HOST-VECTOR-PARASITE RELATIONSHIP AMONG INHABITANTS OF THE ANAMBRA RIVER BASIN IRRIGATION PROJECT AREA

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ABSTRACT

A questionnaire survey was employed to identify the sources of contact with parasites and disease vectors among people living in the Anambra River Basin Irrigation Project Area. The survey indicated that more than half of the inhabitants of this area go to farm. While in the farm disease vectors such as mosquitoes, biting midges, snails and tsetse flies are usually encountered. In addition, the lack of proper sewage disposal common among the communities exacerbates the situation. Water from various sources such as rivers, ponds, streams, as well as rainwater are used for many purposes. Common disease symptoms such as diarrhoea, abdominal pain, blood in sputum, body nodules, blood in stool, coughing, itching, headache, fever, haematuria were commonly recorded. Positive relationships were observed between the presence of some vectors and the corresponding disease symptoms.

Keywords: Parasites, Vectors, Contact, Sources, Host, Relationship

INTRODUCTION

The overall effect of developmental projects on parasitic disease spread is related to the alteration in natural habitat, population movements, water flow, vegetation cover, micro environmental condition and change in value systems. The overall consequences of these situations are causes of concern in communities with low level of education, poor environmental quality, and limited access to preventive and curative healthcare (Davis, 1983; McGarvey *et al.,* 1992). For rural dwellers, exposure to vectors and diseases become part of the normal life experiences. Preventive measures are not well known and curative therapy largely involves self-medication and concomitant drug abuse.

Direct information from rural dwellers on signs and symptoms of presence of vectors and diseases offers a vital source of information required for disease monitoring and intervention programmes (Tanner and Savingny, 1987).

Diseases noted at the village health centres and the perception of health problems by the community members can be used to rank the major health problems and results from such studies always matched with data from parasitological surveys (Degremont *et al.*, 1987; Tanner and Savingny, 1987). Lengeler *et al*, (1991), also pointed out that using the opinions of key informants such as school children, teachers, and community leaders, information obtained can be compared with the result from health status surveys.

The Anambra River Basin rice irrigation project provides large expanse of open rice farms with canals of flowing water. Influx of people to the communities in the project area became high with the establishment of the river basin rice project. Rice farmers spend up to 12hrs daily in rice farms in each season.

With the irrigation system, water becomes available to communities that previously had no source of regular water supply. The open rice field and available water also brought the Fulani cattle rearers to dwell among the surrounding communities. The process of rice production provides job for every age group including young children.

This study was carried out to detect possible avenues of contact with parasites and disease vectors among the people inhabiting Anambra River Basin irrigated project site.

MATERIALS AND METHODS

Pre-test: The multiple purpose questionnaires were used according to the method of Tanner and Savingny (1987) and Lengeler *et al* (1991). The questionnaire was pre-tested at Opi-Agu and Eha-Ndiagu, all in Nsukka Local Government Area. These communities have similar environmental settings with the study area. Rivers and streams are the major sources of water supply.

The Study Areas: Towns covered by the study include Umumbo, Omor, Adani, Omasi, Umulokpa and Ifite Ogwari. They have been described previously (Onyishi and Okafor, 2004). A total of 300 persons made up of 150 males and 150 females took part in the study. The questionnaire was designed to assess their perception of the most prevalent disease vectors and disease symptoms in their communities (Table 1). Additional information required in the questionnaire include sources of drinking water, uses of water, methods of water treatment, rates of contact of vectors of parasites, method of sewage disposal and use of faecal matter as manure.

RESULTS

Frequency of Visit to the Farms by the People in the Various Communities: The people in all communities sampled go to the farms. Figure 1 showed that in Omor town, 81 % of the people sampled visited their farms frequently.

