ORIGINAL ARTICLE

SURVEY OF URINARY SCHISTOSOMIASIS AMONG INTERNALLY DISPLACED PERSONS (IDPs) IN BORNO STATE.

BALLA HJ[1], BULAMA AA[1], KUTDANG ET[2], BABAGANA M[1]

ABSTRACT

BACKGROUND: Urinary schistosomiasis is endemic in Nigeria and continues to pose public health challenges especially in inhabitants of rural areas.
AIM: This study was undertaken to determine the incidence of urinary schistosomiasis among internally displaced persons (IDPs) in Borno State, Nigeria.
MATERIALS AND METHODS: Microscopic examination of the urine samples were employed to determine the presence of *S. haematobium* eggs. Questionnaires were also administered to consenting participants to collect information on socio-demographic data and water-contact activities.
RESULTS: An overall incidence of 35.5% infection with *S. haematobium* was observed out of the 200 IDPs examined, among which the age group (11-20) carries the highest prevalence rate of 37(48.7%). Out of the 71(35.5%) tested positive, 39(54.9%) presented with visible haematuria. There is no statistical significant difference between the number of samples tested positive and those tested negative in terms of haematuria as p = 0.543. Males recorded higher prevalence rate of 39.5% than females (28.9%), thus there is a statistically significant difference in prevalence rate between males and females as p = 0.0085.
CONCLUSION: The study draws attention to the health hazards posed by urinary schistosomiasis among residents of Local Government Areas forming the Internally Displaced Persons within the State. Hence, the urgent need for a decisive control intervention to stem this problem cannot be overemphasized.

KEYWORDS: Schistosomiasis, Internally Displaced Persons, Incidence, Borno, Nigeria.

INTRODUCTION

Schistosomiasis is an acute and chronic parasitic disease caused by blood fluke trematode of the genus Schistosoma[1]. It is one of the oldest parasitic infections that have posed a threat to public health[2].

Department of [1]Medical Laboratory Science,
College of Medical Sciences,
University of Maiduguri
[2]Microbiology, Faculty of Science, University of Maiduguri

Correspondence to:
HABIBA JIMETA BALLA (Mrs)
Department of Medical Laboratory Science
College of Medical Sciences
University of Maiduguri
eMail:- ballahabiba@gmail.com
08035904772/08087638333

Schistosomiasis is classified as the second most important parasitic disease with over 200 million people being infected in 74 countries worldwide[3]. More than 200,000 deaths per year in sub-Saharan Africa are due to schistosomiasis[4].

In men, urinary schistosomiasis can induce pathology of the seminal vesicles, prostate and other organs. In women, it may present with genital lesions, vaginal bleeding and nodules in the vulva. While in children, it can cause anaemia, stunted growth, and a reduced ability to learn[5].

Since 2009, insurgents in Borno State, North-Eastern part of Nigeria have been carrying out increasingly frequent and sophisticated attacks and bombings of housings, schools, Government facilities, mosques and churches.

This has claimed many lives and resulted in significant displacement of people. Thousands from Local Government Areas were uprooted from their homes and forced to abandon their properties, farmlands and fishing occupation. Borno State has been worst affected by insurgency with about 1.3 million people most of them women, children and the elderly currently in need of aid[4]. About 250,000 persons displaced were now living in camps or with their relatives and friends. For now, of all the 27 Local Government Areas in Borno State, only about five are safe, while the residents of the remaining councils are either living in perpetual fear of attacks by insurgents, or have fled to the state capital or to neighboring Chad, Niger and Cameroon[5]. Most of the internally displaced persons due to insurgency in the state were settlers of Local Government Areas dominated with rivers, and were involved in fishing and farming activities, and are therefore vulnerable to infections by schistosomes.

The internally displaced persons in Maiduguri camps were overcrowded and lives under poor health and hygiene conditions, lacking portable water, food and basic amenities such as toilets, rooms and cooking facilities. This has been the cause of an outbreak and spread of diseases among them that has resulted to death of some, and others seriously sick with suppressed immune systems rendering them vulnerable to opportunistic infections and activation of latent previously acquired infections[6]. The internally displaced persons who lived in areas with water are likely to be infected, and also their visit to water bodies in Maiduguri for recreation increases the chance of infecting others[5].

