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Urinary Schistosomiasis and Water Contact Activities in Some Communities of Fufore Local Government Area, North East Nigeria

Ameh, V[1].,Qadeer, M.A[2]., Ameh, A.J.[3]
[1] *Department of Sciences, American University of Nigeria Academy, Adamawa state, Nigeria*
[2]*Department of Zoology, Moddibo Adama University of Technology, Adamawa State, Nigeria.*
[3]*Head of Laboratory Services Adamawa German Medical center, Jimeta, Adamawa State, Nigeria*

Abstract
This study was conducted to determine the water related activities and prevalence of Schistosoma haematobium in some communities of Fufore Local Government Area of Adamawa State Nigeria. Out of 618 samples were collected within three months, from September to November 2014 andparasitologically examined for eggs of S . haematobium using the sedimentation method, questionnaires were also administered to participants toobtaininformation on demographic data and water contact activities. Of the 618 samples collected 31 were infected giving an overall prevalence of 5.02%. Infection was recorded mainly among those who had contact with water bodies 8.05% whereas those using well water recorded the highest prevalence 4.37%.People who visited mainly for recreational purposes like swimming and playing were the most infected 6.30%.No infection was recorded for those who visited for Farming and Fishing (P>0.05). In conclusion, though prevalence is low, it is important to intensifycontrol measures in order eradicate the disease from this region. Routine treatment and monitoring of the infected dams is recommended so as to reduce the rate of transmission of the disease and also recreational sites and activities should be created in endemic areas to reduce the frequency of visits of the inhabitants to the infected dams, andalso infected persons should be treated.

Key words:*Communities,Fufore, NortheastNigeria,UrinarySchistosomiasis, Water contact activities.*

I. Introduction:

Urinary Schistosomiasis is said to be second to malaria in terms of prevalence and persistence with grave public health and socio-economic importance in endemic communities [1]. It is one of the neglected diseases in tropical Africa that continues to plague inhabitants of sub-urban and rural areas where there are little or no safe water outlets [2].The infection is prevalent in tropical and sub-tropical areas, in poor communities without potable water and adequate sanitation [3]. It is one of the most widely spread among the parasitic helminthic infections that affect man. It is an occupational risk disease encountered in rural areas of developing countries. The disease is indicated by the presence of blood in urine and sometimes by pains on urinating or after urinating. Man contacts the disease when he comes in contact with infected water bodies while carrying out necessary daily activities such as farming, fishing, laundry, bathing and swimming [4]. These socio-economic activities and symptoms are not uncommon among the inhabitants of Fufore L.G.A, Nigeria. There are rivers, ponds, especially constructed dams which have become favourable habitat for the snail intermediate host. Reports in AbribaAbia state [5] show that swimmers have higher prevalence of 3.9%, fishing 0.9% and 4.8 % for domestic users.Studies in Gwong and Kabong areas of plateau state [6] showed that the prevalence was highest among those that obtained water from rivers/stream than those who used well water, while there was no infection among those that obtained water from borehole. In Zamfara state Nigeria [7] indicated that prolong contact with water is a factor aiding infection and reported that farmers 85.79% were infected , those who visit for domestic purposes recorded 52.7 % and fishing had the highest mean egg intensity of112.98g/10ml of urine.
[2] reported that children of farmers recorded the peak of infection with 159 (24.37%),In Buruku and Katsina-ala area of Benue state .Inhabitants of the area mostly linked the disease to other causes like drinking dirty water 195(29.63%) among whose 115 (17.47%) were infected, playing in water 118 (17.93%) among whose 67 (10.18%)

were infected, eating unripe fruits 72 (10.98%) among whose 30 (4.00%) were infected. Subjects' knowledge about the role that fresh water snails play in transmission was low 38 (5.77%). 116 (25.22%) were recorded not having any idea of the cause of the disease and 70 (9.33%) were found infected[2]. Activities like swimming, bathing/playing in water, washing and collection of edible snails from stream, ponds or river significantly correlated with the prevalence of infection ($P < 0.01$) and could be identified as risk factors in the area [2].The Scarcity of epidemiological data on *Schistosoma haematobium* infection in Fufore LGA can adversely affect adequate patient evaluation, management and control programmes. This study was therefore undertaken in order to determine the level of infection and water related factors associated with the disease among the inhabitants. This information can be used to plan strategies for control programme for the area.

