



Prevalence of Schistosomiasis among Primary School Children in Gadabuke District, Toto LGA, North Central Nigeria

A.E.J Okwori^{1*}, M. Sidi², Y.B Ngwai², S.O.Obiekezie², M.D.Makut², S.C. Chollom³, I.O.Okeke¹ and T.I.Adikwu⁴

¹*Federal College of Veterinary and Medical Laboratory Technology, Vom, Nigeria.*

²*Department of Biological Sciences, Faculty of Natural and Applied Sciences, Nasarawa State University, Keffi, Nigeria.*

³*Viral Research Department, National Veterinary Research Institute, Vom, Nigeria.*

⁴*Royal Infirmary Hospital, Edinburgh, UK.*

Authors' contributions

This work was carried out in collaboration between all authors. Author AEJO designed the study, wrote the first draft of the manuscript and co-ordinated the research; Authors MS and YBN helped with sample collection and laboratory analysis; authors MDM and IOO performed statistical analysis; Author s SOO and SCC helped with literature search, while author TIA was our consultant. All authors read and approved the final manuscript.

Original Research Article

Received 1st July 2013
Accepted 25th September 2013
Published 23rd November 2013

ABSTRACT

Aim: This study was aimed at determining the number of children infected in relation to study population.

Study Design: Cross sectional

Place and Duration of Study: This study was conducted among school children in Gadabuke and Garagwa LGEA Primary schools in Toto Local Government Area of Nasarawa State, Nigeria between October-December, 2012.

Materials and Methods: A total of 250 samples were collected comprising 192 urine and 58 faecal samples. Samples were investigated using standard World Health Organisation guidelines for identification of parasites. Samples were analysed macroscopically and microscopically.

Results: Out of the 192 children screened. Gadabuke LGED primary school had a

*Corresponding author: Email: okwori2001@yahoo.com;

prevalence of 58.1% while Garagwa LGED primary school had a prevalence of 22.7% and the overall prevalence of urinary schistosomiasis in the two schools is 44.3%. There was no significant difference in prevalence rate of urinary schistosomiasis between Gadabuke and Garagwa primary schools ($P>0.05$). On the other hand, Gadabuke had a prevalence of 5.3% for *S.mansoni* and 0% prevalence for Garagwa LGED. On the whole, the prevalence of *S. mansoni* was 3.4% in the study area. Children of age group (8 – 14) were more infected with urinary schistosomiasis. Male had higher prevalence of urinary schistosomiasis 50 (50%) than the female 35 (35%). Statistically there was significance difference in prevalence infection of *Schistosoma haematobium* among males and females investigated. Children whose parents are farmers and fishermen had the highest prevalence infections, followed by Artisan, civil servant and the businessmen.

Conclusion: Urinary schistosomiasis in some selected primary schools in Gadabuke district of Toto LGA in Nasarawa State have been documented.

Keywords: Schistosomiasis, pupil, Nassarawa Toto, North Central Nigeria.

1. INTRODUCTION

Schistosomiasis is a human disease syndrome caused by infection from one of the several species of parasitic trematodes (fluke) of the genus *Schistosoma*. It is second only to malaria in human impact among tropical diseases and the third (after malaria and intestinal helminthiasis) in global parasitism. It is the most devastating prevalent parasitic disease due to morbidity and mortality for developing countries in Africa, South America, the Caribbean, the Middle East and Asia [1].

A systematic review and collation of population statistics for mid-2003 revealed the following estimates: on a global scale, 779 million people were at risk of schistosomiasis and 207 million individuals were infected with schistosome worms [2]. Regarding the at-risk population, an estimated 660 million were concentrated in Africa, accounting for 85% of the global at-risk estimate. An alarming 201.5 million schistosome infections (mainly *Schistosoma haematobium*) were estimated to occur in Africa, accounting for more than 97% of the estimated number of infections worldwide. The disease is associated with considerable morbidity and mortality in the developing world [3]. The distribution of the diseases is focal and often restricted to areas with peculiar ecology which favours its transmission [4].

Movement of people in unstable regions may also contribute to the transmission of schisto, in addition to rapid urbanization and increase in off track tourism [5].

In Nigeria, the prevalence levels of urinary schistosomiasis in both rural urban communities is within 2% and 90% and occurring more among the poor and marginalized group [7].

This study was aimed at determining the prevalence of schistosomiasis among school children in Gadabuke district, a rural community of Toto Local Government Area, Nasarawa State, Nigeria.

