PREVALENCE OF MALARIA AND THE USE OF INSECTICIDE TREATED NETS AND OTHER MEASURES FOR CONTROL OF MALARIA IN IBERE COMMUNITY IKWUANO LGA ABIA STATE, NIGERIA

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ABSTRACT

Prevalence of malaria and use of insecticide treated nets (ITNs) and other measures for control of malaria was done in Ibere community in Ikwuano LGA, Abia State, Nigeria using structured questionnaires and microscopic examination of blood samples. 300 persons made up of 123 males and 177 females within different age groups from different villages in Ibere had their blood samples collected and microscopically examined for the presence of malaria parasites using thick blood smears. Out of this number 176(58.67 %) were infected. More females (59.88 %) than males (56.90 %) were infected. Location wise, Iberenta recorded the highest prevalence of infection (71.4 %) the least infection rate was Ihim (35.7 %). Highest infection rate occurred in age group 0 – 10 years (68.08 %). Famers (75.83 %) recorded highest infection rate. More than half of the respondents (61.0 %) resorted to drugs for prevention and control of malaria while some used ITNs (25.33 %) and combination of drugs and insecticides (5.0 %). A good number of the study populations (97.76 %) were aware of the existence of ITNs. Amongst them 69.0 % did not have ITNs while (25.33 %) owned and used it. Some reasons given for not having or using ITN were that it was expensive (44.33 %), not available (24.67 %) and are not convenient (3.67 %). It is recommended that the government should intensify awareness and put in place monitoring teams to ensure effective distribution of ITNs to targeted group in the rural malaria endemic community.

INTRODUCTION

Malaria has been one of the world's killer diseases throughout human history. It has actually increased in occurrence since 1970 (Taylor *et al.,* 2010). According to WHO (2011), malaria is prevalent in 106 countries of the tropical and semi tropical world, with 35 countries in central Africa bearing the highest burden of cases and deaths. It is transmitted to humans when the infected vector, the female Anopheles mosquitoes takes a blood meal from man to nourish its eggs (Taylor *et al.,* 2010). The incidence of malaria is usually very high during the wet season. This period favours breeding of mosquito.

WHO (2008) put the yearly clinical cases of malaria at between 300 million and 500 million resulting in over 200 million deaths most of whom are children. WHO (2011) reported that there were 216 million episodes of malaria in 2010 which approximately 81 %, or 174 million cases were in Africa and about 91 % being caused by *Plasmodium falciparum*. It has

been reported that every 45 minutes a child in Africa dies from malaria attack (UNF, 2013).

The prevalence of malaria is high in Nigeria and it is a leading cause of morbidity and mortality in the country. Available records have shown that at least 50 percent of Nigeria population suffers from at least one episode of malaria each year and this accounts for over 45 percent of all patients visits (Ojurongbe *et al.,* 2007).

Malaria is endemic in Nigeria and remains a major cause of hospital attendance in Nigeria (Anumudu *et al.,* 2006). Communities with high level of malaria have many chronically ill members resulting in absenteeism from work and school. It is also a serious risk to pregnant women and infants. It is a common cause of abortion (miscarriage) and anaemia in pregnant mothers while the infants suffer under weight at birth (WHO, 2010).

The burden of malaria infection is a concern to everybody. In the past few years the World Health Organization has tried different approaches in fulfilling its constitutional mandate to the problem and control of malaria. The methods adopted as directed by WHO include the use of prophylaxis (drugs), drainage of stagnant water, destruction of water holding cans and pot, destruction of adult mosquitoes through spraying of insecticides and destruction of breeding stages of mosquitoes (Taylor *et al.,* 2010). The African nations generally are spending about 12 billion dollars a year in the control of Malaria which is a great economic loss to the continent (UNF, 2013). Presently, emphasis is being place on the use of insecticide treated nets (ITNs) at night while sleeping (Okeke *et al.*, 2016).

The Federal Government of Nigeria apparently aware of the fact that Nigeria is an endemic area of malaria infection has taken several steps to eradicate the vectors and the disease. The Federal Government's campaign against malaria is still ongoing. More than 50 million insecticide treated Net (ITN) have been distributed to house hold to sustain the campaign against the malaria (WHO, 2002).

In spite of these efforts, the incidence of this life threatening disease is still significant mostly in the rural communities of the nation.

Consequent upon the high incidence of malaria especially in the rural areas of the nation, this work becomes necessary to ascertain the prevalence of malaria, the level of awareness and accessibility to ITN and the effectiveness of their use in the control and prevention of malaria in the rural communities of Ibere clan in Ikwuano LGA of Abia State, Nigeria.

