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Socioeconomic Factors Associated With High Prevalence Of Schistosomiasis Among Rural Dwellers In Benue State, Nigeria

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Abstract: ***High prevalence of schistosomiasis had been reported in many rural communities of Benue State. The aim of this paper was to collate information and determine the major socioeconomic factors responsible for the high prevalence of schistosomiasis in rural areas of Benue State, Nigeria. Field survey was carried out in three zones of Benue State across 11 locations. Sample size was determined using Raosoft (2004) calculator. A total of 360 structured questionnaires were specifically distributed to farmers and general hospital patients in all the zones (120 in each zone). In three zones, farmers were administered 180 questionnaires while general hospital patients were also administered 180 questionnaires. Interview was conducted native languages but translated in English depending on the type of respondents. Information was obtained on possible socioeconomic factors responsible for high prevalence of schistosomiasis in the study area. Respondents' spouses were predominantly occupied with farming activities (67.5%). Those engaged in fishing were about 10.6% while 6.9% were jobless. Family sizes were high (38.1%) consisting of 6-10 members per family on the average while level of education was low. Those that gave three major reasons for making contacts with water bodies were the highest (48.9%) followed by four reasons and above (27%) whereas only 4.4% of the respondents had adequate knowledge of schistosomiasis. A total of 789 responses were obtained as reasons for making frequent contacts with water bodies. Top on the list were: washing of clothes (25.56%) and fetching for domestic use (24.31%). Information reveals that many rural dwellers are latent carriers. Highlighted socioeconomic factors are: large family size, poverty, habit, low level of education, lack of awareness, dependence on river, and poor hygiene. People are willing to be treated or vaccinated in orthodox way but low financial strength and poverty are major hindrances. The information provided is relevant in the epidemiology, management and control of schistosomiasis in Benue State, Nigeria***

Keyword: Benue State, Control, Epidemiology, Schistosomiasis, Socioeconomics

I. INTRODUCTION

A major public health challenge in Africa today is the high prevalence of endemic infections in many communities among which are schistosomiasis and salmonellosis (WHO, 2017). The human schistosomiasis is categorized by the WHO as a neglected tropical disease caused by specialized parasitic intestinal worms, *Schistosoma* species (*S. haematobium*, *S. mansoni*, *S. japonicum*). Schistosomiasis or bilharzia is caused by the larvae of one or more of five types of blood flukes called schistosomes. It counts as the second most devastating tropical parasitic disease worldwide after malaria with more

than 200 millions of cases mainly in rural agricultural and peri-urban areas of developing countries (Chistulo *et al*.,2004; WHO, 2016). About 80-85% of the disease is now found in sub-Saharan Africa, and the number of people infected is alarming. Unfortunately, the impact of schistosomiasis has long been under-estimated compared to that of malaria and tuberculosis (Adeyeba and Ojeaga, 2002). Cases of complications manifesting from acute and chronic schistosomiasis have been reported in many parts of Africa (Gryseels, 1991; Colley *et al.*, 2001; Ross *et al*., 2010; Leshem *et al*., 2008; Adenowo *et al*., 2015). With the high prevalent rates also reported in many places (Gberikon *et al*., 2015; Magaisa *et al*., 2015; Adenowo *et al*.,2015), it has become necessary to create awareness on issues bordering on the infection as the first step in disease control programme.

Schistosomiasis is restricted to areas with poor sanitation and warm temperature in the tropical and sub-tropical regions (Lar *et al*., 2006). It is water borne and enteric. It largely affect rural dwellers especially children and farmers having frequent contact with water bodies (Imarenezor *et al*., 2013). Prolonged infections can cause devastating physiological effect. The WHO has expressed the need for detailed epidemiological data on the prevalence of single and mixed infections of these organisms in all parts of Africa for adequate control measures. The role of socioeconomic data on disease control cannot be over-emphasized. According to WHO (2017), targeted areas of schistosomiasis control programme are areas with water bodies with active life cycle of *Schistosoma* species. A study carried out by Yandev (2019) reported a high prevalence of urinary schistosomiasis of 36.9% among farmers and school children living in the rural areas of Benue State Nigeria. This was far above the WHO regulatory limit of <5%. The aim of this paper was to collate information and determine the major socioeconomic factors responsible for the high prevalence of schistosomiasis in rural areas of Benue State, Nigeria and to suggest possible preventive and control measures.