2. MATERIALS AND METHOD

2.1 Study Area

The study was conducted in two different locations: Gadabuke and Garagwa in Toto Local Government Area of Nasarawa State. The area has sparse population. The vegetation which is characterized by Guinea Savanna consists of dry valleys, poor ground water and rocks. Raining seasons start from April to October followed by dry season (November to March). Economic activities of these localities include farming, fishing, trading, Artisan and civil service. Social amenities such as good roads, pipe-borne water and electricity are lacking at considerable levels.

2.2 Ethical Consideration

The protocol for this study was approved by the Nasarawa State Hospitals Board through the Local Government Education Authority. The parents of the children screened completed an informed consent form. Pupil anonymity was treated with confidentiality and for the purpose of this research.

2.3 Study Population

The study population comprised children who were five to thirteen years old. Two primary schools were selected for the study in Local Government Education Authority Primary Schools Garagwa and local Government Education Authority pilot school Gadabuke. The choice of the schools were based on the fact that the schools were located near a stream. Sample size was determined according to the method of Dawet *et al* [1]. About 250 samples were collected. 192 of which were urine and 58 stool samples. Samples were collected randomly from pupils in classes 1-5.

2.4 Collection of Sample

Each pupil was given two clean well labeled specimen container with which faeces and early morning urine samples were collected and transported using a cold box to the laboratory department of the Basic Health Center, Gadabuke for processing. Structured questionnaire was administered to parents for demographic information and source of drinking water.

2.5 Parasitological Examination

In the laboratory, the urine and faecal samples was first examined macroscopically for colour, presence of blood and consistency. Using procedure of Cheesborough [10] for microscopic examination was applied. Urine samples were transferred into a glass test tube and spun for 15,000 rpm for 5 minutes. Deposit were examined for the presence of parasites (eggs).

2.6 Data Analysis

The data obtained were analyzed using Statistical Package for Social Sciences (SPSS) version 17.0 into simple percentiles and test for significance.

3. RESULT

Of the 192 subjects examined, 85 were found infected with *Schistosoma haematobium* (Table 1). From the two areas investigated, subjects from Gadabuke had the prevalence rate of 68% while Garagwa had 17%. The prevalence was higher among males (60%) and age bracket of 10-14years had higher prevalence of 62.8% (Table 3). Statistically there was significant difference ($P>0.05$) in the prevalence of infection between males and females (Table 2).

With respect to infection of children due to the occupation of parents, there was significant difference ($p>0.05$) in the infection of *Schistosoma haematobium* (Table 4). Children whose parents are farmers and fishermen had the highest prevalence infections, followed by Artisan, civil servant and the businessmen. Gadabuke primary school had the highest prevalence of 5.3% for *S. mansoni* (Table 5).

Table 1. Prevalence of *Schistosoma haematobium* infection in the areas investigated.

School	No. examined (%)	No. infected (%)	No. Uninfected (%)
LGEA Primary School Gadabuke	117	68 (58.1)	49 (41.9)
LGEA Primary School Garagwa	75	17 (22.7)	58 (77.3)
Total	192	85 (44.3)	107 (55.7)

Table 2: Sex distribution of *Schistosoma haematobium* among pupil

Sex	No. examined (%)	No. infected (%)	No. Uninfected (%)
Male	100	50 (50)	50 (50)
Female	92	35 (38.0)	57 (61.9)
Total	192	85 (44.3)	107 (55.7)

Table 3. Age distribution of *Schistosoma haematobium* among pupil

Age	No. examined (%)	No. infected (%)	No. Uninfected (%)
5 - 9	71	17 (23.9)	54 (76.1)
10-14	121	76 (62.8)	45 (37.2)
Total	192	93 (48.4)	99 (51.6)

Table 4: Prevalence of *Schistosoma haematobium* infection by occupation of parents

Occupation (%)	No. examined (%)	No. infected (%)	No. Uninfected (%)
Fishing	20	12 (60.6)	8 (40)
Farmers	85	32 (38)	53 (62.3)
Artisan	33	10 (30.3)	23 (69.6)
Civil servant	34	7 (20.5)	27 (79.4)
Businessmen	20	5 (25)	15 (75)
Total	192	66 (34.3)	126 (65.6)

