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Prevalence, Attitude and Perception about Malaria in a Rural Setting in Rivers State, Nigeria

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Abstract

Malaria is a global public health problem particularly in the tropical and sub-tropical regions of the world. It is a mosquito-borne disease caused by parasitic protozoans called *Plasmodium*. It is caused by the bite of a female *Anopheles gambiae* mosquito that harbours the sporozoites of a protozoan parasite associated and it is often associated with intermittent and remittent fever. This study was carried out from June to August, 2015 in Rumuekpe Community located in Emohua Local Government Area, Rivers State, Nigeria. A well structured questionnaire was randomly distributed to marked households to investigate people's knowledge, attitudes and perception towards malaria treatment. Out of 200 volunteers who participated in the exercise only 154 subjects willingly allowed blood sample collection for further study. Out of which 53 were males and 101 were females. Blood samples were collected by vene-puncture; thin and thick films were prepared, stained and examined microscopically. Rapid diagnostic test kit technique was also used for comparism. Out of 154 blood samples screened 134 (87%) were positive for malaria. Microscopy detected more malaria infection (59.1%) than RDT technique (54%) although the difference was not statistically significant ($p > 0.05$). The results showed that there was no association between age, gender and the prevalence of *Plasmodium* infection in this study. The awareness level of the use of insecticide- treated bed nets, insecticide spray among the Rumuekpe community was very poor. The major factors influencing the transmission of malaria parasite here include; poverty, ignorance, socio-cultural and background. Aggressive health enlightenment campaigns is advocated.

Keywords: Malaria, attitude, perception, ignorance, prevalence, rural setting, Nigeria.

Introduction

Malaria is an intermittent and remittent fever caused by a protozoa parasite of genus *Plasmodium* which invades the red blood cells and is transmitted by female *Anopheles gambiae* mosquitoes in many tropical and subtropical regions. It is a single-celled protozoan parasite that multiplies in red blood cells of humans and other animals including the mosquito intestine (Malaria.com, 2017). When the female mosquito feeds on an infected person, male and female forms of the parasite are ingested from human blood. Subsequently, the male and female forms of the parasite unite in the mosquito gut, a zygote is formed which is the ineffective stage. This infective form is passed onto another human when the mosquito feeds again.

Plasmodium which is the causative agent of malaria is divided into numerous sub-genera, and then again into hundreds of different species, of which five infect humans, *P. falciparum*, *P. vivax*, *P. ovale*, *P. malariae* and *P. knowlesi* (Filmer, 2001). Malaria is a significant global problem. There are approximately 216 million cases of the disease worldwide, killing about 655,000 people every year (Bouchier *et al.*, 2010). Malaria is

prevalent in Africa, Asia, the Middle East, Central South America, Hispaniola (Haiti and the Dominican Republic), and Oceania (Papua New Guinea, Irian Jaya, and the Solomon Islands). However, malaria is most prevalent in Africa where 60% of all cases are reported (Binka *et al.*, 1997).

The mosquito vector belongs to the Phylum Arthropoda, sub phylum Uniramia, the class Insecta, order Diptera, sub order Nematocera, infra order Culicomorpha, super family Culicoidae, family Culicidae, sub family, Anophelinae, genus Anopheles which has specie complex (Harbach, 2015). This study therefore aimed at investigating a local community's (Rumuekpe) knowledge, attitude and perception (KAP) of malaria and its prevalence.

Materials and Methods

Study Area

This study was conducted from June to August, 2015 in Rumuekpe Community located at $4^{\circ}57'49.5N$ and $6^{\circ}41'56.2E$ in Emohua Local Government Area, Rivers State, Nigeria. Administratively, the community has eight villages which are Ekwuche, Imogu, Ovelle Nvakoihia, Omegwa, Ovelle Oduoha, Mgbodo, Mgbuhie and Omeviri with only one ward. Agriculture is the main economic activity in the community. The major food crops grown are banana, maize, cocoyam, cassava, yam, okra, and fish farming.

In 2005, Rumuekpe experienced intra community clash that affected the eight villages and claimed many lives. The remnants fled to other tribes for protection. Between 2005-2009, the community was left uninhabited, overtaken by wild life, overgrown vegetation and multiplication of disease transmitting organisms such as mosquitoes, tsetse flies and rodents. In 2010 the population started to come home with Rivers State Government's help. The community became more exposed to malaria infections as most of their houses and shelters had been destroyed during communal crisis; the crises effects included food shortage,

unhygienic environment, hardship, poverty and crisis phobia. Many of the returnees could not afford good shelters more than five years after they were home.

Ethical Considerations

Verbal informed consent was obtained from the volunteers. Ethical approval was obtained from the community heads after submitting an introductory letter from the University of Port Harcourt explaining the purpose of the research.

Socio-Demographic Data Collection

A well structured questionnaire was used to investigate the people's knowledge, attitude and perception towards malaria. Also with the help of the questionnaire, the people's knowledge were assessed on mode of malaria transmission, symptoms, treatment seeking behaviour and the use of insecticide-treated bed nets. Only 200 respondents voluntarily participated in this exercise. A total of 200 people in Rumuekpe consisting of 90 males and 110 females were interviewed with the help of questionnaires.

Only 15 (7.5%) reported to have had obtained primary education, 74 (37%) had secondary education, and 10 (5%) had attained tertiary education, 21 (10.5%) stopped along the way, 80 (40%) reported to have never been to school. Out of the 200 participants 70 (30%) were in the age group 11-25 years, 32 (16%) in the age group 26-40 years, and 35 (17.5%) were found in the age group 41-55 years and 63 (31.5%) were in the age of 56-70 years. And out of these 85 (44.5%) participants were married. Occupational distribution of the subjects indicated that 66 (33%) were farmers, 53(26.5%) were petty traders, 79 (39.5%) were pupils and students, and 2 (1%) were traders and civil servant.