Table 1: Questionnaire format for the assessment of host-vector-parasite relationship among the inhabitants of the Anambra river basin irrigation project area

Name:_____Sex: Male( ) Female ( )
Village:_____Town:_____
Local Government Area:_____
1. How often do you go to the farm? Frequently ( ) Sometimes ( )
2. Rank according to order of importance in your area the following diseases signs and symptoms.
   - Coughing
   - Itching
   - Headache
   - Fever
   - Blood in urine
   - Blood in stool
   - Diarrhoea
   - Abdominal pain
   - Blood in sputum
   - Nodules on the body (Akpu)
3. Rank in their order of importance the uses of water in your community.
   - Recreational uses
   - Domestic uses
   - Occupational uses
   - All of the above
4. Tick the most common sources of drinking water in your community
   - Taps (pump)
   - Stream
   - Ponds
   - Irrigation canals
   - Rivers
   - Rain water
5. Indicate the drinking water treatment methods employed in your family.
   Filtering ( ) Boiling ( ) Addition of alum ( ) None ( )
6. How often do you come in contact with these organisms?
   Mosquitoes
   Frequently ( ), Sometimes ( ) Rarely ( ) Never ( )
   Biting midges
   Frequently ( ), Sometimes ( ) Rarely ( ) Never ( )
   Cockroaches
   Frequently ( ), Sometimes ( ) Rarely ( ) Never ( )
   Rats
   Frequently ( ), Sometimes ( ) Rarely ( ) Never ( )
7. Indicate the most convenient and most common type(s) of toilet system in your community.
   Pit toilet ( ) Farm ( ) Bush ( ) River ( ) Irrigation canals ( ) Water cistern ( )
8. How often do you use human faeces as manure in rice farm?
   Frequently ( ), Sometimes ( ) Rarely ( ) Never ( )
9. Rank in order of importance, the organism most encountered while at the farm.
   - Mosquitoes
   - Biting midges
   - Snails
   - Rats
   - Others specify

Other records were Umumbo (78 %), Ifite Ogwari (74 %), Omasi (70 %), Umulokpa (60 %) and Adani (50 %).

Order of Importance of Disease Signs and Symptoms among the Communities: The order of importance of disease signs and symptoms in the communities are shown in Table 2: Diarrhoea (17.6 %) and body nodules (15 %) were the most frequent symptoms reported in all the communities. Other symptoms were blood in stool (14.6 %), fever (13.6 %) itching (12.6 %), blood in urine (0.66 %) and blood in sputum (2.3 %) Blood in urine and sputum were the least recognized of all the disease symptoms in all the communities. There was a positive relationship between the presence of biting midges and body itching in the communities (r = 0.594) (Figure 2). Furthermore, the presence of biting midges and body nodules showed very high positive relationship (r = 0.682). (Figure 3).

Water Usages in the Communities: Of all the water use methods in the communities, domestic water use topped the list in all the communities (Figure 4). This was followed by the use of water for occupational and recreational purposes. Occupational use of water was principally for par-boiling rice grains during processing, cassava fermentation and garri processing.

Swimming for leisure and relaxation was observed among people returning from farm. Rivers in Adani, Ifite Ogwari, and large streams in Umulokpa offered recreational grounds for swimming. Farmers in Umumbo, Omor and Omasi used large part of the major irrigation canals for swimming and hunting of edible frogs *(Rana rana).*

Major Sources of Drinking Water in Various Communities: Irrigation canals and ponds (burrows pits) were the major sources of drinking water in Umumbo (Table 3), while streams were the major sources of drinking water in Omor and Umulokpa. Rivers were principally used by inhabitants of Adani (96 %), Umulokpa (88 %), Ifite Ogwari (88 %) and Omasi (78 %). Umumbo community lacked streams and rivers. The use of rainwater for drinking was admitted by all communities and none of the communities had pipe borne water.

Water Treatment Methods among the Communities: The highest value of "No water treatment method" was indicated in all the communities while addition of alum was the next most popular water treatment adopted by all the communities (Figure 5). This is followed by boiling and then filtration of water.