Table 5. Prevalence of infections with *Schistosoma mansoni* by school

Chool Uninfected (%)	No. examined (%)	No. infected (%)	No.
LGEA Primary School Gadabuke	38	2 (5.3)	36 (94.7)
LGEA Primary School Garagwa	20	0 (0)	20 (100)
Total	58	2 (3.4)	56 (96.6)

4. DISCUSSION

Prevalence of intestinal and urinary schistosomiasis among school children continues to be a major public health concern in tropical countries especially in Nigeria. The occurrence of intestinal and urinary tract schistosomiasis among school children cause chronic infection which can negatively affect all aspects of children health, nutrition and learning [11]. Schistosomiasis infection during childhood cause substantial growth retardation and anaemia and also cause structural abnormalities of urinary tract. The transmission cycle requires contamination of surface water by excreta or urine and fresh water snail as an intermediate host and human water contact.

From the result, 85 samples of urine were positive for urinary schistosomiasis giving a prevalence of 44.3% of which 22.7% was reported from the LGEA Primary School Garagwa and 78.1% from LGEA Pilot School Gadabuke. This prevalence is higher compared to 22.4% in some primary schools in Jos, Plateau State, where 2.9% (Abattoir area) and 49.9% (Faringada village area) were reported by Akufougwe *et al* [12].

The prevalence of *S. haematobium* in this study did not agree with the report of Ekpo *et al* [13] who reported 58.1% prevalence among preschool children in a community near Abeokuta South western Nigeria. Similarly, Ugbomoko *et al* [14] reported a prevalence of 62% in two per-urban communities in south-western Nigeria. Prevalence rate of 24.3% infection among school children in Konduga LGA North Eastern Nigeria was similarly documented by *Biu et al* [15] which is not consistent with the study. The difference in prevalence rates may be influenced by peculiar ecological characteristics and level or contact of individuals with water bodies and the degree or exposure to infective schistosoma cercariae in different locations.

In relation to sex, the high prevalence of *S. haematobium* in male (60%) than female (35.9%) is consistent with *Biu et al* [15] and *Ugbomoko et al* [14]. However it varies with [6, 13] who separately reported insignificantly higher prevalence in female than male. The higher prevalence and intensity observed among male compared with females could be attributed to the diverse outdoor activities engaged by males which exposed them to cercariae infected water.

The high prevalence (62.8%) among the age group 10-14years in this study agrees with the finding of *Dakul et al* [17] who reported the highest prevalence 65.8% among the age group 10-14years in Lankaku –Namu district, Quan'an-Pan LGA Plateau State. [4] reported the

highest prevalence of 57.4% in age group 10-14 in Danjarima community, Kumbotso LGA Kano State.

In relation to occupation, the high prevalence of *S. haematobium* in school children who engaged in fishing 60.6% in this study agrees with [17] who reported 73.1% infection among school children in Kpeshi Aleoko – Edo LGA, Edo State. [18] reported highest prevalence of 22% among those that engaged in fishing followed by farmers and students with 19.5% and 16.3% respectively in Nasarawa LGA, Nasarawa State Nigeria. This report opposed [19] who documented the highest prevalence of 0.7% among artisan.

Our findings have identified urinary schistosomiasis as endemic in Gadabuke district of Toto Local Government Area of Nasarawa State Nigeria, with a high prevalence rate of infection particularly among teenagers.

Our reports are similar to the findings of [20] and [21] in Keffi and Lafia metropolis of Nasarawa State. The lack of proper knowledge of the cause of the disease and insufficient safe water supplies coupled with inadequate health care facilities may have influenced the infection rate and distribution of the disease in the area.

5. CONCLUSION

Urinary schistosomiasis in some selected primary schools in Gadabuke district of Toto LGA in Nasarawa State have been documented.

Appropriate intervention and health education for the community are required for the control and prevention of schistosomiasis and its attendant illness in Gadabuke district of Toto Local Government.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Dawet A, Benjamin CB, Yakubu DP. Prevalence and Intensity of *Schistosoma haematobium* among Residence of Gwong and Kabong in Jos North Local Government Area in Plateau State. International Journal of Tropical Medicine. 2012; 7(2):69-72
2. Steinmann P, Keiser J, Bos R, Tanner M, Utzinger J. Schistosomiasis and water resources development: systematic review, meta-analysis, and estimates of people at risk. Lancet Infectious Diseases. 2006;6:411–425. [Pub Med]
3. Hotez PJ, Fenwick A. Schistosomiasis in Africa: An Emerging Tragedy in Our New Global Health Decade. PLoS Negl Trop Dis. 2009; 3(9):485.
4. Sarkinfada F, Oyebanji A, Sadiq IA, Ilayasu Z. (Urinary Schistosomiasis in the Danjarima Community in Kano Nigeria. J. Infect dev. Series. 2009;3(6):452-457
5. World Health Organization Microbiology notes; Schistosomiasis. Microbiology Bytes Pub. (Line 175); 2007.
6. Nkegbe E. Prevalence of Schistosomiasis among school children in the lower river Volta Basin in Ghana. Gomal Journal of Medical Sciences. 2010; 8(1):54-56.

