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Department of Zoology, Faculty of Natural Sciences, University of Jos, Jos, Nigeria

Prevalence and Impact of Urinary Schistosomiasis Amongst Fadama Farmers in Bassa Local Government Area of Plateau State, Central Nigeria

M. R. DABEN[1], G. S. MWANSAT*[1], M. A. DIBAL[2], S. M. PUKUMA[3] AND L. H. NJILA[1]

[1]Parasitology and Entomology Unit, Department of Zoology, Faculty of Natural Sciences, University of Jos, P. M. B.2084, Jos, Nigeria; [2]National Museum and Zoological Garden, P. M. B. 2031, Jos, Jos, Nigeria; and [3]Department of Biological Sciences, Federal University of Technology, P. M. B. 2067, Yola, Nigeria

With 3 figures, 1 table and 11 references

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ABSTRACT

The status of urinary schistosomiasis infections, with the aim of developing schistosomiasis health education programmes through primary health care water contact activities amongst irrigation (Fadama) farmers in Bassa Local Government Area of Plateau State, Nigeria, was assessed. Out of 234 urine samples collected, 68.80% were positive for urinary schistosomiasis while, 23.50% tested positive for haematuria. There were significantly more infected males than the female counterparts ($p<0.05$). The highest prevalence of infections was recorded in the age group of 21 - 30 (84.50%), which incidentally was also the most active group of farmers. This was followed by the 1 - 10 year-old age group (89.00%) in which 67.97% of females were infected and this compared favourably with the 70.40% male infections typical of an agrarian socio-cultural life style. Mean intensity of *Schistosoma haematobium* in the total population was 20 eggs per 10 ml of urine. However, there was no significant difference in the rate of infection in both males and females in the three study areas ($X^2 = 0.70$; Tab 5.991 at 5% level of probability) ($p>0.05$). However, there was a statistically significant difference in the rate of infection with visible haematuria amongst the sexes ($p<0.05$). The study indicated that urinary schistosomiasis (bilharziasis) infections constitute a potential public health problem to Fadama farmers.

Key words: Urinary schistosomiasis (bilharziasis), water-content-activities, haematuria, Fadama farmers
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Introduction

Schistosomiasis is a potentially dangerous infection from trematode worms known as blood flukes, responsible for serious health hazards worldwide. It is endemic in 74 developing countries with more than 80% of the infected people living in sub-Saharan Africa [UNDP/World Bank, 1997/98]. In Nigeria, both urinary and intestinal schistosomiasis caused by *Schistosoma haematobium* and *S. mansoni* respectively, are endemic. However, the urinary form is more distributed and widespread than the intestinal schistosomes [Agbolade and Odiaibo, 1996].

Human schistosomiasis is an important widespread infection in the tropics. It has of recent given rise to a

*Author for correspondence

complex of acute and chronic disease conditions with differing signs and symptoms [WHO, 1993]. It is the second most prevalent parasitic disease after malaria in the developing world with a huge impact on public health and socioeconomic development [WHO, 1993; UNDP/World Bank/WHO, 1997/98]. Recent environmental changes due to modern systems of agricultural practices, such as irrigation schemes, water resource development or dam constructions, and in crease in population densities on these sites, lead to rapid spread of disease, to previously low or non-endemic areas.

The endemicity of urinary schistosomiasis in the central region of Nigeria, and the association between the occurrence of the disease and irrigated agriculture or Fadama farming, has not been investigated. Thus, a rapid assessment of the communities in the irrigation and water-resource development areas is necessary for effective chemotherapeutic and public health education intervention strategies.

The present study is a preliminary investigation report of the prevalence of urinary schistosomiasis amongst Fadama farmers in three informal irrigation schemes, in Bassa Local Government Area (LGA) of Plateau State, central Nigeria.

Materials and Methods

The study area

Bassa LGA is at the tip of Plateau State in central Nigeria (Figs 1 and 2), and covers an area of approximately 1,693 square kilometers. The headquarters is located at Jebbu Bassa which lies on latitude 10.3°N and 8.7°E of the equator. The LGA shares boundaries with Bauchi and Kaduna States to the its north and east-western axis respectively, with a projected population of 112,793 people. The study was conducted in the three Chiefdoms of the LGA namely, Rukuba (Binchi village), Irigwe (Miango village) and Pengana (Padaman-Shanu village). The people are mostly agrarian and are involved in the cultivation of food crops such as yam, acha, maize, rice,, beans, etc., and vegetables like tomatoes, cabbages, pepper, carrots, etc.).

