PREVALENCE OF SCHISTOSOMIASIS AMONG PRIMARY SCHOOL CHILDREN IN NASSARAWA TOTO, NORTH CENTRAL NIGERIA

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Authors' contributions

This work was carried out in collaboration between all authors. Author AEJ designed the study, wrote the first draft of the manuscript and co-ordinated the research; Authors SI, and YB helped with sample collection and laboratory analysis; Authors MD and IO performed statistical analysis; Author SO and CSC helped with literature search, while author TI was our consultant. All authors read and approved the final manuscript.

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.

***Methodology:** 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 prevalence of 58.1% while Garagwa LGED primary school had a prevalence of 22.7% while the overall prevalence of urinary schistosomiasis in the two schools is 44.3%. There was no significant difference in prevalence rate between Gadabuke and Garagwa primary schools (P>0.05). On the otherhand, Gadabuke had a prevalence of 5.3% S.mansoni while Garagwa LGED had 0.0% prevalence. On the whole, the prevalence of S. mansoni is 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: *School based treatment campaigns and health education should be encouraged to ensure the prevention and control of the disease in Nigeria.*

Key words: *Schistosomiasis, pupil, Nassarawa Toto, North Central Nigeria*

Comment [UFE1]: Include name of district in title, as the sample size is too small for this generalization

Comment [UFE2]: Prevalence of which species?

Comment [UFE3]: This is still not a valid conclusion. It more of a recommendation.

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].

Schistosomiasis occur in most parts of the tropics and sub-tropics, affecting some 200 million persons, and is most prevalent in sub-Saharan Africa [2]. Alarm *et. Al;* [2] in their earlier study observed that in highly disease endemic areas, prevalence rates can exceed 50% among the local population and high, rates have been reported among expatriates living in such areas and even among short term travelers to these areas. 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 Toto Local Government Area, Nasarawa State, Nigeria.

MATERIALS AND METHOD

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.

ETHICAL CONSIDERATION

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

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

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Comment [UFE5]: What is the existing prevalence in this LGA from existing study?. What is the rationale for this study?

Comment [UFE6]: At this 5-13 years. Informed consent are acceptable if taken from Parents/Guardians

Comment [UFE7]: What is total number of primary schools in the LGA. Why was only two selected?

determined according to the method of Dawet *et al* [1]. About 250 samples were collected. 192 of which was urine while 58 was stool samples. Samples were collected randomly from pupils in classes 1-5. Selection of these schools was based on the high prevalence of schistosomiasis in the study area.

Comment [UFE8]: Provide references to support this statement!

COLLECTION OF SAMPLE

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

PARASITOLOGICAL EXAMINATION

In the laboratory, the urine and feacal ~~each~~ samples was first examined macroscopically for colour, presence of blood and consistency. Using procedure of Cheesborugh [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.

Comment [UFE9]: What form of the parasites, egg or larva?

STATISTICAL ANALYSIS

The data gathered were analyzed using statistical package for social sciences (SPSS) version 17.0.

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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 intensity was higher among males (60%) and age bracket of 10-14years (62.8%) Table 3. Statistically there was no significant difference (P>0.05) in the prevalence of infection between males and females (Table 2). The infection was actually indicated in age group 10-14 (Table 3) as reported by Dawet *et al* [1].

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However there was no significant difference (P>0.05) in the infection of *Schistosoma haematobium* between the occupational groups (Table 4). Gadabuke primary school had the highest prevalence of *Schistosoma mansoni* (5.3%) (Table 5). Children whose parents are farmers and fishermen had the highest prevalence infections, followed by Artisan, civil servant and the businessmen.

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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 S*chistosoma 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**

School	No. examined (%)	No. infected (%)	No. Uninfected (%)
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)

DISCUSSION

Prevalence of intestinal and urinary schistosomiasis among school children continues to be a major public health concern in tropical countries especially in Nigeria. Although intestinal and urinary schistosomasis is among the group of neglected tropical diseases that occur predominantly in rural areas. The occurrence of intestinal and urinary tract schistosomasis 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 of 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 schistosoma as endemic in Gadabuke district of Toto Local Government Area of Nasarawa State Nigeria, with a high prevalence rate of infection particularly among teenagers. 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. 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.