The aim of the study is to provide evidence based information on the incidence of urinary schistosomiasis among internally displaced persons in Borno State, and educate them on its mode of transmission and prevention.

MATERIALS AND METHODS

The study was conducted in two selected camps of internally displaced persons in Maiduguri, Borno State (Yerwa Government Girls Secondary School Maiduguri and Government Girls Secondary School Maiduguri). Maiduguri has a geographical coordinate of 11°50' North, 13°09' East, 13.833° North and 13.150° East. Most of the internally displaced persons settling in various camps within Maiduguri were settlers of Local Government Areas dominated with rivers, and were involved in fishing and farming activities, and are therefore vulnerable to infections by schistosomes. A total of 200 IDPs (100 from each camp) were recruited.

Ethical clearance for this study was obtained from the State Ministry of Health Borno State. Informed consent was obtained from each subject before collection of specimen. This was interpreted into local languages such as Hausa, Kanuri, Fulani, etc. for easy communication. The aforementioned camps were visited systematically to enable the process of informed consent to take place. This process complied with institutional approvals from camps Directors.

A well-structured questionnaire consisting of questions relevant to urinary Schistosomiasis such as age, sex, level of education, occupation and water contact activities was administered to each consenting participants through the help of medical personals working at the clinics of the camps. Some of the questions were translated and communicated to the participants in their local languages for better understanding.

Urine samples were collected between 10:00am and 2:00pm for optimum egg passage. Sterile universal container was given to each consenting participant to collect about 15-20mls of terminal urine sample. The essential data of the participant such as age, sample number and time of collection were written on the corresponding containers and questionnaires and also against the serial number of each participant in a register. 10% formal saline was added to the urine samples

(ratio: 1:100) to preserve any Schistosome ova present. The specimens were appropriately labeled with identification numbers and placed in a cold box with ice packs immediately after collection.

The standard examination and urine microscopy methods for detection of *Schistosoma haematobium*, (standard microbiology sample collection, preservation and analysis were maintained) and matrix method were simultaneously employed.

All urine samples were macroscopically examined for their appearance. The urine samples were screened for the presence of eggs using wet preparation method[7], and the procedure is as follows:

The urine specimens were thoroughly agitated, 10ml of each sample taken and centrifuged at 3,500 rpm for 5 minutes. The whole sediment was transferred on to a clean glass slide, covered with cover slip and examined under the microscope using x10 and x40 objective lenses with the condenser iris closed sufficiently to give good contrast. The samples were characterized as positive or negative, based on the presence or absence of eggs respectively[7].

Data generated in this study were captured on Microsoft Excel and were subjected to statistical analysis using Statistical Package for Social Sciences (SPSS) for windows (version 20.0). The data was subjected to independent T- test, to test the level of significance. Also a frequency count was equally used to determine the level of prevalence. A P-value less than or equals to 0.05 ($P \leqslant 0.05$) was considered statistically significant.

RESULT

Table 1 shows the statistics of samples analyzed in this research work. It shows the age group, number of samples examined, number and percentage infected and number and percentage not infected. A total of two hundred (200) samples were analysed in this research work, from which 71 were found to be infected. People within the age group (11-20) had the highest prevalence rate of infection, then followed by the age group (1-10) with the percentage infective rate of 37(39.6%) and 19(48.7%) respectively. Prevalence rate decreased gradually with increasing age.

There was a significant difference between the samples infected and those not infected p= 0.020.