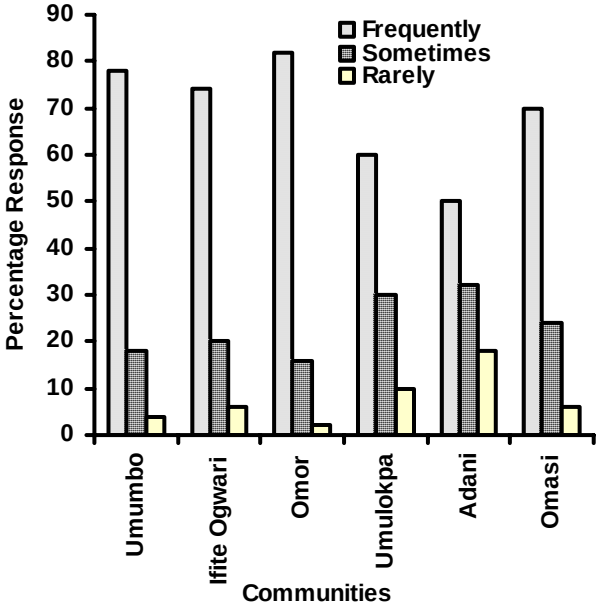

Figure 1: Rate of visits to farm by people in the different communities

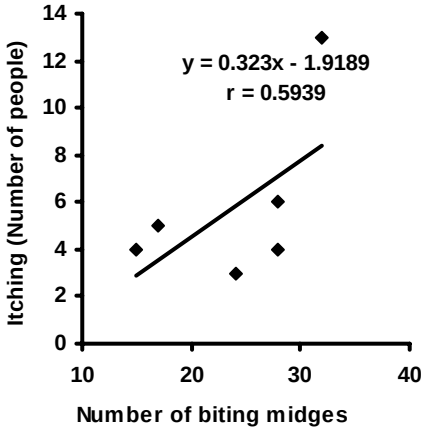

Figure 2: Interaction between biting midges and presence of body itching

Table 2: Disease symptoms based on responses from community members

Towns	No. of persons sampled	Coughing		Itching		Headache		Fever		Blood in urine		Diarrhoea		Abdominal pain		Blood in sputum		Nodules		Blood in Stool	
		No. of Response	% Response	No. of Response	% Response	No. of Response	% Response	No. of Response	% Response	No. of Response	% Response	No. of Response	% Response	No. of Response	% Response	No. of Response	% Response	No. of Response	% Response	No. of Response	% Response
Adani	50	3	6	2	4	3	6	8	16	1	2	14	28	6	12	0	0	2	4	11	22
Ifite Ogwari	50	2	4	3	6	13	26	2	4	1	2	12	24	1	2	0	0	6	12	10	20
Omasi	50	1	2	5	10	5	10	5	10	0	0	13	26	3	6	3	6	6	12	9	18
Omor	50	1	2	4	8	9	18	8	16	0	0	12	24	3	6	2	4	1	2	10	20
Umumbo	50	4	8	12	24	5	10	4	08	0	0	1	2	5	10	1	2	15	30	2	4
Umulokpa	50	4	8	12	24	5	10	4	08	0	0	1	2	5	10	1	2	15	30	2	4
Total and % Response for each disease Symptom	300	15	5	38	12.6	40	13.3	41	13.6	2	0.66	53	17.6	23	7.6	7	2.3	45	15	44	14.6

Methods of Sewage Disposal in the Communities: Table 4 showed the various methods of sewage disposal in the communities sampled. The use of pit latrine (80 %) was admitted by people in Adani and (72 %) in Umulokpa. Few people admitted the use of pit latrine in Ifite Ogwari (30 %), Omasi (16 %) and Umumbo (10 %). The use of bush as a method of sewage disposal was most popular in Umumbo (76 %) and Omasi (58 %) while it is rare in Adani (14 %) and Umulokpa (20 %). Farms, rivers and irrigation canals were used not routinely but in emergencies. Cisterns are present in very few homes in Umulokpa (6 %) and Umumbo (4 %).

