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Prevalence of *Schistosoma haematobium* among School Children in Bauchi State, Nigeria

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ABSTRACT: An investigation conducted to determine the prevalence of *Schistosoma haematobium* among school children was carried out in Bauchi State Nigeria. Six hundred 600 urine samples were collected and examined in the rainy and the dry season each. Sedimentation method was used for the investigation of the *Schitosoma haematobium.* Six hundred (600) questionnaires were distributed in order to determine their knowledge and perceptions about urinary schistosomiasis in relation to their community. The overall prevalence of 423 (35.3%) was observed during of the period of study 314 (26.2%) males and109 (9.1%) females. The difference between the infection rate in males and females was statistically significant ($p<0.05$). Prevalence rate was also noted to be higher among age groups between 13-14 years 206 (17.2%) followed by 11-12 years 139 (11.6%), 9-10 years 66 (5.5%) and 7-8 had least 12 (1%). This was also tested statistically and was not significant ($p<0.05$). The prevalence rate in the rainy season was 235 (39.2%) and 188 (31.3%) in the dry season. This was statistically significantly. The study showed that there is prevalence of urinary schistosomiasis in the study area. Poor knowledge of causative agent of the infection and subsequent means of transmission has contributed to the high prevalence recorded. Proper health education, provision of portable water especially in the rural areas as well as raising the standard of primary health care clinics to facilitated correct diagnosis and treatment of the cases is all recommended for the eradication of the disease in the study area.

KEYWORDS: *Schistosoma haematobium,* Students, Bauchi state.

1 INTRODUCTION

Schistosoma, is a genus of tramatodes, commonly known as blood fluke. They are parasitic flatworm responsible for a highly significant group of infection in human termed schistosomiasis or Bilharziasis named after the founder Theodor Bilharz. World Health Organization fact sheet (2014) considered schistosomiasis as the second most socioeconomic parasitic disease after malaria, with hundreds of millions infected worldwide. Schistosomiasis affects almost 210 million people worldwide (Fenwick 2012) and an estimated 12,000 to 200,000 people die from it yearly (Lozono *et al.*, 2012 and Thetiot-Lourent *et al.*, 2013). The disease is most commonly found in Africa, as well as Asia and South America (WHO, 2014). Around 700 million people, in more than 70 countries, live in areas where the disease is common (Thetiot-Lourent *et al.*, 2013 and WHO, 2014). The disease is wide spread here in Nigeria with a relatively low mortality rate but very high morbidity rate causing severe debilitating illness in millions of people. It is often associated with development projects, such as dam and irrigation schemes where the snail intermediate host of the parasite breed and people use the water for swimming washing, bathing and fishing.

Five species of schistosome infect humans *S. haematobium, S. mansoni, S. japanicum, S. mekongi and S. intercalatum*. *S. intercalatum* is parasite of cattle in West Africa, also occasionally causes the disease in human. Except for *S .haematobium*

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that produces urinary tracts disease, the human schistosomes primarily affect the intestine and liver. Chronic schistosomiasis also causes physical growth and cognitive delays in children. *Schistosoma haematobium* (urinary *schistosoma*) occurs in all 36 States of Nigeria including the Federal Capital Territory (Ekpo and Mafiana, 2004). The disease is spread by contact with the water that contains the parasites. These parasites are released from freshwater snails that have been infected. The disease is especially common among children in developing countries as they are more likely to play in infected water. Other high risk groups include farmers, fishermen, and people using infected water for their daily chores. Diagnosis is by finding the eggs of the parasite in a person's urine in case of *S. haematobium* or stool in the case of other *Schistosoma* species. It can also be confirmed by finding antibodies against the disease in the blood (WHO, 2014).

Schistosoma haematobium also known as Urogenital schistosomiasis is the most common here in Nigeria. It is an occupational disease acquired by man through water related activities such as fishing, bathing and recreation (Cowper, 1963). Due to lack of information or insufficient attention to hygiene, infected individuals may contaminate their water supply with urine. Urinary schistosomiasis has been known as a serious public health problem in Nigeria (Remme *et al.*, 1993). This study was aim to determine the prevalence of *Schistosoma haematobium* among school children in Bauchi state.

2 MATERIAL AND METHOD

STUDY AREA

The study was conducted in Bauchi State Nigeria. Bauchi is a State in northern Nigeria and was established in 1976 when the former North-Eastern State was broken up. The State has three Senatorial Zone and 20 Local Government Areas Council which are Bauchi,Tafawa Balewa, Dass, Toro, Bogoro, Ningi, Warji, Ganjuwa, Kirfi, Alkaleri, Darazo, Misau, Giade, Shira, Jama'are, Katagum, Itas/Gadau, Zaki, Gamawa, Damban. The State is bordered by seven states, Kano and Jigawa to the north, Taraba and Plateau to the south, Gombe and Yobe to the east and Kaduna to the west.