Pre-visits were made to the local government administrators in order to obtain permission and to locate relatively large bodies of water with high Fadama/irrigation farming activities. This study was carried out from July to November, 2002 taking care of the rainy season and the early part of the dry season.

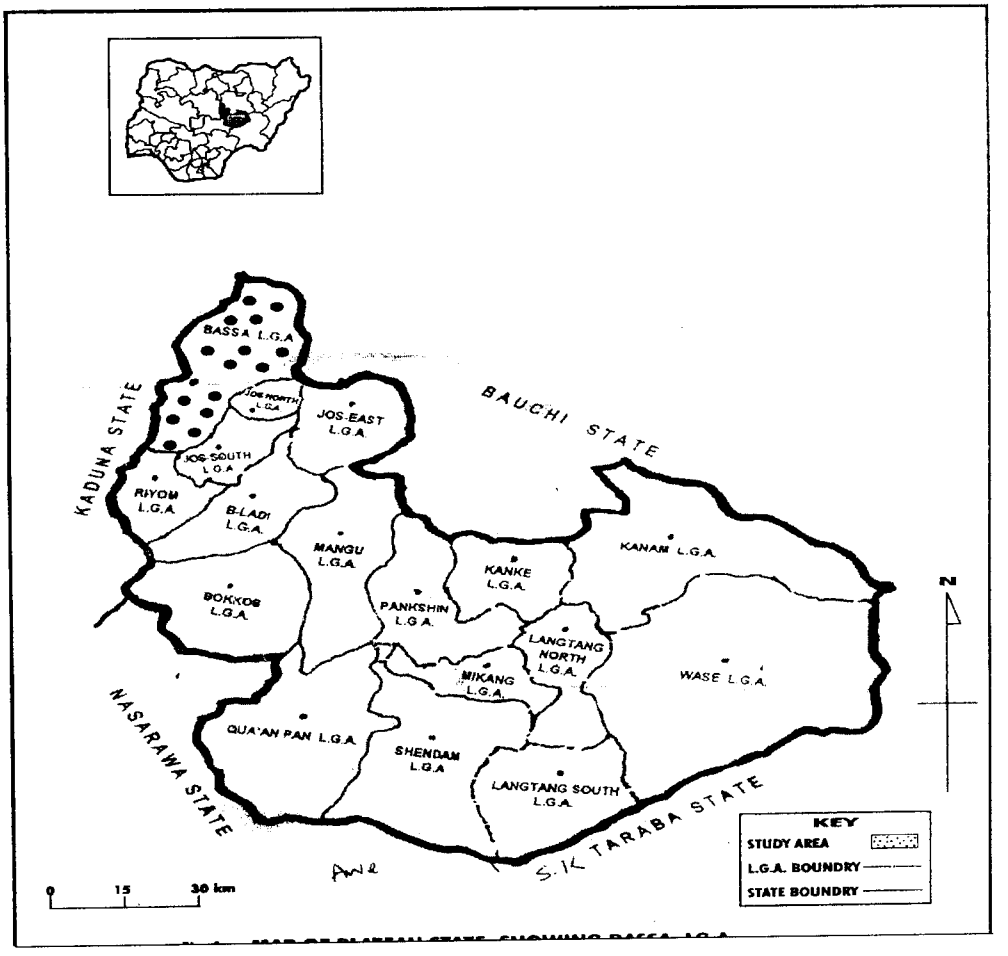

Fig. 1. Map of Plateau State, showing the study location of Bassa LGA (Inset: Map of Nigeria)