II. Area and population of study

The area of this study is Fufore local Government Area of Adamawa State; Fufore is located in Adamawa State, it has a land area of 4972Km^2 and a population of 209,460 and a density of 42.1 inch. It is 26km away from yola and lies between latitude 9^o 13'N and longitude 12^o 39'E of Green wichmeridian[8]. The area experiences distinct dry and wet season with temperature and humidity varying with season, average annual rainfall of 750-100mm between April to October is experienced and dry season period between November to march characterized by dry, dusty and hazy north east trade wind. Temperatures are relatively high through the year about 30 -40 ^{o}c [8]. The site of this study include: Parda, Dasin Bata and Dasinhausa, Wuro biriji, Beli chutti and Giere all in Fufore local government. Area of Adamawa State. The river Benue passed through parts of Fufore local government area and various man-made dams are found scattered in the location especially along the yola- Fufore – Gurin road which were mainly constructed during road construction.The population of the study was drawn from people working and living in these areas. Involvement was purely voluntary and the people were enlightened through health education on the need of the study and useful benefits of it. Those whose formal consent could not be easily obtained were exempted from the study. The control group consists of people from Beli-chuiti whose location has no link with any water body whether stream or dam and only use bore hole dug by government as their source of water.

III. Consent seeking

Clearance was gotten from the Executive Secretary of State Primary Health Agency and the Secretary of the Fufore local Government Primary Health Agency. The consent of the Ward Heads (Mai Jimilas) of the location in which the research was carried out was sought also the consent of the participants was obtained before questionnaires and sample bottles were distributed to each of them. The aim of the study was explained in details to the participants, mode and source of transmission, effect and control measures of the disease.

IV. Questionnaire administration

Questionnaire consisting of relevant questions related to schistosomiasis infection was issued to the participants to obtain information on their water contact activities. The questionnaire was translated to Hausa language which is common and generally understood by people in the location. Participants were properly guided on how to fill the form.

V. Collection and processing of samples

Pre-labeled screw capped plastic container was given to each participant to collect urine samples each labeled according to the number on the questionnaire. Samples were appropriately labeled and transported in a cooler to the Adamawa German Medical Centre laboratory for Confirmatory analysis. Instruction was given to the participants to include terminal urine which should be collected between 10.00hrs and 2.00pm to suit the diurnal rhythm corresponding to the peak output of *schistosoma* egg [9].Laboratory analysis was done using the Sedimentation method [9], and examined for the ova of the parasite using the simple centrifugation technique. 10ml urine samples were collected from each shaken specimen bottle and spun for 10min at 1000rpm. The supernatant was gently decanted and using a clean pasture pipette, a drop of the sediments was placed on a clean grease free microscope slide covered with coverslip and examined using the ×10 and ×40 objective lenses respectively of the S. haematobium ova.

VI. Data analysis

SPSS version 17 was used to carry out the Chi square test for the parameters, where $P<0.05$ was considered significant

VII. Results

A total of Six hundred and eighteen (618) urine samples were collected, of which 31 (5.02%) showed evidence of Schistosoma haematobium infection. Eggs of parasite were not detected in any sample from Dasin Hausa and Beli chuiti (Beli chuiti was the control population).From the table below, the highest prevalence was recorded in Wuro biriji with 44.83% .For the Overall prevalence, Parda and Giere had 0.32 percent respectively with only two cases recorded for each, Dasinbwatiye had 0.16%, the highest infection was recorded in Wuro biriji with about 4.21%. Statistically, there was a significant difference between prevalence and the location with $P < 0.05$.