Table 1: Overall age-related incidence of urinary schistosomiasis in the study subjects

Age Group	Number Examined	Number Infected		No. Not Infected	% No infected	Significance level	Decision
1 – 10	48	19	39.6	29	60.4		
11 – 20	76	37	48.7	39	51.3		
21 – 30	21	7	33.3	14	66.7	0.020*	S
31 – 40	24	4	16.7	20	83.3		
41 – 50	18	3	16.7	15	83.3		
51 – 60	13	1	7.7	12	92.3		
Total	200	71	35.5	129	64.5		

S= Significant

Table 2 shows the incidence of urinary schistosomiasis in relation to sex among participants. Out of 124 male samples analyzed, 49(39.5%) were infected, and 22(28.9%) of the female samples were found to be infected. Thus, males recorded higher prevalence rate of 39.5% than females (28.9%). There is a statistically significant difference in prevalence rate between males and females p = 0.0085.

Table 2: Incidence of Urinary Schistosomiasis in relation to sex among participants

Sex	Number	Number	% Infected	Sig. level	Decision
Male	124	49	39.5		
Female	76	22	28.9	0.0085	S
Total	200	71			

S = Significant

Table 3: Overall incidence of haematuria according to urinary schistosomiasis status among participants

Test Results for Schistosomiasi	Haematuria Positive	Status N (%) Negative	Total	Sig. level	Decision
Positive	39 (54.9)	32 (45.1)	71		
Negative	13 (10.1)	116 (89.0)	129	0.543	NS
Total	52 (26.0)	148 (74.0)	200		

NS = Not significant S = Significant

DISCUSSION

This study revealed the endemicity of urinary schistosomiasis among the internally displaced persons (IDPs) in Borno State. The disease was found to exist among the subjects at a prevalence of 35.5%. Focused individual discussions with adult men and women in the selected camps, revealed that infection in children was probably due to their swimming activities in earth dam reservoirs particularly during the active rains in course of their living in their rural localities before they are displaced.

The prevalence of urinary schistosomiasis (35.5%) in this study suggests that the IDPs are coming from Local Government Areas falling within the W.H.O classification as endemic[2]. This particular finding was a very common factor observed in several surveys conducted[8]. This finding supports studies conducted in other parts of Nigeria which have shown endemicity of *S. haematobium* infection in the rural areas[8]. The main factors that might be associated with the endemicity of urinary schistosomiasis among the IDPs are low literacy, presence of infested water bodies like streams and river where daily chores activities like washing, fetching of water for domestic purposes, and fishing, bathing and swimming take place. Such predisposing factors have been also reported to putting individuals at risk of infection in a study conducted by Mbata[9] who found high prevalence (45.7%) in Ogbadibo Local Government Area of Benue State, Nigeria. The high prevalence rate in the present study is similar to various reports across Nigeria including 32.4% in Mayobelwa Local Government Area, Adamawa State[10], 37.9% in Sankwala, Cross-River State, Nigeria[11], 43.7% and 41.6% in two endemic

areas of Ondo State and in the Danjarima community of Kumbotso Local Government Area, Kano State[12] and 46.2% in four Local Government Areas of Benue State[13].

In contrast, the result obtained in this study is lower than the reports of Sulyman[14] and Nmorsi[15] who recorded 71.1% in four States (Borno, Niger, Ondo and Ogun) of Nigeria and 65.0% in Edo State respectively. However Mafiana[16] and Agi[17] also obtained higher prevalence of 54.6% and 51.9% in Ogun State and the Niger-Delta respectively. Ugbomoiko[18] also reported higher prevalence of 62.0% in two peri-urban communities of Southwestern Nigeria. The prevalence recorded in this present study is higher than findings of Okoli[19] and Ejima[20] who reported prevalence of 11.3% and 18.7% in Ohaji/Egbema Local Government Area, Imo State and the Niger-Benue basin of Kogi State respectively. Similar studies in other sub-Saharan areas of Africa have been reported. These include a prevalence of 50.8% in Southwestern Cameroon[21], 32.1% in Kumba, Cameroon[22], 60.0% among Zimbabwean school children[23] and 10.4% among school children in Blantyre district, Malawi[24].

The high prevalence and intensity obtained are in contrast with other studies such as; (11.5%) by Nale[25] in Adamawa State and (11.8%) by Ekwunife[26] in Anambra State.

