**	**123(15.7)**

(χ^2=5.99, df = 3, P > 0.05)

Discussion

The observed prevalence of schistosomiasis in the study area is very low compared with findings from elsewhere in Nigeria with similar sanitary and ecological indices. Infection rates in most schistosomiasis endemic communities in Nigeria range from 13.5% - 21% (Mafiana *et al.,* 2003, Goselle *et al.,* 2010, Nanvya *et al.,* 2011, Houmsou *et al.,* 2012). The prevalence of schistosomiasis in Oju and Obi LGAs is lower than that reported by Mbata *et al.* (2009) in Ogbadibo LGA of Benue State. The reasons for this difference in communities within the same bio-geographical area could be water contact pattern and ecology of the snail intermediate host. In both communities, males had a higher prevalence than females probably due to the fact that males had a higher frequency in their water content pattern. Similar observations were made by (Mbata *et al.,* 2009, Adulugba and Omudu, 2013).

The presence of *S. mansoni* in children in these communities is reflection of the deplorable sanitary, social and environmental conditions as well as inadequate or lack of basic amenities in both urban and rural communities (Omudu *et al.,* 2012). Many children in these communities practice open air defaecation. Sanitary conditions have in fact deteriorated in Nigeria within the past decade and will no doubt exacerbate transmission these infections.

From the index of potential contamination (IPC) for urinary and intestinal schistosomiasis, it appears that children between 5 and 15 years contributed the bulk of *S. haematobium* and *S. mansoni* eggs daily excreted into the environment and consequently, are responsible for most of the environmental contamination and transmission of the disease in these communities. Similar reports have been made elsewhere by (Nale *et al.*, 2003 and Adulugba and Omudu 2013).

Although schistosomiasis is rarely lethal, the disease has significant impact on multiple dimensions of human performance both during childhood and later adult life. Studies of physical and intellectual function indicate significant schistosomiasis-associated reductions in physical fitness and spontaneous activity among children (King, 2010). Considering the medical consequences of schistosomiasis which results in growth stunting, cognitive impairment, lost years of schooling and other health and development implications of the disease on individual's health, our findings justify the urgent need to develop an integrated community-based intervention that address the water and sanitation needs of the communities.

References

Adulugba and Omudu, E.A (2013). Epidemiological studies of Schistosomiasis in Agatu LGA, Benue State, Nigeria. *Nigerian Journal of Parasitology, 34:12-18.*

Chitsulo, L. D; Engles, A; Montreson and Savioli, L. (2000). The global state of Schistosomiasis and its Control. *Acta Tropica* 77: 41-51.

Goselle, N.O., Anegbe, D., Imande, G.N., Dakul, D.A., Onwuliri, C.O. E., Abba, O.J., Udeh, O.E. and Abelau, A.M. (2010). *Schistosoma mansoni* infections amongst school children in Jos, Nigeria. *Science World Journal*, 5(1): 23-30.

Houmsou, R., Kela, S., Suleiman, M. and Ogidi, J. (2010). Perceptions and Assessment of risk factors in *Schistosoma haematobium* infection in Buruku and Katsina-Ala LGAs of Benue State, Nigeria. *Internet Journal of Infectious Diseases,* 8(1): 1- 4.

King C.H. (2010). Parasites and Poverty: The case of schistosomiasis. *Acta Tropica*, 113 (2): 95 – 104.

Mafiana, C.F., Ekpo, U.F. and Ojo, D.A. (2003). Urinary Schistosomiasis in Pre-school children in settlements around Oyan Reservior in Ogun State, Nigeria:

Implications for Control. *Tropical Medicine and International Health,* 8 (1): 78 – 82.

Mbata, T., Orgi, M. and Oguoma, V. (2009). The prevalence of urinary schistosomiasis in Ogbadibo Local Government Area of Benue State, Nigeria. *Journal of Infectious Diseases*, 7(1): 3 – 7.

Nanvya, T.N., Dakul, D.A. and Mwansat, G.S. (2011). Schistosomiasis in Ndinjor District of Langtang North Local Government Area of Plateau State, Nigeria, *Nigerian Journal of Parasitology*, 32 (2): 209 – 213.

Nale, Y; Galadima, M; Vakubu, S. (2003). Index of Potential Contamination for Urinary Schistosomiasis in five settlements near River Kubanni in Zaria. *Nigeria Journal of Parasitology.* 24: 95-101.

Ofoezie, I. E; Imoerbore, A. ; Balogun, M. D ; Ogunkoya, O. O. and A Saolu, S. O. (1991). A study of outbreak of Schistosomiasis in resettlement Village near Abeokuta, Ogun State. *Nigerian Journal of Helminthology.* 25: 95-102.

Omudu, E. A. and Odeh, P. (2004). A Survey of Zooplaktons and Macroinvertebrates of Agi-Stream in Oju Benue State and their Implication for Transmission of Endemic Diseases. *Biological and Environmental Journal of the Tropics.* 3(2) 10-17.

Omudu, E.A., Onah, E. and Emberga-Biem, M. (2012). Epidemiological studies of polyparasitism in two different communities in Benue State, Nigeria. *Journal of King Abdulaziz University. Medical Sciences,* 19(1): 21-34.

Ukaaga, C.N. Onyeka, P.I.K. and Nwoke, B.E.B. (2002). Practical Medical Parasitology for Biological Sciences/Medical Students. Avan Global Publications, Owerri, Nigeria. 167pp.