MATERIALS AND METHODS

Study Area: The study was done in Ibere community in Ikwuano Local Government Area of Abia state, Nigeria. The town is located at approximately latitude 5° 26N and longitude 7° 34E. It has an area of 281 km^2. It is within the tropical rain forest zone of Nigeria and has a marked difference in annual seasons. There are eight months of rain seasons between April and November and four months of dry seasons with short period of harmattan between December and January. This could alter due to climatic change (Ironemenefu, 2006). Ibere is an Igbo community with few people from other ethnic groups in Nigeria. The inhabitants are predominantly farmers with relatively few traders and civil servants. The town is made up of 14 villages. A simple random technique was used to select 10 villages out of 14 villages for the study, namely; Iberenta, Inyila, Iyalu, Elemaga, Itunta, Obuohia, Ngwugwo, Umulu, Ihim and Amuro. The town has rivers and streams. These include; IyiUkwu in Ngwugwo village, Ako and Ikwu in Itunta, Iyi Oba in Elemaga, and spring water found in most of the villages. The streams and rivers are located near human habitations and farms. All the villages have at least one stream were domestic activities such as washing of clothes, steeping of cassava are carried out. The streams are also the major source of drinking water for the villages. The presence of the thick vegetation and water logged banks of the rivers serve as potential mosquito breeding sides (Ironemenefu, 2006).

Study Design: The study was done in Ibere community in Ikwuano LGA of Abia State, Nigeria. The study was a cross sectional survey conducted between the months of April and

September 2013. Town is made up of 14 villages. A simple random technique was used to select 10 villages out of the 14 villages for the study. A total of 300 people were randomly selected for the study and were subdivided into 7 age groups of 10 years interval thus:- 0 − 10, 11 − 20, 21 − 30, 31 − 40, 41 − 50, 51 − 60 and 61 − 70.

Ethical Permit: The ethical permit was gotten from the local government authority. The village heads were visited and intimated about the purpose of the research. They gave their consent before any work could begin in their domain. The respondents were informed about the research and gave their oral consent before being included in the study.

Data Collection: Data collection was done using well-structured validated and pre-tested questionnaires to obtain information such as awareness of insecticide treated net and usage, methods adopted to control and prevent malaria as well as the demographic data of the respondents. Blood samples were also collected from the respondents and thick blood films were prepared and examined for the identification of malaria parasite using Field's Staining Technique as described in Ochei and Kolhatkar (2008). Three hundred (300) samples were collected within the periods of April and September 2013.

Data Analysis: Data collected were analyzed using Chi-square to determine the prevalence of malaria and presented in percentages. Correlation analysis was used to test for the relationship between malaria prevalence, the use of ITN and other methods of control and prevention of malaria. All analyses were done using SPSS version 20.

RESULTS

A total of 300 persons made up of 123(41.0 %) males and 177(59.0 %) females within different age groups from different villages in Ibere had their blood samples collected and examined microscopically for the presence of malaria parasite using thick blood smears. Out of this

number 176(58.67 %) were infected as shown in Table 1.

Table 1: Overall prevalence of malaria parasite infection in Ibere community, Ikwuano LGA, Abia State, Nigeria

Number Examined	Number Infected	Percentage of Infection
300	176	58.67 %

Malaria prevalence in different villages in Ibere community: The result indicates that Iberenta recorded the highest prevalence (71.4 %), in terms of location. The least prevalence was in Ihim (35.7 %) (Table 2).

Table 2: Malaria parasite prevalence in different villages in Ibere community, Ikwuano LGA, Abia State, Nigeria

Name of village	Number examined	Number infected	Prevalence (%)
Iberenta	28	20	71.42
Obuohia	30	14	46.67
Inyila	27	16	59.26
Amuru	20	11	55.00
Ngwugwo	60	37	61.67
Itunta	26	18	69.23
Ihim	28	10	35.71
Elemaga	22	14	63.63
Umulu	26	17	65.38
Iyalu	33	19	57.57
Total	300	176	58.67

Participant Gender, Age and Occupation: Considering prevalence by sex, more females (59.88 %) than males (56.9 %) were infected, but the difference was not significant (p>0.05) (Table 3). The prevalence by age indicated that the highest rate of infection occurred in the age group 0 − 10 years (68.08 %). Infection rate between ages were significantly different (p<0.05) (Table 4). Regarding occupation, the highest infection was recorded among farmers (75.83 %). The result showed that there was significance difference between occupations (p<0.05) (Table 5).