A total of 384 respondents visited stream, river or dam and 31 of them were infected giving a prevalence of 8.05%. Statistical analysis shows significant difference and an association between the visit to water bodies and infections ($P< 0.05$). The highest prevalence of 3.04 % was recorded amongst those who visited at least once a week and the lowest amongst those that visited at least once a month. Statistically, there is a significant difference with ($P < 0.05$). Also highest prevalence was recorded from those who use water for recreational purpose with prevalence of 6.30% and the least with the farmers and fishermen. Statistically there is a relationship between the water contact activity and the prevalence of S. haematobium infection in Fufore LGA. Those who used well water had the highest infection rate followed by those using bore hole, there was no infection from those using tap water, statistically there was an association with respect to infection ($P<0.05$).

Table 1: Prevalence of *S. haematobium*infection based on the various locations in the study area.

Location	Number sample	Number infected	Prevalence per site (%)	Overall prevalence (%)
Dasin Hausa	201	0	0.00	0.00
DasinBwatye	108	1	0.93	0.16
Parda	186	2	0.32	0.32
Wuro biriji	58	26	44.83	4.21
Giere	26	2	7.69	0.32
Beli chuiti	39	00	0.00	0.00
Total	**618**	**31**	**5.02**	**5.02**

$\times^2$=17.752 df=5 p<0.05

Table 2: Prevalence of *S.haematobium*based on the Tribes

Tribe	Number sampled	Number infected	Prevalence
Hausa	186	00(0.00)	0.00
Bwatiye	109	1(0.92)	0.16
Fulani	305	30(9.84)	4.86
Others	18	00(0.00)	00

Tribe $\times^2$ =29.488, df = 4, p< 0.05

Table 3: Prevalence of S. haematobium based on stream visitation, Water bodies' frequency, water contact activities and source of water of participants in Fufore Local Government Area.

Parameter	Number of Respondents	Number infected	Overall Prevalence (%)
Stream Visitation			
Visit Water bodies	385	31(8.05)	5.02
Do not Visit Water bodies	233	0(0.00)	0.00
Total	**618**	**31**	**5.02**
Water Contact Activities			
Recreation	151	23	6.30
Farming	83	00	0.00

Fishing	46	00	0.00
Domestic	85	8	2.19
Total	**365**	**31**	**8.49**
Frequency of visit to Water bodies			
Every day	134	7	1.77
Once in two days	62	8	2.03
Once a week	72	12	3.04
Once a month	91	4	1.01
Total	**395**	**31**	**7.85**
Source of Drinking /Bathing water			
Well water	170	27	4.37
Borehole	326	3	0.48
River	109	1	0.16
Total	**605**	**31**	**5.12**

Visit to water bodies $\times^2$= 17.752 df = 1, p<0.05
Frequency of visit $\times^2$ =31.556, df= 4, p< 0.05
Water contact Activities $\times^2$ = 45.616, df = 4, p<0.05

Domestic refers to those who visit the water bodies for house hold chores like fetching water, laundry, plate washing etc.

VIII. Discussion

The study revealed a statistically significant higher prevalence (P<0.05) in some location than in others, with Dasin Hausa and Beli chuiti (control) recording no infection (0.00%). Dasinhausa has a water body " the river benue" flowing besides it but recorded no infection, this could be associated to the presence of other source of water in the community like bore hole and well which will reduce the water contact activities of the community, also the community is semi urban with the presence of a well-equipped cottage hospital compared to the others; which could serve as a channel to educate the people as health education is an effective means of improving knowledge about urinary Schistosomiasis[10]. Only a single infection was recorded in Dasinbwatiye (0.16%) this low incidence could be associated to the availability of rain water during the rainy season as most people attested to the reduction in the visitation of the Benue River due to the rain fall. Parda and Giere did not have any river or stream but recorded two (0.32%) infections each, this might be due to the contamination of man-made dams used previously for road constructions which are now reservoirs for the parasite, most young Children visit the dams to play and swim. The higher rate of infection in Wuro biriji, 26 out of the 31 infected persons (4.21%) might be due to the contact activities of the people with the stream and dams scattered around them they have a stream which dries up during the dry season and three dams that contain water and used for bathing swimming and washing of sheep.

