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Original article

PREVELANCE AND INTENSITY OF *SCHISTOSOMA HEAMATOBIUM* IN SOME SELECTED COMMUNITIES OF LAVUN LOCAL GOVERNMENT OF NIGER STATE, NIGERIA.

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ABSTRACT

Urinary schistosomiasis is a disease cause by blood fluke of genus schistosome called *Schistosoma heamatobium* with an intermediate host of aquatic snail, *Bulinus species*. The study was conducted between February to May 2017, to determine the prevalence, intensity and pathological implication of *Schistosoma haematobium* infection in five selected communities (Kudogi, Kpachitagi, Lanchikagi, Dokomba and Sachi nku) of Lavun Government Area of Niger State. Volunteers were screened for schistosome infection by microscopic examination of urine that was processed using sedimentation techniques. Microhematuria, proteinuria and bilirubin were assessed using combi-9. A total of 607 subjects were enrolled for the study and the overall prevalence was 37.2% with the intensity of 791.22 $\pm$ 147.3. Of the five communities sampled, participants from Sachi nku had the highest (67.1%) infection while participants from Kpachitagi are least infected (8.4%). Kudogi recorded the highest intensity (1298.4 $\pm$ 366.4) while Sachi nku had least intensity (34.84$\pm$ 32.92). Generally, infection was age and sex-dependent; prevalence of infection was significantly higher in males (43.6%) than females (26.1%); $p = 0.001$. Similarly, age group 16-25 had more infection (43.1%) and lowest (22.0%) in age group 1-5. Infection due to occupation showed that school children had the highest prevalence (41.6%) while traders were least infected (25.9%). Pathological assessment of infection showed a high prevalence of hematuria (57.7%) proteinuria (55.3%) and bilirubin (55.3%) among the participants. The study reveals the risk of infection of schistosome, thus the need for mass chemotherapy to break infection cycle.

KEY WORLDS: Schistosome, prevalence, intensity and communities

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INTRODUCTION

Schistosomiasis is a chronic and debilitating parasitic disease caused by flatworms of the following species, namely Schistosoma *mansoni, japonicum,* which causes intestinal schistosomiasis and *Schistosoma haematobium* that causes urinary schistosomiasis [1, 2]. The infection is common in many part of the world, particularly Africa, Latin America and Asia [3]. Schistosomiasis is one of the Neglected Tropical Diseases, second to malaria in term of socio-economic impact and public health problem. About 74 developing countries with approximately 240 million infected people and more than 700 million are at risk of infection globally [4]. It is estimated that about 90% of people that require treatment are from Africa [5]. It has been reported that Nigeria has the greatest number of cases of schistosomiasis worldwide with 29 million infected cases and about 101 million people are at risk of infection [6, 7].

The human activities like fishing, poor sanitation, personal hygiene, poverty, ignorance and increase irrigation are the risk factors that contribute to the spread of the disease [4].The parasites are transmitted by *Bulinus, Biomphalaria andOncomelania species.* [8] Human infection occur when contact is made with water body containing cercaria. The clinical problem of this disease include hematuria, dysuria, nutritional deficiency, and lesion of the bladder and kidney failure [9].Majority of infected people are asymptomatic and would not go to health center till the chronic state of the disease [10].

In Nigeria the prevalence and intensity vary from state to state. [11] reported high prevalence of 74% with intensity of 77.63 eggs/10ml urine in Zamfara State. Also in Osun and Kwara States of Nigeria 55.8% with mean intensity of 67.4 eggs/10ml was reported by [12] other states in Nigeria have prevalence ranging from 2.0% to 90.0% [13, 14].

Several researches on schistosomiasis conducted in various part of Niger State confirmed increase prevalence. [15] reported 40.0% prevalence in Wushihi, Niger State. There is indication of knowledge dearth in respect to the diseasein many rural communities of Lavun in Niger State. This study was to assess the prevalence and intensity of *Schistosoma heamatobium* in the above selected communities.

MATERIALS AND METHODS

Study area

The study was conducted in five villages of low land communities of Lavun Local Government Area of Niger State. The communities are Dokomba, Kudogi, Lanchikagi, Kpachitagi and Sachi nku. The villages are located between latitude $9^0$24N and longitude $5^0$70E, the area has a tropical climate with annual rainfall of 122.7mm. The vegetation is mainly guinea savanna. The low land use to be flooded with water during raining season in addition to river Lavun that passes through the area which compel the majority of the inhabitants to rice farming and fishing. The majority of the people are illiterate, income is low with only primary school and borehole as the only facilities. The major sources of water is river Lavun use for washing and other domestic purposes.