Methods of Control and Prevention Adopted by Respondents: More than half of the respondents (61.0 %) resorted to drugs for

Table 3: Malaria parasite prevalence among the sexes in different villages in Ibere community, Ikwuano LGA, Abia State, Nigeria

Name of village	Males			Females		
	Number examined	Number infected	% of infection	Number examined	Number infected	% of infection
Iberenta	11	6	54.55	17	14	82.35
Obuohia	12	5	41.67	18	9	50.00
Inyila	11	5	54.55	16	10	62.50
Amuro	9	4	44.44	11	7	63.64
Ngwugwo	22	13	59.09	38	24	63.16
Itunta	14	9	64.29	12	9	75.00
Ihim	10	4	40.00	18	6	33.33
Elemaga	8	6	75.00	14	8	57.14
Umulu	11	8	72.72	15	9	60.00
Iyalu	15	9	60.00	18	10	55.56
Total	123	70	56.90	177	106	59.88

Table 4: Malaria parasite prevalence in relation to the age groups in different villages in Ibere community, Ikwuano LGA, Abia State, Nigeria

Age group	Number examined	Number infected	Percentage infection
0-10	47	32	68.08
11-20	43	22	51.16
21-30	65	43	66.15
31-40	55	36	65.45
41-50	37	20	54.05
51-60	33	16	48.48
61 and above	20	07	35.00

Table 5: Malaria parasite prevalence among different Occupation in different villages in Ibere community, Ikwuano LGA Abia State, Nigeria

Occupation	Number examined	Number infected	% of infection
Pupils	37	24	64.86
Students	41	18	43.90
Civil servants	27	7	25.92
Traders	31	16	51.61
Farmers	120	91	75.83
Others	24	9	37.50

Table 6: Modes of malaria parasite infection control and prevention in different villages in Ibere community, Ikwuano LGA, Abia State, Nigeria

Variables	Number who used it	% of usage
Drugs	183	61.00
Insecticide treated nets	76	25.33
Drugs and Insecticides	15	5.00
Herbs and insecticides	6	2.00
Herbs	4	1.33
Repellants	16	5.33

Prevalence Rate with Respect to Prevention and Control Method: This table showed that the highest infection was recorded among those who used herbs (75 %) and the least infection was among those who use ITNs (31.58 %) (Table 7).

Knowledge and Attitude to the use of Insecticide Treated Net: Regarding perception about ITNs, a good number of the study population (97.67 %) were aware of the existence of ITNS. Those who do not have it were 207(69.0 %), while 76(25.33 %) reported that they have been using it (Table 8). Some reasons given for not having and using ITNs were that it is expensive (44.33 %), not available (24.67 %) and not convenient (3.67 %).

prevention and control of malaria, while some used ITNs (25.33 %), combination of drugs and insecticides (5.0 %). Use of herbs and insecticides (2 %), herbs only (1.33 %) and use of repellants (5.33 %) (Table 6).

Table 7: Malaria parasite prevalence with respect to prevention and control measures adopted in Ibere community of Ikwuano LGA, Abia State, Nigeria

Variables	Number who used it	Number Infected	% of infection
Drugs	183	133	72.68
Insecticide treated nets	76	24	31.58
Drugs and insecticides	16	7	43.75
Herbs and insecticides	6	4	66.67
Herbs	4	3	75.00
Repellants	15	7	46.67

Table 8: Respondents perception of insecticide treated nets in different villages in Ibere community, Ikwuano LGA, Abia State, Nigeria

Variables		Frequency	%
a. Awareness of ITN			
i	Currently aware	293	97.67
ii	Not aware	07	2.33
b. Possession of ITN			
i	Those that have it	93	31.00
ii	Those that do not have it	207	69.00
c. Usage			
i	Currently in use	76	25.33
ii	Have it but not using it	17	5.67
d. Reasons for not having or using it			
i	Not available	74	24.67
ii	Expensive	133	44.33
iii	Not convenient	11	3.67
iv	Difficult to set up	4	1.33
v	Fear of suffocating children	2	0.67

DISCUSSION

The result of this study gave the prevalence of malaria as 58.67 % in the study area. This is quite high, above 50.0 % prevalence and suggests that malaria is endemic in Ibere. This also buttresses the fact that malaria is endemic in the rural areas of Africa (WHO, 2002). This is similar to the reports of Mbanugo and Ejims (2000), who reported 58 % of prevalence in Awka, but contrast with the higher prevalence of 85.50 % in Okigwe, 75.0 % in Owerri, 73.30

% in Ikwuano and 80.39 % in Umuahia (Ukpai and Ajoku, 2001; Kalu *et al.*, 2012). The high prevalence observed in this work could be due to climatic factors such as high rainfall, relative humidity and temperature which help to create conducive breeding sites for the malaria vector. Other factors could be the behavioral attitude of the inhabitants and the poor knowledge of the importance and use of ITNs.