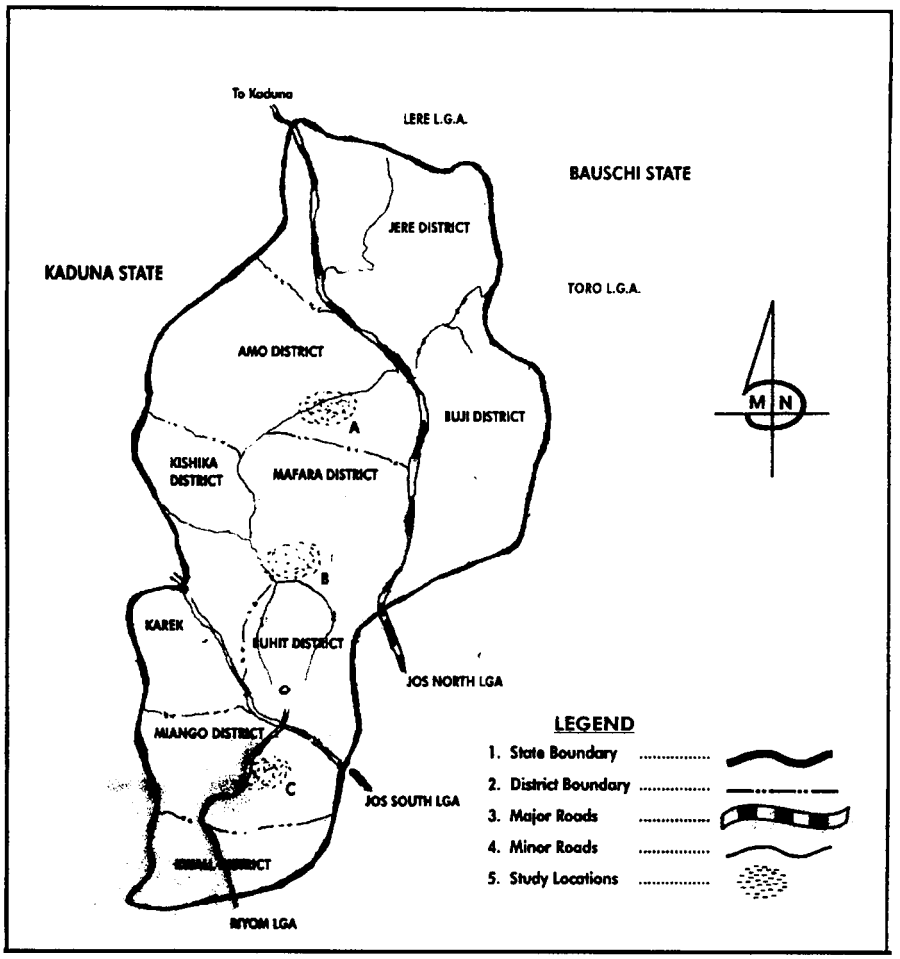

Fig. 2. Map of Bassa LGA, Plateau State, Nigeria (**Source:** Department of Lands and Survey/Town Planning, Bassa LGA)

Collection of specimens

Universal screw-capped containers were used to collect urine samples from the Fadama farmers. The collection of urine samples was usually between 10.00 h and 14.00 h, i.e., a period of maximum egg output. The containers were labeled with an identification number for each individual sample. The urine samples were taken to the laboratory for parasitological analysis. All urine samples found to habour *Schistosoma. haematobium* parasites were noted.

Parasitological analysis

The colour of the urine samples (clear, cloudy and whether blood was present) were first recorded, and analysis was carried out by using the filtration technique as described by Cheesbrough [1997] and the WHO [1993] recommended procedure for the filtration method in the analysis of urinary schistosomiasis. A Nytrel woven filter membrane was placed inside a filter holder with the help of forceps and the filter assembled. Each urine sample was then mixed thoroughly by either drawing it in and out of a 10 ml syringe several times, or by shaking the urine container thoroughly until a homogenous mixture of the sample is obtained. The urine sample was then drawn into a 10 ml syringe connected to the wide end of the assembled filter holder. The urine sample was then forced slowly through the filter.

On completion of sample filtration, the filter was removed with a blunted-ended and untoothed forceps and transferred to a clean glass slide with the egg-on-surface side up. With the aid of a Pasteur pipette a drop of 50% Lugol's iodine solution was applied unto the filter membrane and the whole preparation examined using a ×10 objective with the condenser iris closed sufficiently to give a good contrast. The entire filter was examined systematically for *S. haematobium* eggs which were counted, and the number per 10 ml of urine sample recorded.

