

Prevalence and management practices of malaria in a rural community of Ebonyi state, southeast Nigeria

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Abstract: A prevalence survey of malaria was carried out in Onicha-Igbeze, a rural community in Onicha Local Government Area of Ebonyi state, southeast Nigeria. Thick blood films of 100 individuals in the community were used to determine the prevalence. A close ended questionnaire was also administered to 100 respondents in order to obtain information on malaria management practices of the people. The study was carried out between July and September which corresponds to the wet season in Nigeria. The prevalence rate was found to be 64% and all were infections with *Plasmodium falciparum*. The prevalence rates of malaria at the study locations within the community were as follows: Amanator Primary school (68.2%), Onicha General Hospital (56.3%) and Afoudo market, Onicha (66.7%). The prevalence rates by age groups were found to be 1-10 (76.5%), 11-20 (54.5%), 21-30 (50%), 31-40 (57.1%), 41-50 (100%), 51 and above (66.7%). The prevalence rates by occupation were as follows: students (70%), civil servants (30%), farmers (72%), and traders (53.3%). Gender-wise, the males had a total prevalence of 67.9% while females had a total prevalence of 59.1%. The malaria management practices showed that 14% buy anti-malarial drugs across the counter, 8% attends hospitals, 14% use traditional medicine from local healers. It was found that some individuals use more than one method in their management of malaria. Those who combined anti-malarial drugs from shops with attendance to hospitals were found to be 16%, 12% combined anti-malarial drugs from shops with traditional medicine from local healers, 10% combine attendance to hospitals and use of traditional medicine from local healers, 12% do the three management practices, while 14% reported doing nothing about malaria. The high malaria prevalence in this community therefore calls for investigations on the causes of the high prevalence of this disease in rural areas of Nigeria and Africa in general. The fact that a good number of people buy anti-malarials from shops calls for stronger commitment by various authorities to ensure that only genuine drugs are on our counters, and the observation that a good number of people use only traditional medicine from local healers to manage malaria calls for an in-depth basic and strategic research on this line of malaria management.

I. Introduction

Malaria is one of the most serious health problems facing the world today. Of all the human parasitic infections, malaria caused by four species of parasitic protozoa belonging to the genus *Plasmodium* debilitates and kills more people than any other single infectious disease (Sherman, 1998). Human malaria can be caused by four species of *Plasmodium* parasite viz. *Plasmodium falciparum*, *Plasmodium vivax*, *Plasmodium malariae* and *Plasmodium ovale*. The effects of malaria are noticeable in rural areas where malaria frequently strikes during that period of the year when the need for agricultural work is greatest (WHO, 1999). Studies in the rural areas of Africa where malaria is endemic revealed that over one third of primary school children had malaria during a school term, more than half of this group had two or more attacks, typically missing a week or more in school with each attack (WHO, 1996). The management of malaria by people dates back to the origin of malaria. An infusion of quinghao (*Artemisia annua*) has been used for at least 2000 years in China. Its active ingredient (artemisinin) has only recently been scientifically identified. The anti febrile properties of the bitter bark of Cinchona ledgeriana were known in Peru before the 18th century. Quinine the active ingredient of the portion was first isolated in 1820 by the pharmacists. In modern times, managing malaria could mean treating the infection using anti-malarial drugs. In Nigeria, there is paucity of information on studies on malaria management by the people. However, various anti-malarials abound, both local and scientific preparations, and these are used by people to contain malaria.

The study was therefore undertaken to know the prevalence of malaria in different major locations and various age-groups in Onicha-Igbeze community and to find out the practices adopted by the people of Onicha-Igbeze in the management of malaria.

II. Materials And Methods

Study Area: Onicha-Igbeze is a rural community in Onicha local government area of Ebonyi state, southeast Nigeria. The community is located in the southern part of Ebonyi state, and bounded by four autonomous communities namely Oshiri, Isu, Ugwulangwu and Okposi. The vegetation type is derived savanna. The mean annual rainfall is 350mm and mean annual temperature is 28°C. The topography of the community is tableland. Northeast hamattan blows from December – May, while the southeast monsoon blows between May and October. The community has a population of about 12,000. The occupation of the people is mainly subsistence farming and petty trading. The main crops cultivated include yam, cocoyam, cassava and rice; also banana and plantain are cultivated around residential areas..

Sample Population:The sample population included only individuals who had not taken any anti-malarial treatment within the past 3 weeks. Venous blood was taken from consenting individuals using disposable lancets. Preparation of thick blood films was as described by Cheesbrough (1992). Two research methods were applied; they are: the use of standardized Questionnaire and Diagnosis of Blood samples collected.