Bauchi State occupies a total land of 49,119km representing about 5.3% of Nigeria's total land area and is located between latitudes 9º3' and 12º3' North and longitude 8º50' and 11º East. According to the 2006 census; the State has a population of 4,653,066. The State is one of the northern States that have two distinctive vegetation namely Sudan and Sahel savannah (Wikipidia, 2014).

In addition to rainfall, Bauchi has a number of rivers. These include the Gongola and Jama'a rivers. The State also has a number of dams for irrigation and other purposes. These include Gubi and Tilde Fulani dams and Lake Maladumba.

SAMPLE COLLECTION

One thousand two hundred (1,200) terminal urine (Samples) were collected in a clean, opening, screw capped, transparent, dry and sterile containers from the students/pupils. The students were selected randomly from the schools children in the State. The recommended time for the collection of sample is between noon and 3pm (CDC, 2013). The Samples were collected with the consent of both the student and Schools Management.

LABORATORY ANALYSIS

The laboratory analysis of the samples collected was carried out at College of Education, Azare Clinic Bauchi State. Urine microscopic is the method used to examine the sample. Microscopic identification of eggs in urine or stool is the most practical method for *schistosoma* diagnosis (CDC, 2013). Urine examination was carried out when *S. haematobium* is suspected. The samples collected were allowed to sediment for a while in the laboratory and the supernatants were discarded, leaving only the deposits at the bottom of the sample containers. Posture pipettes were used to take two drops to a clean and grease-free slide and the covered with a cover slip gently without the formation of air bubbles. The slide mounted on the microscope stage and examined with X10 and X40 objective lenses. The preparation was then magnified and viewed for the presence of S. *haematobium* ova. All the findings were recorded carefully.

DATA ANALYSIS

Comparisons of prevalence with respect to age, sex and season were made using Chi-square. All analysis were done using SPSS software version 17.0 and ($p<0.05$) was used to determine level of significance.

3 RESULT

Table 1 : The results of this study during the dry season revealed that out of the 600 children examined for *S.haematobium* ova, there was an overall prevalence of 188 (31.3%), indicating 130 (43.3%) males and 58 (19.3%) females which was differ significantly ($p<0.05$). Age groupings of 7-8, 9-10, 11-12 and 13-14 years had prevalence rates of 7 (4.7%), 35 (23.3%), 59 (31.4%) and 87 (58.0%) respectively, this was also differ significantly ($p<0.05$).

Table 2 : The results of this study during the rainy revealed that out of the 600 children examined for *S. haematobium* ova, there was an overall prevalence of 235 (39.2%), indicating 184 (61.3%) males and 51 (17.0%) females which differed significantly ($p<0.05$). Age groupings of 7-8, 9-10, 11-12 and 13-14 years had prevalence rates of 5 (3.3%), 31 (20.7%), 58 (53.3%) and119 (79.3%) respectively, this was also differ significantly ($p<0.05$).

Table 3: The results of the infected children in both seasons (dry and rainy) were comparable statistically. The age was not significantly different ($p>0.05$) but the sex significantly different ($p<0.05$) as shown in the table.

Table 4: shows that out of the 600 questionnaires administered, only 120 responses have the knowledge of the etiology and the mode of transmission of schistosomiasis. As 120 (20.0%) of the respondents attributed urinary schistosomiasis to water contact activities. With remaining 480 (80.0%) respondents attributed the etiology to other causes. 70 (11.7%) respondents believed that the disease was a common sickness “like malaria fever, 198 (33%) respondents attributed the cause as normal in developing stage and 212 (35.3%) respondents believed it was caused by taking food with too much salt.

Table 1: Prevalence of Schistosoma Haematobium according to age and gender during dry season

Parameter	Number Examined	Number Effected (%)	Degree of Freedom	Significance Value	Decision
Age:					
7-8	150	7(4.7)	3	0.00	Significant
9-10	150	35(23.3)			P<0.05
11-12	150	59(31.4)			
13-14	150	87(58.0)			
Gender					
Male	300	130(43.3)	1	0.03	Significant
Female	300	58(19.3)			P<0.05
Total	**600**	**188(31.3)**			

Table 2: Prevalence of Schistosoma Haematobium according to age and gender during rainy season

Parameter	Number Examined	Number Effected (%)	Degree of Freedom	Significance Value	Decision
Age:					
7-8	150	5(3.3)	3	0.00	Significant
9-10	150	31(20.7)			P<0.05
11-12	150	58(53.3)			
13-14	150	119(79.3)			
Gender					
Male	300	184(61.3)	1	0.03	Significant
Female	300	51(17.0)			P<0.05
Total	**600**	**235(39.2)**			