Results

The study recorded a 68.80% prevalence of *S. haematobium* infection amongst the Fadama farmers in Bassa LGA. The male prevalence rate of 70.40% was not statistically different from the 67.97% prevalence rate of the females population ($X^2 = 0.70$, $p>0.05$) (Table 1). However, there was a statistically significant difference ($p<0.05$) in the rate of infection with visible haematuria amongst the sexes (Table 1).

Table 1. Urinary schistosomiasis infection rates amongst Fadama farmers in Bassa LGA of Plateau State, Nigeria

Chiefdom	Male			Female			Total		Mean % intensity/ Visible Haematuria	
	No. examined	No. infected	% infection	No. examined	No. infected	% infection	No. infected	% infection	Male	Female
Rukuba (Binchi)	12	9	75.00	46	37	80.40	46	28.57	1	3
Irigwe (Miango)	38	23	60.53	51	35	68.63	58	36.02	22	19
Pengana (Padaman-Shanu	31	25	80.40	56	32	57.14	57	35.41	9	1
Total	81	57	70.40	153	104	67.97	161	100.00	32	23

The prevalence of urinary schistosomiasis infection differed with age (Fig. 3), and tended to vary from 20 ova/10 ml of urine to 50 ova/10 ml of urine. There was a statistical difference in the rate of infection in the different age groups within the three study areas ($p<0.05$). The highest rate of infection of 84.50% was recorded between ages 21 - 30 and this was closely followed by ages 1 - 10 with an infection rate of 80.00%. However, there was a drastic decline in the rate of infection (22.22%) between ages 50 and above.

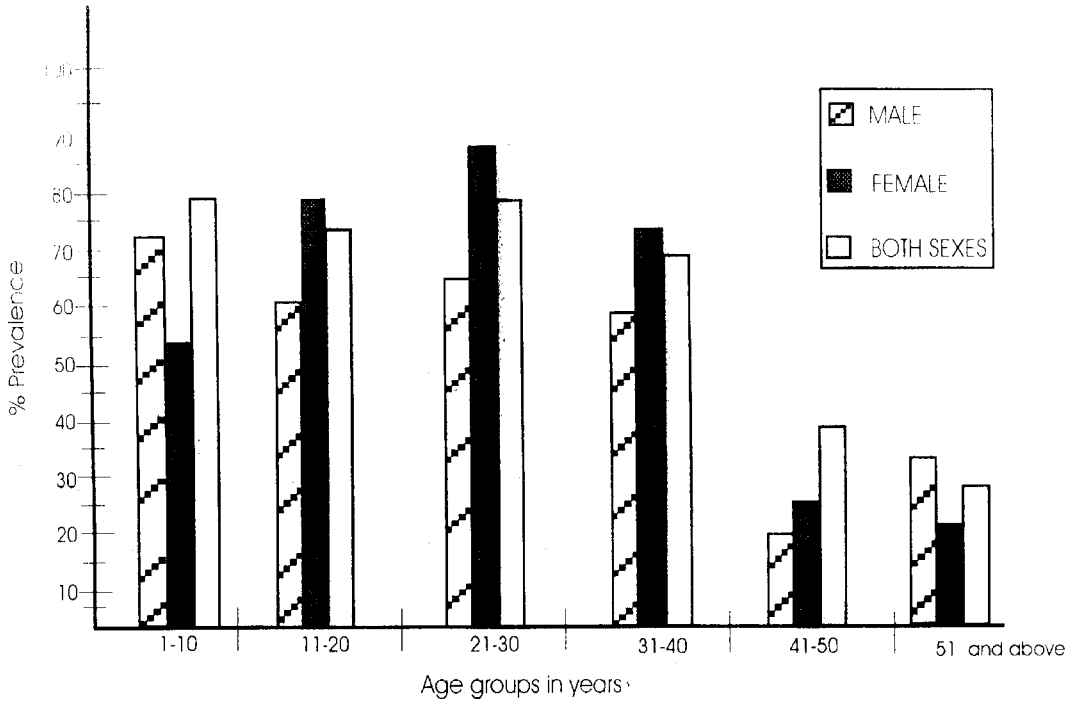

Fig. 3. Age and sex distribution of urinary schistosomiasis among the Fadama farmers in Bassa LGA