Use of questionnaire: The close-ended questionnaires were distributed to the experimental units in the area under study. The questionnaires were administered to those who could read or write and self-administered to those who could neither read nor write. The contents of the questionnaires were malaria and malaria- related biosocial questions.

Blood sample collection / diagnosis: Blood samples for diagnosis were collected by thumb pricking from the consenting individuals. The tip of the finger was cleansed with methylated spirit and puncture was made across the lines at the tip of the finger with a sterile blood lancet which were disposed immediately after each use. Blood samples were collected and preserved in EDTA potassium bottle. Thick films were made and stained according to Cheesbrough (1992) and the stained slides were covered with immersion oil and examined under the microscope with 100x magnification.

III. Results/Discussion

The results showed that 64 of the sampled individuals were positive for malaria parasite. A total of 100 individuals comprising of 56 males and 44 females were sampled. This gives a prevalence of 64%. The following tables show the prevalence of malaria in the sampled area based on locations in the area, different age groups and occupation of the people.

Table 1: Prevalence of malaria among the locations in the sampled area

Locations	MALE			FEMALE			TOTAL		
	No examined	No +ve	Prevalence in %	No Examined	No +ve	Prevalence in %	No Examined	No +ve	Prevalence in %
Amanator Primary School, Onicha	24	18	75	20	12	60	44	30	68.2
General Hospital, Onicha	16	10	62.5	16	8	50	32	18	56.3
Afoudo Market, Onicha	16	10	62.5	8	6	75	24	16	66.7
Total	56	38	67.9	44	26	59.1	100	64	64

Table 2: Prevalence of malaria among the age groups in the study area

Age Group	MALE			FEMALE			TOTAL		
	No examined	No +ve	Prevalence in %	No Examined	No +ve	Prevalence in %	No Examined	No +ve	Prevalence in %
1 - 10	18	16	88.9	16	10	62.5	34	26	76.5
11 - 20	14	6	42.9	8	6	75	22	12	54.5
21 - 30	8	6	75	12	4	33.3	20	10	50
31 - 40	10	6	60	4	2	50	14	8	57.1
41 - 50	2	2	100	2	2	100	4	4	100
51 and above	4	2	50	2	2	100	6	4	66.7
Total	56	38	67.9	44	26	59.1	100	64	64

Table 3: Prevalence of malaria based on occupation of the people in the sampled area

Occupation	MALE			FEMALE			TOTAL		
	No Examined	No +ve	Prevalence in %	No Examined	No +ve	Prevalence in %	No Examined	No +ve	Prevalence in %
Students	30	23	76.7	20	12	60	50	35	70
Civil Servants	7	2	28.6	3	1	33.3	10	3	30
Farmers	13	10	76.9	12	8	66.7	25	18	72
Traders	6	3	50	9	5	55.6	15	8	53.3
Total	56	38	67.9	44	26	59.1	100	64	64

Table 4: Malaria management practices of people of Onicha-Igbeze community.

	Management Practices	NO. OF Respondents (%)	Male	Female
1	Antimalarials from shops	14 (14%)	6	8
2	Visit to Hospitals	8 (8%)	4	4
3	Traditional medicine from Local healers	14 (14%)	8	6
4	Antimalarials from shops and visit to Hospitals	16 (16%)	10	6
5	Antimalarials from shops and local healers medicine	12 (12%)	8	4
6	Traditional medicine from Local healers and visits to Hospitals	10 (10%)	6	4
7	Antimalarials from shops, Hospital visits and Local Healers medicine	12 (12%)	8	4
8	None	14 (14%)	6	8
	TOTAL	100 (100%)	56	44

Table 1 showed that out of 44 individuals in the primary school location comprising of 24 males and 20 females, 30 patients were positive for malaria parasite, with a prevalence of 68%. At the General Hospital location, out of 32 individuals comprising of 16 males and 16 females, 18 patients were positive for malaria parasite with prevalence of 56.3%. And at Afoudo market location, out of 24 individuals comprising of 16 males and 8 females, 16 patients were positive for malaria parasite with a prevalence of 66.7%. A total of 100 individuals comprising of 56 males and 44 females were sampled, 64 patients were positive for malaria and this gives a total prevalence of **64%**. Table 2 showed that the prevalence among the age groups in years is as follows: 1-10 (76.5%), 11-20 (54.5%), 21-30 (50%), 31-40 (57.1%), 41-50 (100%), 51 and above (66.7%). The cases of the malaria detected were only infections of *Plasmodium falciparum*. Table 3 above is showing the prevalence of malaria in the sampled area based on occupation of the people. Out of 50 students comprising of 30 males and 20 females, 35 were positive for malaria giving a prevalence of 70%. Out of 10 civil servants comprising of 7 males and 3 females, 3 were positive for malaria parasite giving a prevalence of 30%. Out of 25 farmers comprising of 13 males and 12 females, 18 were positive for malaria giving a prevalence of 72%. And out of 15 traders comprising of 6 males and 9 females, 8 were positive for malaria giving a prevalence of 53.3%.