The use of Human Faeces as Manure in Rice Farms: The use of human faeces as manure in rice farms was not acceptable in Umulokpa. From Figure 6 it was observed that 96 % of the respondents admitted never using human faeces in rice farms. This is similar to the situation in Adani (94 %), and Omasi (72 %). However, this practice was admitted by 24 % of respondents in Umumbo (30 %) in Omor and 20 % in Ifite Ogwari.

Prevalence of Vectors in the Farms among the Communities: The numbers of vectors encountered in farms are shown in Figure 7. The responses are

similar in all the communities with biting midges topping the list of all the vectors followed by

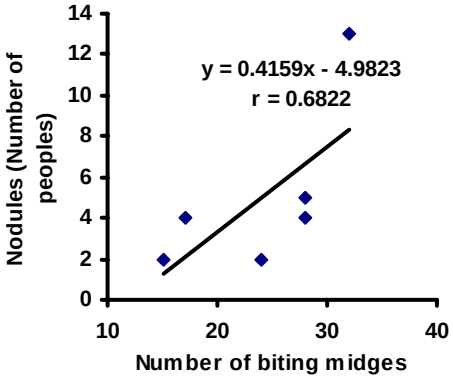

Figure 3: Interaction between the presence of biting midges and the presence of body nodules

mosquitoes. The records for the biting midges were Umumbo (70 %), Adani (70 %), Umulokpa (67 %), Omor (60 %) and Ifite Ogwari (40 %). Rats were also encountered in the farms while snails were least encountered in all the communities. Other vectors included tsetse fly, housefly, and cockroaches.

Human Contact with Vectors: The highest contact rates with mosquitoes 96 % and biting midges 80 % were observed in Umumbo community (Figure 8). This was followed by rats 64 % obtained in Omor community and 56 % for cockroach observed in Adani.

Table 3: Sources of drinking water in the communities

Towns		Tap water		Stream		Pond		Irrigation		River		Rain water	
	No. Sampled	No. of response	% Response	No. of Response	% Response	No. of Response	% Response	No. of Response	% Response	No. of Response	% Response	No. of Response	% Response
Umumbo	50	-	0	-	0	40	80	45	90	-	0	20	40
Adani	50	-	0	25	50	-	0	-	0	48	96	25	50
Omor	50	-	0	50	100	25	50	24	48	-	0	9	18
Umulokpa	50	-	0	49	98	-	0	-	0	44	88	9	18
Ifite Ogwar	50	-	0	19	38	8	16	30	60	44	88	14	28
Òmasi	50	-	0	26	52	21	42	-	0	39	78	24	48
Total and Mean Percentage Response	300	-	0	169	56.3	94	31.3	99	33	175	58.3	101	33.6

DISCUSSION

The environmental health quality of any community can be assessed from the sources of contact with parasites and disease vectors within the area. A safe environment is one where the habitats as well as the habits of the people do not have any negative health implication. The Anambra river Basin Rice Irrigation Project Area is made up of communities without the

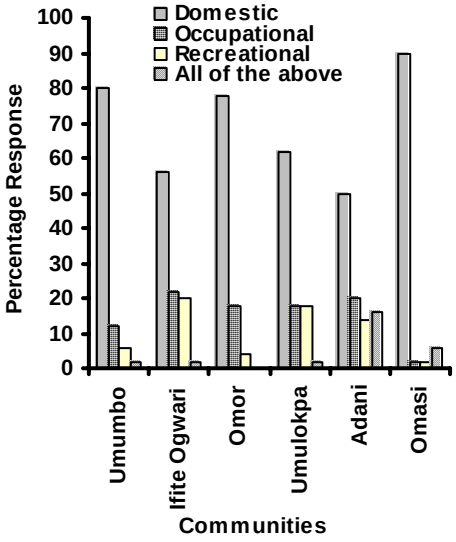

Figure 4: The order of importance of water use in the communities

basic amenities that could reduce vector-parasite-man contacts. For instance, in a community like Umumbo the major sources of drinking water include ponds and irrigation canals. In most homes there are absence of pit latrines for proper sewage disposal and the nearby bushes are used for this purpose. There was strict legislation against defeacating in farms (especially rice farms) and rivers in all communities. Absence of pit latrines in most communities was as a result of the closeness of the water tables to the surface. Attempts to dig pit latrines resulted in water flooding the pit and making it uncomfortable for use. It can also be observed that sewage was used as manure in some communities. These conditions are favourable for parasites such as *Ascaris, Enterobius, Trichuris* infections (Bundy and Cooper, 1989). Addition of alum was however, not frequently

