Perceptions and assessment of risk factors in Schistosoma haematobium infection in Buruku and Katsina-Ala Local Government Areas of Benue State-Nigeria

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Abstract

Schistosomiasis 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. This study investigated urinary schistosomiasis infection in relation to knowledge, attitudes and practices of people in Buruku and Katsina-Ala Local Government Areas of Benue State, Nigeria. Using standard parasitological method (Filtration technique) to examine the urine, 335 (44.66%) were infected with Schistosoma haematobium eggs out of the 750 urine samples examined from school children and communities. Questionnaires were administered to each participant to collect information on socio-demographic data, knowledge on the causes of urinary schistosomiasis and risk factors in Schistosoma haematobium infection. Children of farmers recorded the peak of infection with 159 (24.37%). 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. Activities like swimming, bathing/playing in water, washing and collection of edible snails from stream, ponds or river significantly correlated with the prevalence of Schistosoma haematobium infection ($P < 0.01$) and could be identified as risk factors in the area. There is an urgent need for the launching of a schistosomiasis control programme and development of human resources and materials for health education to decrease the frequency of water contact activities.

INTRODUCTION

Schistosomiasis, also known as bilharziasis is the second most common parasitic disease in the world after malaria. Schistosoma haematobium the causative agent of urinary schistosomiasis develops alternately in humans and fresh water snails. It is estimated that in sub-Saharan Africa, some 436 million are at risk of infection from Schistosoma haematobium, of which 112 million are infected (Van der werf et al., 2003).

In Benue State, Nigeria and particularly in the Tiv land, the perceptions that communities have of the potentially deadly disease of urinary schistosomiasis could make challenging the implementation of a control programme. Rice farming during wet season, exploitation of river banks for garden purposes during dry season, dependence of the inhabitants on streams and ponds for drinking water, cooking, washing and recreation are such factors that could contribute to the endemicity of the disease in the area. However, this study was conducted with a view to providing relevant information on the intensity of Schistosoma haematobium infection in relation to socio-economic status, perceptions of the inhabitants and the risk factors that could expose them to infection.

MATERIALS AND METHODS

STUDY AREA

The study area was made of two Local Government Areas (Buruku and Katsina-Ala) of Benue State, Nigeria. The relative position of these two Local Government Areas in Benue State is about the middle eastern of the state. The area has a monthly temperature between 27, 38ºC and 28, 00ºC and may go up to a maximum temperature of 30, 08ºC and 34, 24ºC. The area receives 900-1000 mm of rain annually. The dry season starts in late October and usually ends by March. The rainy season which lasts from April to early October is the period of intensive agricultural activities when

the indigenous people of the areas mainly Tivs and Etulo are engaged in farming of crops like yams, guinea corn, maize, rice, sesame and cassava which are the principal food crop and cash crop.

SAMPLES COLLECTION AND EXAMINATION

Prior to the commencement of the research, permission was sought from the Chairmen and local education authorities of both Local Government Areas. A total of 750 urine samples were collected from 372 males and 378 females aged 3-70 years. Participants were from communities (250), primary schools (250) and secondary schools (250). The study was conducted between November 2008 and March 2009. Eggs of Schistosoma haematobium were recovered using filtration technique (Cheesbrough, 2000) and examination was done using the x10 and x40 objectives under a microscope.

QUESTIONNAIRE DESIGN AND DATA ANALYSIS

A survey form consisting of twelve (12) questions relevant to urinary schistosomiasis on socio- demographic data, water contact activities and K.A.P (knowledge, attitudes and practices) was administered to each participant. Pre-schools children that participated in the study were excluded for interview and their mothers were asked to provide relevant information on their water contact activities. Using the form, some of the primary school children were interviewed individually and some of the questions were communicated to them in the local language for ease of understanding with the assistance of a local health worker. SPSS version 15.0 for windows and Microsoft Excel 2007 were used for data analysis.

RESULTS

Table 1 shows the prevalence of Schistosoma haematobium infection in the study area. An overall prevalence was 335(44.66%) out of the 750 subjects examined. Children attending secondary schools recorded the peak prevalence with 129 (17.20%) followed by primary school children 110 (14.66%). The communities recorded an infection of 96 (12.80%). Males recorded higher prevalence rate 186 (24.80%) than females 149 (19.56%). No significant differences were observed between Schistosoma haematobium infection in school children and communities, and between males and females (X^2=22.04, P > 0.05).