The following results were obtained from the 100 questionnaires distributed at Onicha: Number of males was 56 and that of females was 44. The occupations of the people were mainly farming followed by trading. Marital status of the examined individuals consist of 74 for single, 20 for married, none divorced, none separated and 6 widowed. The levels of education of the examined individuals were: 15 respondents indicated to have none education, 35 indicated to have attended or attending primary school, 25 attended or still attending secondary school, 10 were found to be in tertiary institution while 12 indicated others. Sanitations were found to be use of rubbish pit, trenches, compound and others. Almost more than half of the individuals indicated having ponds near their houses. 95 respondents indicated knowing what malaria is while 5 indicated no knowledge of what malaria is. Causes of malaria were found to be dirty surrounding, staying under the sun and others especially taking too much edible oil. Surprising is that 20 respondents indicated that malaria cannot be transmitted from one person to another. Attitude to malaria were found to be fever, chills, sweating, headache, fatigue. 80 respondents indicated that malaria is a serious problem, and also indicated that malaria can be prevented or controlled. The best method of control and prevention were found to include Draining stagnant water, keeping the surrounding free of ponds, vaccine production for malaria, use of drug, use of insecticide and also use of mosquito net (ITN). Community, parents, government, medical personnel were indicated as to be involved in the prevention and control of malaria. Out of the 100 respondents, 32 indicated to have been taken or given anti-malaria drugs recently.

The malaria management practices of the community were found to include the buying of antimalaria drugs from pharmaceutical shops, attendance to hospital and use of traditional medicine from local healers while some individuals reported no management practice at all. Table 4 above shows the malaria management practices of the people of Onicha-Igbeze community. Out of 100 individuals that the questionnaire was administered to, 14 respondents comprising of 6 males and 8 females indicated buying antimalarials from shops. 8 respondents comprising of 4 males and 4 females indicated attendance to hospital. 14 respondents comprising of 8 males and 6 females indicated use of traditional medicine from local healers. 16 respondents

comprising of 10 males and 6 females combine buying antimalarials from shops and attend hospital. 12 individuals including 8 males and 4 females indicated to combine buying antimalarials from shops and use of traditional medicine from local healers. 10 respondents comprising of 6 males and 4 females also combine attendance to hospital and use of traditional medicine from local healers. 12 individuals comprising of 8 males and 4 females combine the three management practices. It was found that 14 individuals comprising of 6 males and 8 females reported doing nothing on the management of malaria.

The prevalence of malaria in Onicha community of Ebonyi state found to be 64% was quite high. Although no similar study was known to have been carried out in the community, a comparison with related studies within the same geographical south-east Nigeria revealed that malaria prevalence was 76% for people living in Ihiala, Anambra state (Aribodor *et al*, 2003), 67% for adults in Abakaliki, Ebonyi state (Ike, 2000), 60% for children aged 0-5 in Awka, Anambra state (Mbanugo *et al*, 2005) and 64.1% for individuals at Umueji community in Anambra state (Nwajah, 2006). This clearly suggests that the prevalence of malaria at Onicha community is within the range of the previous studies in south east region of Nigeria. Patients with malaria occurred greatest in individuals living around the Primary school and Afoudo market locations of Onicha (Table 1). This could be because of several ponds around these areas. These ponds were built at several points for collection of water for day-to-day activities of the school and people living around these areas. Around the Afoudo market where some major houses are found at Onicha, rubbish pits in their compounds were seen littered with used cans of different sizes which are capable of breeding the malaria vector-*Anopheles gambiae*. Crop farms were also seen around homes and of all the crop farms seen, coco yam and banana plants whose leaves are capable of holding enough clean water for the breeding of the mosquito vectors were quite dominant.

