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Prevalence of urinary schistosomiasis in relation to the sources of domestic water supply in Northern and Central Borno, Borno State, Nigeria

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ABSTRACT: The prevalence of urinary schistosomiasis in relation to the sources of domestic water supply in Northern and central Borno was studied. A total of 1179 school children aged between 6 years to above 14 years were examined for schistosomiasis and their sources of water at home were ascertained. The pooled data showed that those that use irrigation canal/dam had the highest infection (49.52%) followed by users of pond/pool/river/stream (42.19%). Communities with pipe borne/borehole water supply had the least infection (22.54%) implying that their type of water supply had a low risk factor in schistosomiasis epidemiology. Gwange community had as high as 62.50% prevalence among those using irrigation/dam as against 22.36% for those using pipe borne/borehole water. Similarly, Ngala community had recorded 41.67% prevalence for irrigation canal/dam as against 6.67% for pipe borne/borehole water.

Key Words: Schistosomiasis; Prevalence study; Epidemiology; Gwange community; Borno State; Nigeria.

Introduction

Researchers (Wilcocks and Manson-Bahr, 1972, Betterton-Jones, 1988, Ezeugwu and Mafe, 1998) on the connection between water availability, contact and use on one hand and the transmission and persistence of schistosomiasis on the other noted that the successful transmission of schistosomiasis depended on a number of factors of which the most important are the presence of natural freshwater bodies of water that must be satisfying human needs, pollution of the aquatic habitat with infected human excreta, human contact with the infected natural bodies of aquatic habitat and the presence of the correct intermediate snail hosts. These scenarios therefore implies that schistosomiasis is a water related disease and must be highly related to the domestic water situation of any community.

In Nigeria, undoubtedly, dams and reservoirs have helped to improve our water supplies and account for a significant proportion of the electric power generation in our national grid, while irrigation has resulted in the production of some highly-favoured selected crops, but at what cost? There is firm evidence that the bring with them undesirable and far-reaching environmental social and health problems which are publicized only when they produce crisis (Smyth, 1976; Odu, 1985; Iwugo, 1992). The increases in

awareness of government to solve the problem of water scarcity lead to the construction of dams for irrigations and water treatment plants for drinking water.

Borno state was a beneficiary to this new trend and this actually necessitated a fresh study to update the prevalence of schistosomiasis in the zone in relation to sources of potable water and also to contribute to the call for increase in documented evidence of epidemiological data for schistosomiasis in North-eastern part of the country for which presently, there is shortfall (WHO, 1987; Oyediran, 1984). The present study was carried out in Borno State from 1993-1995.

Materials and Methods

Study Area

The climatic situation in the research zone places in the arid and semi-arid ecological zone with annual rainfall between less than 500mm and 1140mm and prolonged dry season of between 5-8 months. The research zone is characterized by few or no trees, only shrubs, grassy to sparsely grassy vegetation. Desert and desertification characteristics abound in Borno State with about 64,123 km or 55% of the state afflicted with desertification (Esajere, 1985).

Survey of School Children

A total of 1179 pupils (653 males and 526 females) were examined for urinary schistosomiasis using the method of Anya and Okafor (1987). Demographic and socio-economic information relating to the pupils and their parents especially their sources and types of drinking and domestic water supply, were obtained using a prepared questionnaire and by direct communications. A direct observation method was also employed to buttress the information on the water-contact behaviour of the school children after school hours.

Data Analysis

The result was analysed by the use of statistical parameters to obtain prevalence in relation to the sources of domestic water supply.

Results

Table 1 shows the prevalence of *Schistosoma haematobium* infection in relation to sources of domestic water supply in central and northern Borno. In Gwange community, infection rate of inhabitants using irrigation canal and dam water for their domestic activities was the highest (62.50%). The Table also shows that in Arnawa, Gamboru and Ngala communities, inhabitants that use irrigation canal/dam water had the highest percentage infections of 57.90%, 53.33% and 41.67% respectively.

The direct observation also revealed that the pupils play in the irrigation canals, rivers, streams, pools and dam water after school hours as they go to fetch water, wash clothes, catch fish or irrigate their crops. The contaminate the water more by urinating and defecating freely into the water.

Discussion

The result of this study revealed that there is very high association between the type and sources of domestic water supply and the prevalence of schistosomiasis. The pooled data revealed that the sources of domestic water supply could be arranged in descending order of risk factor of schistosomiasis as follows: irrigation/dam (42.52%); pond/river/stream (42.19%); draw well (31.86%); pipe borne/borehole (22.54%).

Table 1: Prevalence of *S. haematobium* infection in relation to sources of domestic water supply.

Sources of domestic water supply	SCHOOLS																	
	GWANGE		IV		GALTIMARI		ARMAWA		NGALA		GAMBORU		CENTRAL		POOLED		TOTAL	
	No. Ex.	No. Inf.	%	No. Ex.	No. Inf.	%	No. Ex.	No. Inf.	%	No. Ex.	No. Inf.	%	No. Ex.	No. Inf.	%	No. Ex.	No. Inf.	%
Pipe borne/Borehole	246	55	22.36	138	27	19.56	0	0	0.00	150	10	6.67	105	51	48.57	639	144	22.54
Pond/Pool/River/Stream	18	10	55.56	7	4	57.14	11	3	27.27	32	8	25.00	60	29	48.33	128	54	42.19
Draw Well	12	7	58.33	10	5	50.00	43	16	37.21	49	9	18.37	90	28	31.11	204	65	31.86
Irrigation Canal/Dam	24	15	62.50	5	2	40.00	38	22	57.90	96	40	41.67	45	24	53.33	208	103	49.52
Grand Totals	300	87	29.00	160	38	23.75	92	41	44.57	327	67	20.49	300	132	44.00	1179	365	30.96

This could probably explain why Ngala and Galtimari communities that predominantly use pipe borne/borehole water recorded the lowest grand total prevalence of 20.49% and 23.75% respectively. Similarly, Armawa community (without pipe borne water) that predominantly uses the Alau Dam and draw well has the highest schistosomiasis prevalence (44.57%) followed by Gamboru community that predominantly uses draw well and infected river Eberji (44.00%). This result is in agreement with the report of earlier studies (Esajere, 1985; Anya and Okafor, 1987; Ukoli, 1986) that infected water that serves as source of domestic water supply leads to high prevalence of disease especially schistosomiasis, in the community that uses it.

The high prevalence of schistosomiasis in this research zone could probably be tied to potable water scarcity and aridity factor. Armawa and Gamboru communities are always in difficulty as regards potable water especially during the dry season when they will have no alternative than to turn to 'anything called water'. This corroborates the earlier report (Campbell-Page, 1992) on the epidemiology that water is the driving force of nature and this made human health and welfare and the survival of the planets ecosystems depend on water.

The study actually confirmed the close association between large-scale irrigation and the increase in the incidence of schistosomiasis as earlier reported (Betterton-Jones, 1988; Hunter et al., 1982; Chikwem and Alaku, 1987).

Conclusion

There is a high association between extensive irrigation activity and increase in the prevalence of schistosomiasis. This puts irrigation canal as an example of a project that can best be described as that of an "approach-avoidance" conflict by any public health parasitologist with interest in epidemiology.

From the result of this study, it is recommended that state ministries of agriculture and agric-extension officers be made to embark on enlightenment campaign to educate the inhabitants of communities on the link between water-contact behaviour and infection of schistosomiasis.

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