Table 3: Prevalence of Schistosoma Haematobium according to gender and age in both seasons

Paramater	Dry Season (%)	Rainy Season (%)	Degree of Freedom	Significance Value	Decision
Age:					
7-8	7(58.3)	5(41.7)	3	0.316	Not Significant
9-10	35(53.0)	31(47.0)			P<0.05
11-12	59(42.4)	58(57.6)			
13-14	87(42.2)	119(57.8)			
Gender					
Male	130(41.1)	184(58.6)	1	0.03	Significant
Female	58(53.2)	51(46.8)			P<0.05
Total	**188(44.4)**	**235(55.6)**			

Table 4: Knowledge and Perception of respondents about Urinary schistosomiasis in Bauchi State

No	Attribute cause of Schistosoma haemotabium	Number of respondent (%)
1	Common disease like malaria	70(11.7)
2	Water contact activities	120(20.0)
3	Food we eat	212(35.3)
4	Developmental stage	198(33)
	Total	**600(100)**

4 DISCUSSION

Bauchi State experience two climatic seasons, the dry season (October to April) and the wet season (May to September). In this, study school children were the target. This is because they are the main groups at risk. WHO Expert Committee (2002) report said the main groups at risk are school age children, specific occupational group (fishermen, irrigation workers, farmers) , woman and other groups using infected water for domestic purposes. However, most if not all of the previous studies target urban areas ignoring the rural areas, were the majority of their residents are farmers and irrigation workers. The high prevalence (39.2%) was observed during the rainy season due to the frequent contact of the children with prevailing water bodies in the period. This finding agree with the earlier report by Mafiana *et al.* (2003) that infection in pre- school and school children was primarily due to exposure occasioned by washing, bathing, dry season farming, and fishing activities, also Biu *et al.* (2000) said the peak period of the infections is between August and September. However the low prevalence observed (31.3%) during the dry season when compare with the rainy period was not totally unexpected because of local climatic conditions particularly the long dry months that did not favor the small snail habitats which are the ponds and the rivers. These habitats dried up during the dry season with the resultant desiccation and death of most of the vector snails, hence limiting perennial transmission. It was actually the remaining collections of water with the few surviving hibernated snails that provided fresh ground for vector snails to multiply when the next rainy season came as observed earlier by Belonwu (2007) in the study area and this were tested statistically which differ significantly ($p<0.05$). The higher prevalence among males (74.2%) than the females counterparts (25.8%) with a significant different ($p<0.05$) could be due to the greater water contact activities by male compared to their females conterpart. These agree with El-Mahamood and Daughari (2008), Abdullahi and Saidu (2011) and Faruk *et al.* (2009) in Misau, Niger and Danjarima respectively However, it was observed that females were less prone to long period of swimming and therefore had less exposure to water activities (swimming) compared to males. Olusanya and Odiomu (1984) as well as Edungbola *et al*. (1988) stated that females mature earlier and are therefore restricted socially compared to males to swim naked in the stream. The study showed that children between the ages of 13 – 14 years had the highest prevalence followed 11-12, 9-10 and 7-8 had the least. The low prevalence observed in the last age group could be attributed to the fact that this age group only accompanies the older ones to the open water bodies but are not actively involved in activities that take place at the water contact sites because of their age and fear of drowning as observed by Ogachukwu and Patience (2013). The rise in prevalence with age could be attributed to exposure factor. Consequently, at early age, water contact activities such as swimming, washing and bathing inside the water (river) body are less and these activities could increase with age and maturity. These also agrees with Abdullahi and Saidu (2011), Dawu *et al.* (2009), Biu *et al.* (2009) and Faruk *et al.* (2009) in Niger, Minjibir, Konduga and Danjarima respectively.

However as revealed by the questionnaire, the majority of the residents (Rural areas) were not aware of the actual cause, mode of transmission, and control of urinary schistosomiasis as only 120 (20%) of the respondent attributed the cause of

urinary schistosomiasis to water sources. Although, they are very knowledgeable about the disease which is called Tsagiya in their language (Hausa). Similarly, Dawu *et al*. (2009) observed this in neighboring state. This shows high level of ignorance as to the causative agent and mode of transmission of the disease. The respondents have different believe as 212(35.3%) respondents believe the disease is contacted by taking too much salt, another 70 (11.7%) respondents believe is common disease like Malaria and 198(33%) respondents believe is normal in the development stage. Haematuria was also observed in more than quarter of the samples and this trend has been observed by Duwa *et al.* (2009) and Oniya and Odaibo (2006).

In conclusion, there is prevalence of *Schistosoma haematobium*, in the study area. However, information revealed that there is no control programmed on the disease in Bauchi State for now. If the situation is left unchecked without proper control, it may affect the standard of education of the children especially in the rural areas, as well as the productivity of the rural populace in the study area.

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