II. METHODOLOGY

STUDY AREA

Benue State lies within the lower river Benue trough in the middle belt region of Nigeria. The geographical coordinates are: Longitude 7° 47' and 10° 0' E; Latitude 6° 25' and 8° 8' N. The State is one of the North Central States in Nigeria with an estimated population size of 4, 253, 641 based on the 2006 population census (FGN, 2010). It is inhabited predominantly by the Tiv, Idoma and Igede ethnic groups. There are 23 Local Government Areas with Makurdi as the State Capital. The climate has two seasons (Wet and Dry seasons). Annual temperature ranges between 21^{o}C in January and 35^{o}C in March with an annual rainfall of 1500-1800mm. Relative humidity ranges between 69mm in August and September (Nyagba, 1995). The favourable climate and rivers promote agricultural activities including fishing, rice farming, vegetable production by the river banks, sugarcane farming and the large scale production of other food items (potato, cassava, soya bean, yam, groundnut, guinea corn and cowpea). The State boasts of the of one of the longest stretches of river system in the country and in Africa with great potential for a viable fishing industry and dry season farming through irrigation.

STUDY DESIGN AND LOCATIONS

Study design consisted of field survey to specific locations and use of structured questionnaires.

Field survey was carried out in three Senatorial zones of Benue State (Zone A, B and C) across 11 locations: Iange, Sati, Korgyen, Ikov Sati and Adikpo, Buruku, Imande Akpu, Makurdi, Ikache, Otobi and Otukpo. Information was obtained on the existing socioecomic factors and infrastructures.

STRUCTURED QUESTIONNAIRE

Permission was sought from village heads and hospital management prior to the study. Ethical clearance was also obtained from the Benue State Government. Sample size was determined using Raosoft (2004) calculator. A total of 360 structured questionnaires were specifically distributed to farmers and general hospital patients in all the zones (120 in each zone). In three zones, farmers were administered 180 questionnaires while general hospital patients were also administered 180 questionnaires. Interview was conducted in English, Tiv and Idoma languages depending on the type of respondents. Information was obtained on: socio-demography of subject, family size, highest level of education, spouse occupation, description of residence, frequency of contact with water bodies, source of drinking water, schistosomiasis, access to quality health care and level of education attained. Information was obtained on the causes, transmission and signs/syptoms of schistosomiasis. Information was obtained on possible previous experience, disease complication, medication and vaccination.

DATA ANALYSIS

Data were transferred from the field log book into Microsoft Excel. Information was collated from the questionnaires and summarized in frequency and percentages. Presentation was done in tables and charts.

III. RESULTS AND DISCUSSION

Respondents' spouses were predominantly occupied with farming activities (67.5%) while 15% of the spouses were busy with other undisclosed occupation. Those engaged in fishing were about 10.6% while 6.9% were jobless (Table 1). About 26% of the respondents had a small family size of less than 5 members while majority (38.1%) had family size of between 6-10 members. Those with the largest family size above 10 members were 35.83% (Table 2). Based on education, 40% of the respondents had primary education as the highest level attained followed by secondary (36.4%) and tertiary (9.4%) while 14% did not receive any formal education (Figure 1).

Spouse occupation	Frequency	Percentage (%)
Farming	243	67.5
Fishing	38	10.55
Others	54	15
Not working	25	6.94
Total	360	

Table 1: Respondents' spouse occupation

Family size	Frequency	Percentage (%)
<5	94	26.11
6-10	137	38.06
>10	129	35.83
Total	360	

Table 2: Family size of respondents

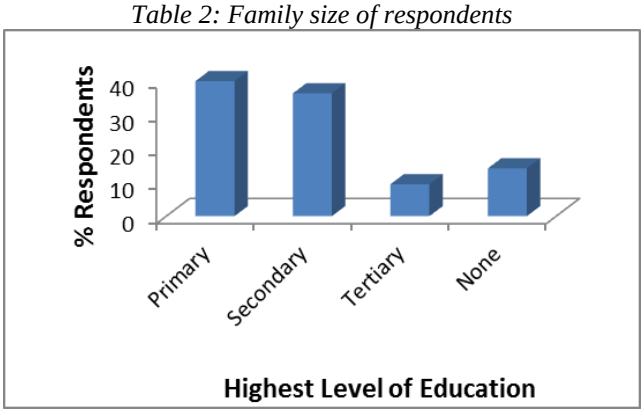

Figure 1: Information on level of education of respondents

Most of the respondents (77%) lived in houses built with mold clay with thatched roof. Those that lived in houses made of cement block and galvanized roof were 22.8% (Table 3). All the respondents had contacts with water bodies either frequently or occasionally. Percentage of those that had contact once in a week was 21%. Those with 2-4 times contact in a week were the largest (40%) while 26% had contact with water bodies every day (Figure 2). Those that gave three major reasons for making contacts with water bodies were the highest (48.9%) followed by four reasons and above (27%). A huge percentage of 96.5% of respondents gave more than one reasons (Table 4)