Discussion

Urinary schistosomiasis infection caused by *Schistosoma haematobium* is a very common disease in Nigeria and especially associated with Fadama farming/irrigation projects in the arid parts of the country. Human transmission is rather focal which is dependent on snail distribution and frequency of human water-contact within the area, and the proximity of such water bodies to residential houses as earlier reported by Farid *et al.* [1968]. In their study among Egyptian females, associated water-contact through various occupations and other developmental projects such as scale damming, irrigation, rice cultivation and hydroelectricity, influenced the transmission dynamics of visceral schistosomiasis.

There was similarity in the intensity of infection among the farmers in the various village areas or Chiefdoms studied. This is in agreement with the results of Wilkins *et al.* [1984] on the intensity of infection among farmers in Gambia. It is worth noting that occupational groups have various levels of public health education, sanitary habits, age-related risk behaviours and water-contact patterns which affects the rate of infection among the various occupational groups.

Cases of visible haematuria were observed to be higher in the male population than in their female counterparts in all the three communities in this study. This may be due to the fact most males in these communities spend more time on the farm tending to the crops.

The acquisition of *S. haematobium* infection in relation to age in the three communities studied was similar in both males and females. The results also showed that the highest prevalence rate of infection was between ages 21 - 30 years and this was closely followed by ages 1 - 1- years (Fig. 3). A similar undistinguished rate of infection between sexes has been reported in Ago-Iwoye in Nigeria for *S. haematobium* where 65% of the subjects were infected [Agbolade *et al.*, 1996]. Similarly, Nagi *et al.* [1999] also observed the same rate of infection in males and females and also observed that the highest infection rate was between ages 10 - 20 years in Yemen. In this study, there is a gradual increase in the rate of infection from the age group 1 - 10 years, peaking amongst the 21 - 30 years age group and gradually declining from the 41 - 50 years age group (Fig. 3). The decline in infection could be due to the less involvement of people of this age group in farming activities, while people in the age bracket of 21 - 30 years were the most active and economically viable farmers and hence, the most infected. In addition to the farming activities which has to do with a lot of water contact, this active group also spent a lot of time bathing and swimming in water that are potential transmission sites. It was also common sight to find children of ages 2, 6 and 10 years playing in the irrigation canals and stagnant pools during the hot months. It has been reported that could be

responsible for the observed differences in age and sex rates of infection include changes in the pattern and use of water and the development of protective immunity [Dalton and Pole, 1978; Jordan and Webbe, 1982].

The prevalence and rate of infection in the 3 most active groups of females, i.e., 11 - 20, 21 - 30 and 31 - 40 years, is quite high compared to the other age groups (Fig. 3). This may not be unconnected with the high frequency of water contact through domestic activities like, washing of utensils, laundry and fetching of water, apart from their active involvement in farming. Some of the water bodies also serve as drinking water further increasing the chances of infection through the mucosal membrane of the oral cavity. These result in debilitating and morbidity effects on the health of the women with consequent effect on their productive capacity and economic well-being. This is in consonance with the observation that females who are ill due to schistosomiasis infection especially haematuria, are unable to carry out their domestic roles in the homes [Nwaorgu, 1992]. Iron deficiency and anaemia will lead to loss of appetite, paleness, tiredness and weakness. Such females will be unable to go to farms and this leads to loss in the family income and productivity. This is also true of the wider society where the children are infected as the parents.

The implication of *Schistosoma* infection in 80% of the society is enormous as the children and their mothers who are the productive strength of the family and the entire society on the farms could result in morbidity and debilitating effects on the economy and production efficiency of the Fadama farmers. This agrees with the findings of Nwaorgu [1992] in which females who are ill due to schistosomiasis infection are unable to carry out their domestic roles in the homes and farms, leading to loss in family income and productivity.

The general outcome of this study indicates that in all the districts and locations studied, there is a moderate to high prevalence and transmission pattern. Extrapolating this result on the entire population means a high rate of endemicity for *S. haematobium* infection within the localities.

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