This study also revealed a statistically significant higher prevalence in males (39.5%) compared to the females (28.9%) which agrees with the findings by Aboagye[27] and Satayathum[28] but contradicts some reports[29], [30]. However, Biu[31] reported that there was no statistically significant difference between sexes. Edungbola[32] suggested that there is no consistent pattern attributable to sex differences with respect to the infection in Nigeria and elaborated that status of the infection is associated with water contact pattern. This Study also however, disagrees with the findings of Bello[33] who stated that more females are exposed to urinary schistosomiasis than males in rural communities of Nigeria. However, other studies reported that sex related prevalence is not significant in the distribution of urinary schistosomiasis but could differ due to some variations in behavior and cultural practices regarding water uses and contact[34]. Thus, the variations in the infection pattern may be attributed to differences in geographic and environmental settings or in cultural and religious beliefs.

The higher prevalence among males (39.5%) than females (28.9%) could be due to the greater water contact activities by males compared to females in the Local Government Areas forming the IDPs. It was observed that females were less prone to long periods of swimming and therefore, has less exposure to water activities (swimming) compared to males. One possible reason might be that females mature earlier and were therefore restricted socially compared to males to swim naked in the stream[29].

These findings agree with the report by Akinwale[30], that infection in pre- school and school-age children was primarily due to exposure occasioned by washing, bathing, dry season farming, and fishing activities with peak infections between August and September rains.

This study also associated severe infection to age groups between 11-20 years which agrees with the findings by Etim[35] and Aboagye[36] that ages of 13 and above tend to play outdoor water contact activities more, with a drop in load of infection with increasing age due to development of immunity[36].

RECOMMENDATION

The authors strongly recommends that Borno State Government should urgently provide drugs to treat those infected with urinary schistosomiasis among the IDPs in the State, as

infected children are at high risk of developing bladder cancer if left untreated.

CONCLUSION

Conclusively, this study has helped to identify the incidence of urinary schistosomiasis as a health problem among the Internally Displaced Persons in Borno State, and provided valuable insight into the endemicity of the disease in the affected Local Government Areas forming the Internally Displaced Persons within the State. Hence, there is need for urgent health programs, provision of good and quality safe water source for the pupils and communities, destruction of intermediate hosts-snail vectors by experts at the commencement of raining season, better systems of waste collection and disposal should all be employed, aimed at controlling the infection in the affected Local Government Areas forming the IDPs in the State.

ACKNOWLEDGMENTS

The authors are indebted to the respondents of the Internally Displaced Persons in Maiduguri, Borno State. We are also grateful to staffs of the clinics of the visited camps for their compliance and assistance during the exercise.

REFERENCES

1. World Health Organization fact sheets N0115 February, 2014.
2. World Health Organization (W.H.O). Schistosomiasis and Soil Transmitted Helminth Infections – Preliminary Estimates of the Number of Children Treated with Albendazole or Mebendazole. 2006; 145–164.
3. Nwabueze. & Opara, K.N. Outbreak of urinary Schistosomiasis in Riverine communities of Delta State, Nigeria. *Journal of Medical Sciences.* 2007; *7(4)*:572-578.
4. World Health Organization (W.H.O) Authors. Schistosomiasis. Fact sheets No. 115 February, 2010; http://www.who.int/mediacentre/factsheet/Fs/15/en/index.html.
5. Hamza, I., Yahaya, I. & Ibrahim, S. Borno refugees uprooted by insurgency, ravaged by diseases and uncertainties in camps. Retrieved 17th December 2014 from www.weeklytrust.com Hyg 2014; 84: 257–261.
6. Pierre, Fragmented response to internal displacement amid insurgent attacks and flood season. 2013; retrieved 22nd December 2014, from www.internal-displacement.org /sub-Saharan - Africa/Nigeria/2013.
7. Cheesbrough, M. District Laboratory Practical in Tropical Countries 2nd Edition. Cambridge University Press 2005; Part 1: 218-239.
8. World Health Organization Prevention and control of Schistosomiasis and soil transmitted helminthiasis. WHO Technical report. Series No. 912: i-vi. World Health Org, Geneva 2002; Pp 64.
9. Mbata, M. The prevalence of urinary schistosomiasis in Ogbadibo Local Government Area of Benue State, Nigeria. *The International Journal of Infectious Diseases.* 2008; 6(1). www.ispub.com.
10. Balla, Habiba Jimeta; Jabbo, Astaharam Abba. Survey of Urinary Schistosomiasis among school-aged children in the rural communities of Mayo-belwa Local Government Area, Adamawa State, Nigeria. Journal of Natural Sciences Research, 2013; 3(4):73-77
11. Akeh, A.M., Ejezie, G.C., Enyi-Idoh, K.H., Eja, M.E., Agba, A.O. & Ogbeche, J.O. Urinary schistosomiasis, perceptions and treatment seeking behaviour in Sankwala, Cross- River