7. Ofoezie IE, Asaolu SO, Christensen NO, Madsen H. Patterns of infections with *S. haematobium* in lakeside resettlement communities at the Oyan reservoir in Ogun State, South-Western Nigeria. *Annals of tropical Medicine and Parasitology*.1997; 91:187-197.
8. Poggensee GH, Felmeier, Krantz I. Schistosomiasis of the Female Genital Tract Public Health Aspects. *Parasitol Today*, 1999;15:378-381.
9. Doudler B, Parola P, Dales JP, Linzberger N, Brouqui P, Delmont J. schistosomiasis as an unusual cause of appendicitis. *Clin. Microbiol. Infect.* 2004;10:89-91.
10. Cheesbrough M. *District Laboratory Practical in Tropical Countries* 2nd Edition Cambridge University Press Part 1. 2005;218-239.
11. Pukuma SM., Sale,HL., Njila HL, Dibal M. urinary schistosomiasis in primary school pupils of Shelleng town, Adamawa State, Nigeria. *J. Pest. Dis. Vector Manage.* 2006; 7:445-448
12. Akufougwe PF., Dondj B, Okwuosa VN, Daku DA., Nfonifor HN, Observed Disparity on Schistosome Infection Rates in field biophalaria Pfeiffer (krauss) between two areas of the Jos Metropolis Nigeria. *Parasite.* 1995; (2):89-91.
13. Ekpo UF, Laja Deile A, Oluwole AS, Sam-Wobo SO, Mafiana CF(2010) Urinary Schistosomiasis among Pre-school Children in a Rural Community near Abeokuta, Nigeria *Parasites Vectors* Vol. 3 10. 1186/1756.3305-3-58
14. Ugbomako US, Ofoezie IE Okoye IC, Heukelback J. Factors Associated with Urinary Schistosomiasis in two Peri-Urban Communities in South-Western Nigeria. *Ann.Trop. Med. Parasitol.* 2010;104(5) 409-419.
15. Biu AA, kolo HB, Agbadu ET, Prevalence of *Schistosoma haematobium* Infection in School Aged Children of Kouduga Local Government Area North Eastern Nigeria. *Inter J. Biomedical and Health Sciences.* 2009;5(4)181-184.
16. Dakul DA, Onwuliri COE, Anyanwu GI, Imander NG. A longitudinal study of *Schistosoma haematobium* infection in Quaan-pan local government area of Plateau State. *J,Pest.dis. vector manage.* 2001;3:225-230.
17. Nmorsi OPG, Egwunyenga OA, Ukwandu NCD, Nwokolo NQ. Urinary schistosomiasis in a rural community in Edo state, Nigeria. Eosinophiluria as a diagnostic marker. *African J. Biotech*, 2005; 4:183-1186.
18. Ombugadu RJ A Study of *Schistosoma haematobium* among the inhabitants of Udege Community in Nasarawa Local Government Area of Nasarawa State, *Biol Environ Sci. J. Trop.* 2011; 8:81-84.
19. Olusegun AF, Ehis OC, and Richard O. Proportion of Urinary schistosomiasis among HIV-infected Subjects in Benin City, Nigeria. *Oman Med J.* 2011;26:175-177.
20. Ishaleku, D, Yako AB, Usman D, Azamu SA. *Schistosoma haematobium* infections among school children in keffi town, Nasarawa State, Nigeria. *Scholarly J. of Med.* 2012;2(7):104-107.
21. Rene CR, Habibu T., Jasini, AM, Epidemiology of urinary schistosomiasis among secondary school students in Lafia, Nasarawa State, Nigeria. *Journal of Biology, Agriculture and Healthcare.* 2013;3(2) ISSN 2224-3208.

© 2014 Okwori et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/3.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

The peer review history for this paper can be accessed here:
<http://www.sciencedomain.org/review-history.php?iid=254&id=8&aid=2591>