The Fulani's had the highest prevalence and the research showed a significant difference between the tribes. The Hausas' recorded no infection this may be closely related to their location because they are mainly located in Dasinhausa, which do not have any man made dam but only the river Benue which is a fast flowing river and may not support the breeding of the parasite, which agrees with report that fast flowing water do not support the development of the S. haematobium parasite [11]. Also Dasinhausa has a good supply of portable water from bore holes scattered around the community which would reduce the water contact activities of the people to mainly fishing and the Hausa's are not known for fishing activities. The higher prevalence amongst the Fulani may be attributed to their constant visit to water bodies to wash, bath sheep, and give drinks to their livestock. For the Bwatiye's, they are mainly fishermen and farmers and live in a terrain where there is no portable water, though they dig small ponds on land close to streams for their home needs, those ditches could eventually become breeding sites for the snail intermediate host and increase their chances of infection with the parasites. The low infection could be as a result of the reduce visit to the river side due to the rains as most of them attested to the fact that during the rainy seasons , they store water from the rains to use for domestic activities like cooking, bathing etc.

This report showed a strong relationship between infection of S. haematobium and contact with water bodies as seen, all infection recorded where with those that had contact with water which is in line with [3] The level of contact is also important in the rate of infection as shown those who visit only once in a month recorded only 4

positive cases (1.01 %) while those who visit daily and once in two days and once a week recorded higher values, this indicates that the frequency of visit to the water bodies would increase the chances of infection with the parasite which agrees with the report [7] indicated that prolong contact with water is a factor aiding infection . The highest prevalence was recorded amongst those who go for recreation i.e., swimming and playing as shown 6.30% similar report has been documented [12] [5] followed by those who visit for domestic purposes like washing, and water fetching. this is not surprising as recreational activities affords more time in contact with the water than domestic activities and the low prevalence in the farmers and fishermen is similar to [5] who recorded lower prevalence of 0.9% for fishing as against 3.9 % for recreation ,but contrary to [13]Who recorded higher for farmers and fishermen. This may be due to the fact that their occupational activities might not necessarily take them to the dam which are the main source of infection in this study but to the river side. This agrees with the report [12] who emphasis the fact that infection of S. haematobium has increase with the construction of dams for collecting water supply, irrigation and fishery whether small, medium size or larger dams. Those who use well water recorded higher prevalence, 4.37% contrary to [6] who reported higher prevalence for people using river. This difference could be due to the fact that the river in this case do not support the development of the Parasiteas it is fast flowing, also the well water might be insufficient hence the need to resort to the infected dams for other domestic water needs so as to reduce the pressure on the well and probably preserve it for drinking purpose.

IX. Conclusion

In conclusion, this study has indicated a low prevalence 5.02% of urinary Schistosomiasis infection among the people in the study area, therefore it is important to put up effort to further reduce and prevent an increase in the future, also routine surveillance, and treatment should be done especially in location like Wuro biriji to reduce the menace. Government should regularly disinfect ponds and streams, treat school children and emphasize on school health education programmes even in primary schools. The major factor influencing the spread of this disease still includes the presence of the man-made dams scattered around the local government areas, pollution of the water bodies with human urine, the presence of the snail intermediate host and its transmission to man, the socio economic status of the people [5] and from this result it shows clearly that infection is dependent on contact with the water body, ignorance based on educational background ,socio economic status and lack of recreational facilities for the young.

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