State, Southeastern Nigeria. *Nigerian Journal of Parasitology*. 2010; 31:7-13.
12. Sarkinfada, F., Oyebanji, A.A, Sadiq, I.A., & Kyasu, Z. Urinary schistosomiasis in the Danjarima community in Kano, Nigeria. *Journal of infection in Developing Countr*y. 2009; 3:452-457.
13. Okwusu, V.N. & Banke, R.K. A study of the urinary schistosomiasis from some schools in four local government areas of Benue State. *Nigerian Journal of Pure and Applied Sciences*. 2001; 1:1-4.
14. Sulyman, M.A., Fagbenro-Beyioku, A.F., Mafe, M.A., Oyibo, W.A., Ajayi, M.B. & Akande, D.O. Prevalence of urinary Schistosomiasis in School children in four states of *Nigeria. Nigerian Journal of Parasitology*, 2009; 30:110-114.
15. Nmorsi, O.G, Egwunyenga, O.A., Ukwandu, N.D. & Nwokolo, N.O. Urinary Schistosomiasis in Edo State, Nigeria: Eosinophiluria as a diagnostic Marker. *African Journal of Biotechnology,* 2005; 4:21-24.
16. Mafiana, C.F, Ekpo, U.F. & Ojo, D.A. Urinary schistosomiasis in pre-school children in settlements around Oyan reservoir in Ogun State, Nigeria: implications for control. *Tropical Medicine and International* Health, 2003; 8:78-82.
17. Agi, P.I. & Awi-waadu, G.B. The status of *Schistosoma haematobium* infection in Anyu community in the Niger- Delta, Nigeria. *Journals of Applied Science and Environmental Management,* 2008; 12:21-24.
18. Ugbomoiko, U.S., Ofozie, I.E., Okoye, I.C. & Henkelbach, J. Factors associated with urinary schistosomiasis in two peri-urban communities in South-western, Nigeria. *Annals of Tropical Medical Parasitology*, 2010; 104: 409-419.
19. Okoli, C.G., Anosike, J.C. & Iwuala, M.E. Prevalence and distribution of urinary schistosomiasis in Ohaji/Egbema LGA of Imo State, Nigeria. http//www.americanscience.org/journals/am-sci/0204/07-0201-okoli-am.doc.
20. Ejima, I.A. & Odaibo, A.B. Urinary schistosomiasis in the Niger- Benue basin of Kogi State Nigeria. *International Journal of Tropical Medicine,* 2010; 5:73-80.
21. Nkengazong, L., Njioku, F., Tenkeng, F., Enyong, P., & Wanji, S. Re-assessment of endemicity level of Urinary schistosomiasis in the Kotto-Barombi focus (South-west, Cameroon) and impact of mass drug administration (MDA) on parasitic indices. *Journal of Cell and Biology,* 2009; 3:159-164.
22. Sama, M.T., Oyono, E. & Ratard, R.C. High risk behaviours and schistosomiasis infection in Kumba, Southwest Province, Cameroon. *International Journal Environment and Public Health*, 2007; 4:101-105.
23. Brouwer, K.C., Munatsi, A., Ndhlovu, P.D., Wagatsuma, Y. & Shiff, C.J. Urinary schistosomiasis in Zimbabwean school children: predictors of morbidity. *African Health Sciences,* 2004; *4:115*-118.
24. Kapito-Tembo, A.P., Mwapasa, V., Meshnick, S.R., Samanyika, Y., Banda, D. & Bowie, C. Prevalence distribution and risk factors for *Schistosoma haematobium* infection among school children in Blantyre, Malawi. PLoS Neglected Tropical Diseases, 2009; 3:e361.doi:10.1371/journal.pntd.0000361.
25. Nale Y, Galadima M, Yakubu SE. Index of potential contamination for urinary schistosomiasis in Zaria, Nigeria. Niger J Parasitol. 2003; 24: 95–101.
26. C A Ekwunife, F C Okafor. Schistosomiasis Infection in Primary Schools in Agulu Town of Anambra State, Nigeria. Animal Research International, 2004; 1(3): 203-207