More females than males were infected though infections were not statistically significant (p>0.05). It could be because more females turned out to be examined. It could also be because they were exposed to the bites of the vector in the course of farming and preparing foods for the family in the evening using kitchen that are outside, or due to immune suppression during pregnancy, this is because pregnant women are more vulnerable to malaria attack due to immune suppression (Aribodor *et al.*, 2003).

All the age groups were infected but the highest prevalence was in the age group 0 – 10 years. This buttresses the fact that young children in the group are most affected by malaria (WHO, 2013). The infection in other age groups could be due to the fact that many of them are farmers. The effect of malaria is felt more in the rural areas were out door agricultural activity is high (WHO, 2000). Infection rates are reported to be highest during rainy season, which could result in decreased agricultural productivity (WHO, 2013), this study took place during the period of intensive agricultural activity.

Occupation wise, infection was highest among the farmers; this could be attributed to exposure to bites of the vector during farming periods and lack of protective clothing during the said period. Some of the farmers could be among those who do not have or use ITNs which could have helped to reduce man-mosquito contact and thus reduce infection. Civil servants were least infected, this could be because they have had some level of educational exposure which could have created some awareness on the prevention and control of malaria, which they probably adhered to. Brieger *et al.* (1996) reported that education improves general awareness and protection

against diseases such as malaria. More than half of the respondents resorted to drugs for prevention and control of malaria. This suggests that self-medication was very rampant. Previous studies have documented the wide spread of self-medication from retail drug outlets among persons in malaria endemic areas; in most developing countries (McCombie, 2002; Erhun and Osagie, 2004; Onwujekwe *et al.,* 2005a). This is not a welcomed trend as it can lead to drug resistance.

The use of ITNs as a preventive and control measure could be because of some awareness created about the health benefits of its use and the benefits the user seemed to have derived from It. Similar observation have been documented about African indigenous communities (Osondu and Jerome, 2009).

Those who use drugs and herbs only for preventive and control measures recorded high infection rates 72.68 % and 75.0 % respectively. This could be as a result of self-medication which has culminated into drug abuse and drug-resistance for drugs. For the herbs; it could be that the dosage was not right to take care of the parasite; thus giving the parasite opportunity to develop resistance for the herbs (Osondu and Jerome, 2009).

The least infection occurred among those who use ITNs. This probably suggests that ITN is a more effective preventive measure against malaria. If a greater portion of the population had it and used it, it could possibly bring down the prevalence rate of infection in the community. It has been reported that the current challenge facing many sub-Saharan African countries like Nigeria is how to achieve a wide spread distribution and use of ITN for malarial control (Onwujekwe *et al.*, 2005b; Okeke *et al.,* 2016).

Respondents perception of ITNs showed that a good number of them were currently aware of its existence, while only few had it. More worrisome is the fact that only few of the respondents are using the ITNs. Reasons given for not having or using ITN were, not being available, being expensive, though it is supposed to be given out free to the women

and children, not convenient due to excessive heat and irritation of the nose difficult to set up due to lack of space. Some negligible few refused using it out of fear of suffocating the children. This border on ignorance and calls for creation of awareness and health education on the importance of ITNs as a control measure against malaria. The usage of ITNs is still poor in the rural population and they remain at risk as long as their education is not enhanced and the distribution of nets are not intensified and judiciously distributed (Okwelogu *et al.*, 2012).

Malaria is a serious problem and one of the major childhood diseases especially in the rural areas of Nigeria. Following the WHO recommendations; ITNs have been proposed for all people vulnerable to malaria infection with a special focus on children younger than five years of age by Nigerian government. Thus an increased public awareness and health benefits of the ITNs have been reported and documented across African countries (Blackburn *et al.*, 2006; Muller *et al.,* 2008; Osondu and Jerome, 2009; Okeke *et al.,* 2016). In Kenya for instance ITN coverage increased rapidly from 7 % in 2004 to more than 60 % in 2006 leading to significant reduction in childhood mortality (Fegan *et al.*, 2007). A study conducted by Muller *et al.* (2008) in the north western Burkina Faso reported overall house hold assessment of ITNs and that ownership have been discouraging. Jegede *et al.* (2005) and Afolabi *et al.* (2009) reported low level of ITN usage in Nigeria.

Conclusion: The result of this study has shown that a large proportion of the targeted population do not have the ITNs and usage is poor among studied population unless the socio-cultural issues as well as individual factors surrounding knowledge and correct use of the ITNs are resolved malaria would continue to threaten children and the entire Nigerian society. There is therefore the need to intensify awareness on how to use ITNs and making them available to the population most at risk in the endemic rural areas.

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