Figure 1

Table 1: Occurrence of infection among the inhabitants of Buruku and Katsina-Ala Local Government Areas

	Male		Female		Total	
	Neg	Pos (%)	Neg	Pos (%)	Exam	pos (%)
Primary schools	58	64 (8.53)	82	46 (6.13)	250	110 (14.66)
Secondary schools	54	80 (10.66)	67	49 (6.53)	250	129 (17.20)
Communities	78	42 (5.60)	76	54 (7.20)	250	96 (12.80)
Total	190	186 (24.80)	225	149 (19.56)	750	335 (44.66)

(X^2=22.04, P>0.05)

Table 2 elucidates the prevalence and intensity of Schistosoma haematobium infection in relation to paternal occupations. Children of farmers recorded the highest infection rate of 36.80% while children of nurses recorded the least infection with 0.40%. No significant difference was observed between infection and parental occupations(X^2=44.38, P>0.05).

Figure 2

Table 2: Prevalence and intensity of infection in relation to pater- nal occupation of school children

	Intensity of infection (%)				Total	
Occupation	Neg	Light	Mild	Heavy	Exam	Pos (%)
Farming	192(30.18)	87(13.67)	47(7.38)	25(3.93)	351	159(24.37)
Civil service	46(7.23)	9(1.41)	5(0.78)	2(0.31)	62	16(2.51)
Teaching	46(7.23)	8(1.06)	5(0.78)	3(0.47)	62	16(2.51)
Nursing	5(0.78)	1(0.15)	3(0.47)	0(0.00)	9	4(0.62)
Police/Military	11(1.72)	8(1.25)	4(0.62)	0(0.00)	23	12(1.88)
Trader	11(1.72)	5(0.76)	0(0.00)	4(0.62)	19	8(1.41)
Fisherman	1(0.15)	3(0.47)	1(0.15)	8(1.25)	13	12(1.88)
Others	4(0.67)	27(4.23)	9(1.40)	2(0.30)	97	38(5.96)

(X^2=44.38,P>0.05)

Table 3 summarizes the subjects' explanations for the causes of urinary schistosomiasis in relation to infection. Subjects' knowledge about the role that fresh water snails play in transmission was low. Only 38(5.77%) understood the role of fresh water snails as vectors and among these 17(2.58%) were found infected. Subjects were more likely to link the disease to other causes such as drinking dirty water 195(29.63%) among whose 115(17.47%) were infected, playing in water 67(8.93%) among whose 67 (10.18) were infected, eating unripe fruits 72(10.98%) among whose 30 (4.00%) were infected. 166(25.22%) were screened not having any idea about the cause of the disease and 70

(9.33%) were found having Schistosoma haematobium eggs. No significant differences were observed in the subjects' explanations for the cause of urinary schistosomiasis and infection (X^2 = 35.78, P>0.05).

Figure 3

Table 3: Intensity of infection in relation to subjects' explanations for the cause of urinary schis- tosomiasis

	Intensity of infection (%)			Total	
Causes	Light	Mild	Heavy	Examined	Positive (%)
None	35(5.31)	22(3.34)	13(1.97)	166(25.22)	70(9.33)
Drinking dirty water	73(11.09)	29(4.40)	9(1.36)	195(29.63)	115(17.47)
Playing in water	44(6.68)	13(1.97)	10(1.51)	118(17.93)	67(10.18)
Sexual intercourse	5(0.75)	2(0.30)	0(0.00)	11(1.67)	7(1.06)
Mosquitoes bites	15(2.27)	4(0.60)	4(0.53)	47(7.14)	23(7.14)
Flies	5(0.75)	0(0.00)	1(0.15)	11(1.67)	6(0.91)
Fresh water snails	10(1.51)	7(1.06)	5(0.75)	38(5.78)	17(2.58)
Unripe fruits	18(2.73)	7(1.06)	5(0.75)	72 (10.98)	30(4.00)

X^2 = 35.79, P>0.05)

The effects of water contact activities on the prevalence of urinary schistosomiasis are given in Table 4. Responses from the questionnaires indicated that those involved in playing/bathing recorded an overall infection rate of 243(40.40%), followed by those involved in washing 301(40.13%) and swimming 226(30.13%). Those involved in rice farm activities recorded an infection rate of 213 (28.40%). An infection rate of 106 (14.13%) was observed among those that used to collect edible snails from ponds, streams or river. Significant associations were found between water contact activities and prevalence of infection(r = 0.103, for swimming; r = 0.128, for washing; r = 0.185, for playing/bathing; r = 0.149, for collection of snails. P < 0.01)

Figure 4

Table 4: Effects of water contact activities on the prevalence of urinary schistosomiasis