27. Aboagye, I.F. & Edoh, D. Investigation of the risk of infection of urinary schistosomiasis at Mahem and Galilea communities in the Greater Accra region of Ghana. *West African Journal of Applied Ecol*ogy. 2009; 15:1-6.
28. Satayathum, S.A., Muchiri, E.M., Ouma, J.H., Whalen, C.C. & King, C.H. Factors affecting infection or re-infection with *Schistosoma haematobium* in coastal Kenya: survival analysis during a nine-year, school-based treatment program. *The American Journal of Tropical Medicine and Hygiene,* 2006; 75:83-92.
29. Uneke C.J., Patrick, G.O., Ugwuoru, C.D., Nwanokwai, A.P. & Iloegbunam, R.O. Urinary schistosomiasis among School children in Ebonyi State, Nigeria. *International Journal of Laboratory* Medicine, 2007; www.ispub.com.
30. Akinwale, O.P., Ajayi, M.B., Akande, D.O., Gyang, P.V., Adelekem, M.A. & Adeneye, A.K. Urinary schistosomiasis around Oyan reservoir, Nigeria: twenty years after first outbreak. *Iranian Journal of Public Health,* 2010; 39: 92-95.
31. Biu, A.A., Kolo, H.B. & Agbadu, E.T. Prevalence of *Schistosoma haematobium* infection in school aged children of Konduga Local Government Area, Northeastern, Nigeria. *International Journal of Biomedical Health* Science. 2009; 5:181-184.
32. Edungbola, L., Asaolu, S., Omonisi, M. & Aiyedun, B. *Schistosoma haematobium* infection among schoolchildren in the Cabana district, Kwara State, Nigeria. *African Journal of Medicine and Medical Sciences*. 1988; 17:187-193.
33. Bello, A.B. & Edungbola, L.D. *Schistosoma haematobium* a neglected common parasitic disease of childhood in Nigeria. Incidence and intensity of infection. *Acta Pediatric.* 1992; 81:601-604.
34. Nnoruka, V.N. Epidemiological study of urinary Schistosomiasis and the physico-chemical characteristics of the transmission sites in Imo State, Nigeria. *Niger. J. Parasitol.* 2000; 21:21-32.
35. Etim, S.E. Water-contact activities and schistosomiasis among women. Book of Abstract, *Nig J Parasitol*ogy. 1995; 19:77-83.
36. Aboagye, I.F. & Edoh, D. Investigation of the risk of infection of urinary schistosomiasis at Mahem and Galilea communities in the Greater Accra region of Ghana. *West African Journal of Applied Ecology.* 2009; 15: pp 1-6.

Cite this article as: Balla HJ, Bulama AA, Kutdang ET, Babagana M. Survey of Urinary Schistosomiasis Among Internally Displaced Persons (IDPS) In Borno State. Bo Med J 2016; 13(2): 117 - 124. **Source of Support:** Nil, **Conflict of Interest:** None declared.