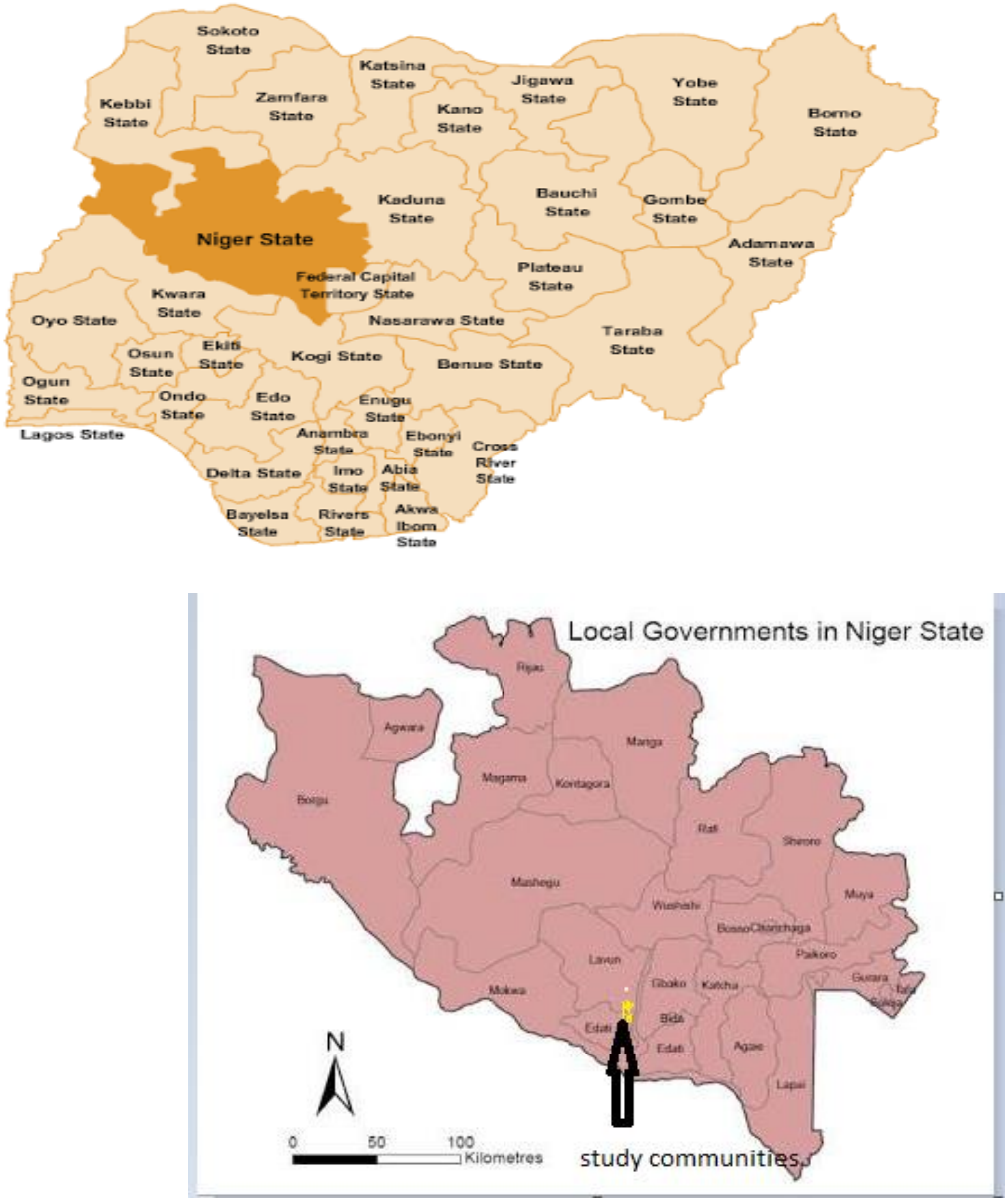

Fig 1. Geographical map of Nigeria showing Niger state with local Government involved in the study, showing study sites..

Sample collection

The sample collection was carried out between Februarys to May 2017. Urine samples were collected from the consented participants using a sterilized sample bottles andwas immediately subjected to pH, proteinuria, hematuria and bilirubin screening using medi-test combi 9strip (Trade name: machnry nagel) right from the field. The samples were collected between 10.00 a.m. and 2.00 p.m.