Description of residence	Frequency	Percentage (%)
Cement block with galvanized roof	82	22.8
Mold clay with thatched roof	278	77.2
Total	360	

Table 3: Description of residence among respondents

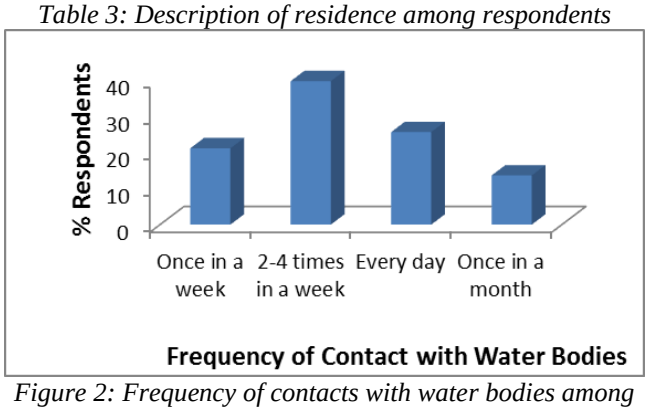

Figure 2: Frequency of contacts with water bodies among respondents

Number of Reasons for frequent contact with water bodies	Frequency	Percentage (%)
One	11	3.53
Two	64	20.58
Three	152	48.87
Four and above	84	27
Total	311	

Table 4: Number of reasons for contacting water bodies

A total of 789 responses were obtained as reasons for making frequent contacts with water bodies. According to their hierarchies, the reasons were: washing of clothes (25.56%), fetching of water for domestic use (24.31%), washing of farm produce (16.54%), means of transportation to neighbouring villages (12.28%), fishing business (9.4%), swimming (6.89%) and farming (5%) (Table 5). A total of 1047 responses were received on sources of drinking water as people used all available sources. Well water was the highest source (31.61%) and followed by river water 30.75%). Rain water had 28.75% of responses while borehole was 8.9% (Table 6). As given in Table 7, only 4.4% of the respondents had adequate knowledge of schistosomiasis while 9.7% had average level of knowledge. 38.3% had low level while 47.5% had no idea of what the infection is all about, that is there is no knowledge on the causes, transmission and signs/syptoms of schistosomiasis. Respondents claimed they do not have access to quality health facilities due to poverty. 30% rely on the secondary and tertiary health cares in the surrounding cities and State capital. Private health facilities are unaffordable. Respondents practiced either self medication or traditional medicine or orthodox medicine for all types of diseases. Due to low awareness of schistosomiasis coupled with self-medication (34%) and traditional medicine (50%), schistosomiasis is hardly diagnosed until when infection becomes complicated. When the infection is diagnosed, 85% rely on the drugs and treatments from hospitals/health care while 15% prefer to be treated in herbal method (Table 8). None of the respondents had received any vaccine on schistosomiasis. Among the hospital patients, 3 patients (1.7%) had developed disease complications due to schistosomiasis.

Reason for frequent contact with water bodies	Frequency	Percentage (%)
Washing of clothes	204	25.56
Washing of farm produce	132	16.54
Bathing/swimming	55	6.89
Nature of farming	40	5.01
Fetching for domestic use	194	24.31
Means of transportation	98	12.28
Fishing business	75	9.4
Total	798 responses	

Table 5: Reasons for contacting water bodies by respondents

Sources of drinking water	Frequency	Percentage (%)
River	322	30.75
Rain	301	28.75
Well	331	31.61

Borehole	93	8.88
Total	1047 responses	

Table 6: Sources of drinking water

Level of information on schistosomiasis	Frequency	Percentage (%)
Adequate	16	4.44
Average	35	9.72
Low	138	38.33
None	171	47.5
Total	360	

Table 7: Level of knowledge on schistosomiasis

Treatment of schistosomiasis	Frequency	Percentage (%)
Hospital/Drugs	306	85.0
Herbs	54	15
Total	360	

Table 8: Treatment option for schistosomiasis among respondents

The current work has highlighted possible socioeconomic factors responsible for high prevalence of schistosomiasis in tropical and sub-tropical areas most especially the sub Saharan African countries (Abebe *et al*., 2014). Some workers and health organisations have reported that schistosomiasis is mostly endemic in poor communities that lack access to safe drinking water, clean environment, good hygiene and adequate sanitation (Anto *et al*., 2013). These conditions are characteristic of the rural communities studied.