REFERENCES

1. Dawet A., Benjamin C.B. Yakubu D.P (2012): 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 7(2) pp69-72

2. Alam K. Maheshwari V., Jam A. Siddique F.A Heg M.E Prasad S. Hassan A.S., (2009):Schistosomiasis. A Case Series with Review of Literature. The Internet Journal of Infectious Disease Vol. 7 No.1 DOI: 10.5580/2337

3. Hotez PJ, Fenwick A (2009): Schistosomiasis in Africa: An Emerging Tragedy in Our New Global Health Decade. PLoS Negl Trop Dis 3(9): pp485.

4. Sarkinfada F., Oyebanji A. Sadiq I.A Ilayasu Z. (2009): Urinary Schistosomiasis in the Danjarima Community in Kano Nigeria J. infect dev. Series vol. 3 (6) pp452-457

5. World Health Organization (2007): Microbiology notes; Schistosomiasis. Microbiology Bytes Pub.

6. Nkegbe, E (2010): Prevalence of Schistosomiasis among school children in the lower river

Volta Basin in Ghana. Gomal Journal of Medical Sciences. Vol.8, No.1

7. Ofoezie, I.E., Asaolu, S.O., Christensen, N.O., and Madsen, H (1997) 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 91:187-197

8. Poggensee, G.H; Felmeier and I. Krantz (1999): Schistosomiasis of the Female Genital Tract Public Health Aspects. Parasital Today, Vol. 15:378-381

9. Doudler, B., Parola, P., Dales, J.P., Linzberger, N., Brouqui, P., and Delmont, J (2004) schistosomiasis as an unusual cause of appendicitis. Clin. Microbiol. Infect. 10:89-91.

10. Cheesbrough M. (2005): District Laboratory Practical in Tropical Countries 2nd Edition

Cambridge University Press Part 1 pp 218-239

11. Pukuma, S.M., Sale,H.L., Njila, H.L., and Dibal, M (2006) urinary schistosomiasis in primary school pupils of Shelleng town, Adamawa State, Nigeria. J. Pest. Dis. Vector Manage 7:445-448

12. Akufougwe P.F., Dondj B., Okwuosa V.N., Daku D.A., Nfonifor H.N.,(1995): Observed

Disparity on Schistosome Infection Rates in field biomphalaria Pfeiffer (krauss) between two

areas of the Jos Metropolis Nigeria. Parasite vol.2 pp89-91

13. Ekpo U.F, Laja Deile, A., Oluwole A.S., Sam-Wobo S.O. and Mafiana C.F (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 U.S., Ofoezie I.E Okoye I.C., Heukelback J. (2010): Factors Associated with

Urinarhy Schistosomiasis in two Peri-Urban Communities in South-Western Nigeria. Vol. 104

No.5 Pp 409-419

15. Biu A.A., kolo H.B., and Agbadu E.T., (2009): Prevalence of Schistosomiasis haematobium

Infection in School Aged Children of Kouduga Local Government Area Northeastern Nigeria

Inter J. Bromedical and Health Sciences vol. 5(4)

16. Dakul, D.A., Onwuliri,C.O.E., Anyanwu, G.I., and Imander, N.G (2001). A longitudinal study of schistosoma haematobium infection in Quaan-pan local government area of plateau state. J, pest.dis. vector manage.,3:225-230

17. Nmorsi,O.P.G., Egwunyenga, O.A.,Ukwandu, N.C.D., and Nwokolo,N.Q (2005) Urinary schistosomiasis in a rural community in Edo state, Nigeria. Eosinophiluria as a diagnostic marker. African J. Biotech, 4:183-1186

18.Ombugadu, R.J (2011): A Study of Schistosoma haematobium among the inhabitants of Udege Community in Nasarawa Local Government Area of Nasarawa State, Biol Environ Sci. J. Trop. Vol. 8: 81-84

19. Olusegun A.F., Ehis O.C., and Richard O. (2011):Proportion of Urinary Schistosomiasis among HIV-infected Subjects in benin City, Nigeria Oman Med J. 26: 175-177