practiced as means of water treatment method because it wastes soap (as a result of hardness) and because "alum purified water" had taste.

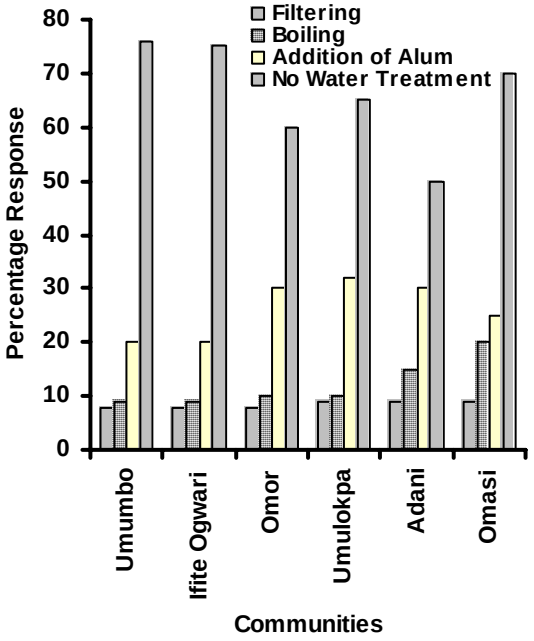

Figure 5: Water treatment methods among the communities

The farming habit of people in the research area makes them to maintain dual homestead. During the rice cultivation periods, farmers are always in the fields and at other times, they move to distant farm homes where other crops like yam and maize are cultivated. These farm homes are nitches for mosquito as well as forest *Onchocerca* vector.

Table 4: Methods of sewage disposal in the communities

Towns		Pit latrine		Farm		Bush		River		Irrigation Canals		Cisterns	
	No. Sampled	No. of response	% Response	No. of Response	% Response	No. of Response	% Response	No. of Response	% Response	No. of Response	% Response	No. of Response	% Response
Umumbo	50	5	10	3	6	38	76	0	0	5	10	2	4
Adani		40	80	2	4	7	14	0	0	0	0	1	2
Omor	50	22	44	2	4	20	40	0	0	5	10	1	2
Ifite Ogwari	50	15	30	3	6	21	42	2	4	8	16	1	2
Òmasi	50	8	16	5	10	29	58	3	6	5	10	0	0
Umulokpa	50	36	72	1	2	10	20	0	0	0	0	3	6
Total and Mean Percentage Response	300	126	42	13	4.3	125	41.6	5	1.6	23	7.6	8	2.6

Frequent visit was necessary in order to chase away weaver birds from the rice farms. The chasing away of birds was often undertaken by children except in cases where the rice field was located far away from the farmer's home. The most prevalent vectors of parasites encountered in the farms are biting midges followed by mosquitoes. Body itching and nodules are commonly reported