Processing and examination of samples.

Each of the sample collected (urine) were preserved with 10% formalin (10ml of the concentrated solution + 90ml of distilled water). The preserved samples were

transported to biology laboratory of the Federal polytechnic, Bida, Niger State for parasitological examination. The urine samples were sedimented for one hour and the supernatant discarded while the sediment weretransferred to a tube and centrifuged at 2000g for 2 minutes. The residue of centrifuge was transferred to clean glass slide and covered with cover slip. The prepared slide was carefully examined for presence of ova using x10 objective lens.

Data analysis

Data entry and analysis was done using IBM version 21 statistical package for social sciences (SPSS).The prevalence and intensity of parasite and other parameters were presented as descriptive statistics, chi-square and one-way Analysis of Variance (ANOVA). All levels of significance was set at $p < 0.05$ and confidence interval of 95%.Tables and chart were presented using M.S word and excel.

RESULTS

A total of 607 individuals participated in this study, of this participant 385(63.4%) are male while 222(36.6%) are female. Participants infected with *S. haematobium* are 226 (37.2%).The five communities examined for prevalence of the disease recorded the following prevalence percentages, Sachi nku with 67.1% being the highest, Kudogi recorded the second highest prevalence of 41.4% and the following percentages 18.4%, 16.4% and 8.4% are for Dokomba, Lanchikagi and Kpachitagi communities respectively. Kudogi communities recorded the highest mean intensity and mean population egg load (Table 1).The Age group specific prevalence showed that, Age group 16-25 has the highest prevalence of 43.7%, closely followed by Age group 6-15 with 41.3% and 1-5 age group recorded the least percentage of 22%. Statistical analysis indicate a p value of < 0.005. (Table 2). For gender, male have the highest prevalence of 43.6% while that of female is 26.1% with a statistical value of $p<0.000$ (Table 2).The intensity with respect to occupation, sex and age group of the participant are as follow: Students recorded highest intensity in severe category with traders being highest in heavy intensity while farmers account for highest in light intensity (Table 3). For sex, female recorded high intensity in heavy category while the male recorded highest in both light and severe category. The overall intensity between the two sexes is not significant. The age group ≥ 36 recorded highest intensityin light category while age group 26-35 account for least intensity in that category, both age group have zero intensity at severe category, but age group ≤ 5 recorded highest intensity in the category (Table 3).

Table 1. Prevalence and intensity of *Schistosoma heamatobium* with respect to study communities; Sachi nku, Kudogi, Dokomba, Lanchikagi and Kpachitagi of Lavun Local Government in Niger State of Nigeria

Variables

Variables	**Number**	**Number Infected (%)**	**95%CI**	**x±SD**	Mpel
Sachi nku	158	106(67.1)	59.1-74.2	34.84±32.92	*1.554*
Kudogi	203	84(41.4)	*34.5-48.5*	1298.4±366.4	3.113
Dokomba	102	19(18.6)	11.8-27.8	50.730±19,43	1.713
Lanchikagi	61	10(16.4)	8.5-28.5	614.30± 98.6	2.789
Kpachitagi	83	7(8.4)	3.7-17.1	99.293± 22.27	2.001
Total	607	226		791.22± 147.3	2.898
P. Value		0.00			

Table 2. Prevalence of *Schistosoma harnatobium* with respect to Age and Sex of the participants in the study communities

Variables	**Number**	**Number of Infected (%)**	**95%CI**
Age			
<5	79	18(22)	14.4-33.8
6-15	305	126(41.3)	35.7-47.0
16-25	119	52(43.1)	34.7-53.0
26-35	59	18(30.5)	19.5-44.0
≥36	45	12(26.7)	15.0-42.2
P. Value		0.005	
Sex			
Male	385	168(43.6)	38.6-48.7
Female	222	58(26.1)	20.5-32.5
P. Value		0.000	

Table 3. Intensity of *Schistosoma heamatobium* with respect to occupation, sex and age of the participants from Sachi nku, Kudogi, Dokomba, Lanchikagi and Kpachitagi communities in Niger State of Nigeria