Patients with malaria occurred greatest in individuals at age range 41-50, 1-10, 51 and above with prevalence of 100%, 76.5% and 66.7% respectively. These are followed by age ranges 31-40, 11-20 and 21-30 with prevalence of 57.1%, 54.5% and 50% respectively (Table 2). For the age range of 31-40, 41-50 and 51 and above, the high prevalence could be as a result of their submissiveness during the sampling days. The high malaria prevalence within the age range of 1-10 could be as a result low immunity (WHO, 1995). And for the age range of 1-10, 11-20 and 21-30, the high prevalence could be due to frequent exposure of these individuals to the insect vector which transmit the disease, because it has been observed in tropical Africa, that these individuals stay outdoors especially in rural areas at late evenings, they may be bare-bodied and also are liable to engage in farming practices, hence the vector may have a successful blood meal.

In occupation related prevalence of malaria, the highest rate of infection was observed among the farmers (72%) followed by the students (70%) (Table 3). Similar results for occupation related malaria prevalence has been reported in similar studies (Ukpai, 2001). The high rate of malaria infection among farmers in the sampled area could be attributed to the nature of their job which exposes them to the bites of exophagous malaria vectors while in their farms in addition to their contacts with endophagous nocturnal mosquito bites while asleep after farm work. The farmers are usually fatigued at nights resulting in deep sleep at night the condition of which encourages the uninterrupted bloodsucking tendency of the nocturnal and endophagous vectors of malaria. Daily activities of children and youths could as well be equated to those of the farmers. Thus, they are equally exposed to the incessant bites of diurnal exophagous and endophagous as well as nocturnal exophagous and endophagous malaria vectors (Ukpai, 2001; Bruce-Chwatt, 1983). These might be the reasons for the high rates of malaria infection recorded by students, who are mainly the children and youths in this community. The high infection rate amongst traders in the community (53.3%) could be attributed to the nature of their job which exposes them to bites of vectors of malaria. Worse than this, the daily hustle and bustle involved in commercial activities might cause fatigue resulting in deep-sleep nights which favors the uninterrupted blood-sucking tendency of malaria vectors. Gender-wise, males seemed to be more infected (67.9%) than females (59.1%) in this study (Table 1). This could be due to the fact that the males expose themselves more than the females especially when the weather is hot, by moving about bare-bodied thereby exposing themselves more to malaria vector bites than the females. *Plasmodium falciparum* was the only infection seen in the individuals in the rural community, this agrees with the observation of a similar study carried out in Lagos and Awka (Mbanugo *et al*, 2000; Asianya *et al*, 1999) where only *Plasmodium falciparum* infections were reported. It however differs from the related studies in Udi, Enugu state and Abuja where infections of *Plasmodium falciparum* and *Plasmodium malariae* were reported (Eneanya, 1998; Matur *et al*, 2001). Whether the difference found in the prevalence of plasmodium parasites especially within the same geographical region was a reality or an error due to diagnosis could not be confirmed in this study.

The effort to document malaria management practices of the people showed that the community does three things namely: buying antimalarials over the counter, attendance at hospital and use of traditional medicine from local healers (Table 4). It was however found that some people adopt more than a single practice. For instance 16 individuals (16% of examined population) buy antimalarials from shops and attend hospital. 12 individuals (12%) combine buying antimalarials from shops and use of traditional medicine from local healers. 10 individuals (10%) attend hospital and use traditional medicine from local healers. 12 individuals (12%)

combine the three management practices, they call for diversified management of malaria all over the world. The fact that a good number of people buy antimalarials from shops calls for a stronger commitment of various authorities to ensure that genuine drugs are on our counters. It has been observed that management of malaria in homes could be significantly improved by use of genuine blister packaged doses of antimalarials as these improve compliance with full course of treatment, drug management resulting in reduced costs of treatment and reduced waiting times in drug dispensaries (WHO, 1999). The observation that 14 respondents (14% of sampled) indicated using only medicine from local healers to manage malaria calls for in-depth basic and strategic research on this line of malaria management practice. The development of Quinghaosu and flower of *Artemisia annua*, a shrub from which Chinese healers and researchers developed various brands of artemisinin is a significant evolution (WHO, 1991). It is therefore expected that the Government and Funding Agencies (such as NGOs) should sponsor research into the development of the traditional local medicine. Of special interest is the revelation that few individuals reported doing nothing to manage malaria. Whether this group does not suffer the effect of the disease is yet to be investigated. However, it is documented that some inherited disorders of the haemoglobin such as sickle cell confer a reasonable degree of resistance or immunity against malaria to certain groups of those individuals. It is also documented that those individuals heterozygous for haemoglobin (AS) suffer malaria less frequently and less severely than do normal individuals (Olumese *et al*, 1997). Also individuals with B-thalassaemias are protected against malaria (Willcox *et al*, 1983).

The Community and Government at all levels should synergistically work together to ensure a reduction in the high prevalence of malaria in rural areas:

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