		Intensity of infection (%)			Total	
Water contact	Neg	Light	Mild	Heavy	Exam	Pos (%)
Swimming						
No	177(23.60)	67(8.93)	32(4.26)	10(1.33)	286	109(14.53)
Yes	238(31.73)	138(18.40)	52(6.93)	36(4.80)	464	226(30.13)
Play/Bath						
None	114(78.10)	22(2.93)	6(0.80)	4(0.53)	146	32(4.26)
Stream	165(50.00)	110(14.66)	35(4.66)	20(2.66)	330	105(22.00)
River	114(51.10)	59(7.86)	32(4.26)	18(2.40)	223	109(14.53)
Ponds	22(43.10)	14(1.86)	11(1.46)	4(0.53)	51	29(3.86)
Washing						
None	99(74.40)	23(3.06)	9(1.20)	2(0.26)	133	34(4.53)
Stream	133(47.80)	95(12.66)	36(4.80)	14(1.86)	278	145(19.33)
River	154(55.00)	72(9.60)	29(3.86)	25(3.33)	280	126(16.80)
Ponds	29(48.50)	15(2.00)	10(1.33)	5(0.66)	58	30(4.00)
Rice farm						
None	175(58.90)	66(8.80)	38(5.06)	18(2.40)	297	122(16.26)
Yes	240(53.10)	138(18.53)	46(6.13)	28(6.20)	452	213(28.40)
Pee						
None	315(57.00)	147(19.60)	60(8.00)	31(4.13)	553	238(31.73)
Stream	38(50.70)	22(2.93)	8(1.06)	7(0.93)	75	37(4.93)
River	30(48.80)	20(2.66)	9(1.20)	3(0.40)	62	32(4.26)
Ponds	32(53.30)	16(2.13)	7(0.93)	5(0.66)	60	28(3.73)
Collection of snails	27(3.71)	69(9.20)	30(4.00)	7(0.93)	133	106(14.10)

DISCUSSION

The present study reveals a relatively high prevalence of Schistosoma haematobium infection in the area. This is, however, closely related to the findings of (Ngele and Oyeukwu, 2008; Oniya and Olofintoye, 2008) who carried out similar surveys in Ebonyi and Ondo States respectively. School children appear to be more predisposed to Schistosoma haematobium infection than communities. This indicates a common pattern of behavior and susceptibility for these children. These children often more of their leisure time playing, swimming or fishing in the river, streams or ponds. They are also more often in contact with infested water bodies through the collection of edible snails. The high prevalence observed among males of school children corroborates the findings of Anosike et al. (2006).

Parental occupation has influence on the prevalence of infection. Children of farmers had the highest peak of infection, this could be attributable to the constant contact with contaminated water bodies during their recreational activities or when they are taking along with their parents in

rice farm. This observation agrees with the results obtained by Okanla (1991) in Ilorin, Nigeria. The relationship between Schistosomiasis has long been known (Edungbola, 1980; Fernwick and Jorgensen, 1972).

Sex prevalence of individuals in the communities fluctuated. Out of the total percentage (12.80%) of people infected, 7.20% of the females were infected with Schistosoma haematobium eggs. This goes along with the findings of Etim (1995) who indicated in his studies on water contact activities and schistosomiasis among women in a rural community that more women than men get severe schistosomiasis infection due to educational and economic backwardness. They are more exposed to more intense infection than their male counterparts. This shows the degree of health burden faced by the inhabitants especially the women and children who have infections in the area.

In this present study, inhabitants perceived that risky behavior such as swimming, bathing/playing, fishing cause urinary schistosomiasis to become manifest, rather than such behaviour increasing the likelihood of infection by an external germ (the scientific understanding); most of the inhabitants usually associate the disease with the drinking of dirty water rather than with playing in water. This perceptions, however agrees with the reports of WARDA (1999) in Ivory Coast. In addition, schistosomiasis is simply not perceived by the inhabitants as a life threatening or debilitating disease. This might be due to the fact that many infected people do not suffer to any great extent. The fact that if the disease is untreated in adolescence could lead to kidney failure at the age of 45-55 years is simply not known or acknowledged. However, the fact that being in contact with infested water through rice farming was completely ignored by the inhabitants as a potential source of transmission.

CONCLUSION AND RECOMMENDATIONS

The present study showed that community perceptions can have a marked effect on the success of scientific interventions. Thus, due to the devastating effects of urinary schistosomiasis on physical and mental conditions of infected people, relief from the burden of Schistosoma haematobium infection could be facilitated by a better knowledge of the epidemiology of the parasite and its pathogenicity. It is therefore recommended that

The development of human resources and materials for health education must be ensured to decrease in the frequency of contact with water sources and encourage adherence to preventive measures.

Primary health care staff in the Local Government Areas should be trained in communication skills using local dialect in order to conduct health education programmes at community level.

Support from non-governmental organization should be sought for schistosomiasis control activities, including chemotherapy, training, health education, sanitation and supply of clean water.

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