Variables		Intensity				
	No. infected	Light	Heavy	Severe	No. Examined	P. Value
Sex		(1-49)	(50-499)	(500+)		0.667
Male	168(43)	53(31.5)	99(58.9)	16(9.5)	385	
Female	58(26)	15(25.9)	38(65.5)	5(8.6)	222	
Age group						0.002
1-5	18(22.8)	7(38.9)	6(33.3)	5(27.8)	79	
6-15	126(41.3)	32(25.9)	81(64.3)	13(10.3)	305	
16-25	52(43.7)	18(34.6)	31(59.6)	3(5.8)	119	
26-35	18(30.5)	3(16.7)	15(83.3)	0(0.0)	59	
≥36	12(26.7)	8(66.7)	4(33.3)	0(0.0)	45	
Occupation						0.554
Students	166(41.6)	31(26.1)	72(62.1)	13(11.2)	277	
Farmers	72(39.3)	26(36.1)	40(55.6)	6(8.3)	183	
Traders	38(25.9)	11(28.9)	25(65.8)	2(5.3)	147	

DISCUSSION

Urinary schistosomiasis is a neglected and endemic tropical disease, particularly in Africa. As a result of the above statement findings will continue to be reported, and thus more literature from the continent. The outcome of this study revealed 37.2% prevalence. Parrallel result have been reported by Kabiru *et al* [16] from wammako in Sokoto State and [17] from Edo State. Contrary to the above findings, 12.6%by Abolarinwa and Fabiyi [18] from Minna, Niger State, Nigeria, was revealed. Also as low as 2.0%was similarly reported from Jos, Nigeria, [13]. However, the prevalence percentage obtain in this research differ from the observation of Bala *et al.* [11] from Zamfara State, which recorded 74% in his research. The percentage observed from the present study may be as a result of obvious risk factors associated with the disease, which include poor personal hygiene, low environmental sanitation, inadequate social amenities, poverty etc.

In this study, gender pattern of infection disagree with the report of Bala *et al.* [11] from Zamfara State that earlier submitted findings with no significant differences between the two genders. Although the result conformed to that of [14] from two communities of Osun State, [19] from Zamfara State and [20] from Edo State. This significant differences may not be far fetch from the fact that male engaged in all risk factors activities while female are prohibited to engage in some of the activities such as farming and swimming, due to cultural and social setting of the communities. In contrast Henry *et al.* [2] reported that female are more infected than male, almost countering the percentage in Jaba, Kaduna State

The prevalence in the present study is also associated with age. Several studies have shown that young individual and elderly people are always less infected with the disease compared to participants of school age and the findings of this study corroborated with the submission above, as age group of 6-15 alone account for 41.3%. This result can be supported by the fact that, they actively involved in all the activities that pre-disposed individuals to infection. Some of the earlier researchers that have reported same result include [21] and [22]. Children who indulge in water- based activities in unsafe or cercarial-infested water bodies are prone to infection [1].The low prevalence recorded in age group 1-5 conformed to the work of [11]. However, a report has also presented different view to the above, where children of less or equal to age nine have high prevalence of the condition.[23]From Ogun State.

Of all the occupation, traders recorded least prevalence, an indication that they are least exposed to cercaria infested water while students and farmers are heavily infected, which prove their high frequency of going to the River. Activities such as swimming, bathing and farming had high infection percentages. This is expected because of their level of exposure and duration in infected water which serve as source of infection. [16]Reported same from wammaka in Sokoto State. Two community of the five, show heavy infection while the remaining three recorded low prevalence. For Kudogi, that is the second most infected,

can be attributed to the fact that majority of them both male and female, young and old are either fishermen or farmers. The community that recorded highest prevalence, despite the presence of health care center, is surrounded by streams in addition to the above risk factors, this may explain the high prevalence in the area. The intensity of eggs recorded in the study followed the pattern of earlier workers with the older participants having less eggs and zero at heavy intensity [16]. This may be as a result of older individuals having ability to developed concomitant immunity common to schistosomiasis, due to frequent infection. Eggs output in relation to gender show that male excrete more eggs than female and this can be attributed to initial assertion that males engage in activities that predisposes than to infection and may stay longer in infected water than females, this result is in consonances to the earlier findings submitted by Awosolu and Ladan *et al.* [12, 19]. Although as many authors has supported the above observation, yet there are few exception. Henry *et al*. [2] from Jaba, Kaduna state reported high intensity in females than males, and this was justified by his submission that females are more active in fadama rice farming than the male. Occupation, the students and farming account for high intensity while traders recorded least, the same pattern with that of prevalence in this study. The study communities, geographically serve as a good breeding ground for the parasites, hence the incidence of parasite is inevitable in addition to earlier mention risk factors. To reduce the incidence of the disease, all hands must be on deck by all stake holders most especially government at all levels.

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