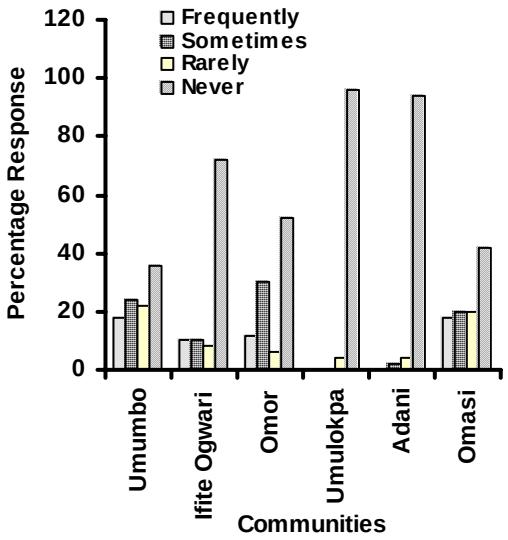

Figure 6: The use of human faeces as manure in rice farms among communities

indicating a positive relationship between the symptoms of Onchocerciasis and the vector of the disease among the people. Basically there was no conscious effort made to reduce parasite-vector-people contact in the irrigation project area during its establishment contrary to what is usually advised (Tanner and Savingny, 1987).

From what is known, changes in the environment often cause changes in human behaviour and vector habitat. When a rural community is involved in this kind of development, ignorance, conservatism and poverty amplifies the risk of multiple infections (Booth and Bundy, 1995).

As a result of micro political situations common in rural African communities, basic infrastructural facilities are often not available in rural communities to combat parasitic infections common among individuals of such communities.

The result is increase in morbidity and mortality rates, reduction in agricultural productivity,

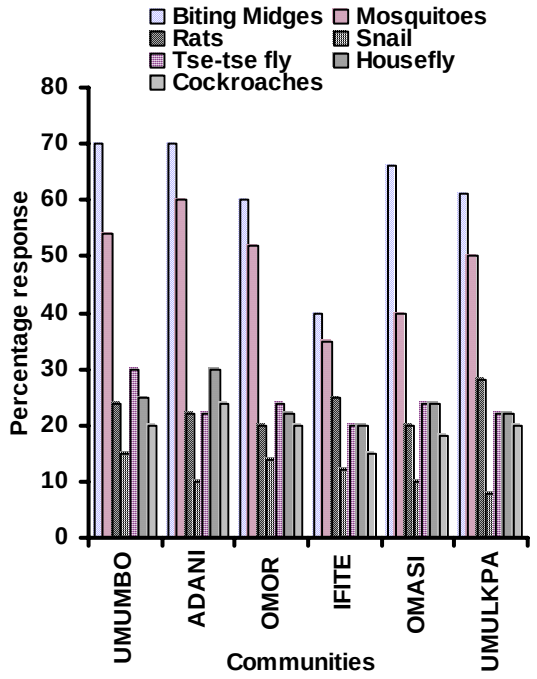

Fig 7: Prevalence of vectors in the farms among the communities

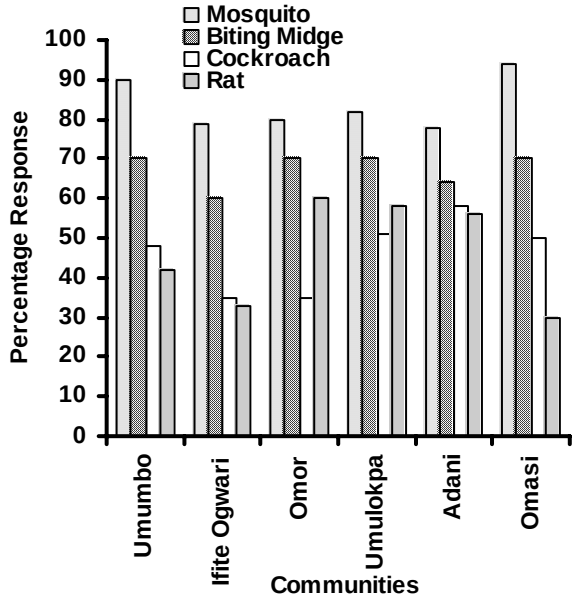

Figure 8: Rates of contact with of vectors of parasites

malnourishment, and other conditions associated with poverty (Belcher and Wurapa, 1995).

It is therefore necessary that adequate disease intervention strategies be instituted in the areas around the Anambra River Basin irrigation Project Area to avert the popular "decay" in health status associated with rural areas in countries where there is lack of care and attention for rural dweller.

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