Moreover, the presence of river Benue diversifying into other large rivers in in the rural communities could be a major environmental determinant. This is because the risk of infection is reportedly highest amongst those living near lakes or rivers (Anto *et al*., 2013). It is most likely that the rivers in the rural communities are contaminated with fresh water snails (*Bulinus*) infected with schistosome cercaria. It is obvious that there is close affinity of people and water bodies in all the communities for their daily activities where they may become exposed to the infective stage of schistosome. Information from respondents in this work confirms that people frequently have contacts with rivers at least 2-3 times in a week. People rely on river water to wash their clothes and also fetch water home for domestic uses. Farm produce such as vegetables and fruits are washed in the river. It is also a major means of transporting the farm produce from the farm to various destinations and markets.

From the results obtained, farmers are the most vulnerable group of people likely to be exposed to schistosomiasis. This category of people includes men and women of different age groups including the children who assist their parents or guardians. Rice farmers grow their rice in marshes and areas with adequate water. Some sugarcane and vegetable growers take advantage of the river banks to cultivate their plants, hence becoming exposed to schistosone infected water snail. Interaction with the farmers has shown high level of ignorance among them concerning schistosomiasis. Most of them enter the contaminated water bodies bare footed as they avoid water damage to their shoes. Those with rubber boot often do not wear them because the rubber boots are heavy which slow down the farmers from working, thereby exposing them to cercaria. This finding is consistent with prevalence report of Yandev (2019).

Fishing activity and swimming are also major aspects that can guarantee maximum exposure to schistosome cercaria. A large percentage of respondents are poor illiterates with large number of family members engaged in farming including children and spouses. Thus, the nature of farming, poverty, family size, habits and ignorance are the likely factors responsible for the high prevalence reported among authors (Yandev, 2019; Gberikon *et al*., 2015). Result obtained are consistent with previous studies on schistosomiasis linking the highlighted socioeconomic factors and high prevalence rates of schistosomiasis (Nwabueze and Opara, 2007; Yirenya-Tawiah *et al*., 2013). Farmers cultivating in riverine areas and those planting by the river banks are more at risk (Yandev, 2019). It is possible that the affected children swim or bath in polluted water bodies as part of their recreation without any monitoring after school hours. Some are even allowed to do so by their guardians due to ignorance. According to Corachan (2002), inadequate hygiene, contact with infected water and playing in the mud make children vulnerable to schistosomiasis and other infections. In many prevalence studies, both urinary and intestinal schistosomiasis cases are higher in children than in adults depending on occupation (Otuneme *et al*., 2014; Kiran and Jitendra, 2016), a view that aligns with the present investigation to a large extent. In both urinary and intestinal types of schistosomiasis, farmers and students are implicated.

The occupational factor seems to be a complex factor because some people practice more than one type of occupation interchangeably. It is possible for any of the occupational group to practice farming to ensure food security. Some civil servants do rice farming or okada riding while some fishermen or women still sell in the market. From this report, all occupational types are affected among those infected with schistosomiasis in the general hospital possible due to occupational interactions. From previous studies where occupation is associated with the infection, such occupation types were known to bring people close to infested water (Anto *et al*., 2013; Gberikon *et al*., 2015).

IV. CONCLUSION

Level of information on schistosomiasis is relatively low among the rural dwellers while predisposing factors are high. They include: large family size, poverty, habit, low level of education, lack of awareness, over dependence on river for all activities, perception on orthodox medicine and poor hygiene. Information reveals that many rural dwellers are latent carriers while cases of life threatening complication arising from schistosomiasis exist in the general hospital. People are willing to be treated or vaccinated in orthodox way but low financial strength and poverty are major hindrances. The information provided is relevant in the epidemiology, management and control of schistosomiasis in Benue State, Nigeria.

V. RECOMMENDATION

There is need for urgent sensitization and health education of people living in many rural areas of Benue State on schistosomiasis. The river, marshes should be quarantined with molluscides that are specifically formulated to kill fresh water snails as secondary hosts to schistosomes. The infection is asymptomatic in latent carriers. Therefore, large scale screening should be conducted on people living in the State. Free schistosomicides, antibiotics and vacines should be admistered to people through the epidemiological centres or any other publicized arrangements. Trained personnel should be employed in this regard for house to house vaccination and or treatment of rural dwellers. Rice farmers, fishers, vegetable farmers and people living near river banks should be educated on how to prevent schistosome infection.

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