Blood Sample Collection

A random sampling of venous blood by phlebotomy samples was carried out according to Cheesbrough (2000). Out of the 200 participants who participated in the questionnaire interview, only 154 subjects consisting of 53 males and 101 females volunteered for blood sampling. Two milliliters



of venous blood was collected from each participants was immediately transferred into an EDTA tube to prevent coagulation and transported to the University diagnostic laboratory for analysis.

Laboratory Analysis

Preparation of thin blood films

Thin blood films were made by placing a drop of well homogenised blood on a clean microscope slide and another slide was placed at an angle 45⁰. It was then moved with a steady motion to form a film that has head and tail regions. The dried thin films were fixed with ethanol and stained with 10% Giemsa for 10 minutes; washed and air dried (Cheesbrough, 2000).

Preparation of thick blood films

Thick blood films were made by placing a drop of blood on a clean glass slide and using another slide to stir until a ring was formed and they were air dried and stained with fields stains (Cheesbrough, 2000).

Results

Malaria management approach in the study area

A total of 154 blood samples were collected, with an overall prevalence of 134 (87%) as shown in table 1. Of the 53 males examined, 48(90.6%) were infected, and 86(85.1%) of females were infected. The difference however was not statistically significant (p > 0.05). Table 2, shows the age-related prevalence of *Plasmodium* infection. There was no association between age and the prevalence of *Plasmodium* infection ($X^2 = 6.592, df = 3, p = 0.159$) as shown in the results. Age-group 11-25 years had the highest prevalence of 93.5%, followed by 26-40 years with 82.4% while 41-55 years had the least (66.7%) respectively.

Comparison of RDT and Microscopy techniques is shown on table 3 shows that the Microscopy dictated more infection (59.1%) than RDT (54%) although the difference was not statistically significant.

Table 1: Knowledge and attitude of the subjects to malaria

Knowledge and attitude	Sample size N=200	Responses N (%)
Source of information about malaria		
Home	33	33(16.5)
Radio	18	18(9)
Hospital	22	22(11)
Health workers	1	1(0.5)
Suffered from it	126	126(63)
Total	200	200(100)
Knowledge of transmission		
By bites of any mosquito	50	50(25)
By bites of infected mosquito	30	30(15)
Others	41	41(20.5)
Do not know	79	79(39.5)
Total	200	200(100)
How do you know it is malaria?		
Symptoms	177	177(88.5)
Lab. Test	23	23(11.5)
Total	200	200(100)

Symptoms of malaria used

Headache	82	82(41)
Fever	20	20(10)
Cold	37	37(18.5)
Cartarrh	13	13(6.5)
All of the above	48	48 (24)
Total	200	200(100)

Table 2: Malaria management approach in the study area

Management methods	sample size N=200	responses N(%)
Treatment		
Herbal	90	90(45)
Patent chemist	75	75(37.5)
Hospital	35	53 (17.5)
Total	200	200(100)
Preventive measure		
Using insecticide-treated bed nets	52	52(26)
Insecticide spray	23	23(11.6)
No any method	118	118(59)
Others	17	17(8.5)
Total	200	200(100)
Family members who sleep under bednets daily		
Children and mothers	15	15(7.5)
Every one in the house	50	50(25)
Father and mother	11	11(5.5)
Others	124	124(62)
Total	200	200(100)
Reasons for not possessing bednets		
Expensive	10	10(5)
Not available	30	30(15)
Reduce surrounding air	20	20(10)
Increase room temperature	100	100(50)
Cannot prevent malaria transmission	25	25(12.5)
No reasons	15	15(7.5)
Total	200	200(100)

**Table 3: Overall prevalence of *Plasmodium* infection based on gender**

Gender	No. Examined	No. Infected	Percentage Infection (%)	χ^2	p-value
Males	53	48	90.6		
Females	101	86	85.1		
Total	154	134	87	2.773	0.096

Table 4: Age related prevalence of *Plasmodium* infection in the study population

Age (years)	No. Examined	No. Infected	Percentage infection %	χ^2	p-value
11-25	92	86	93.5	6.592	0.159
26-40	17	14	82.4		
41-55	15	10	66.7		
56-70	30	24	80		
Total	154	134	87		

Table 5: Comparisons of rapid diagnostic test (RDT) and microscopy technique

Tecchnique used	Numberof subjects examine (%)	Numberof subjects infected (%)	X^2	p value
Rapid diagnostic test kit (RDT)	50 (100)	27 (54)	2.733	0.096
Microscopy	154 (100)	91 (59.1)		

Table 6- Prevalence of malaria based on preventive measures

Preventive measures	Number of subjects examine	Number of subjects infected	% infection	χ^2	p value
Insecticide bed net (IBN)	52	25	33.8		
Insecticide sprays (INs)	23	20	15		
No any method (NAM)	17	12	11.04		
Herbal method	62	43	40.3		
Totalling	154	100	64.9	6.592	0.159

Discussion

The commonly adopted method of malaria management in Rumuekpe community is the use of medicinal herbs placed on top of burning lanterns. As the herbs get dried they seemed to release some aroma that inhibit the mosquitoes’ respiratory processes and so demobilize them temporarily, thereby reducing the bite rate of mosquitoes on their victims. Another observed approach employed in the study area, is the use of mosquito coils, insecticide- treated bednets and the indoor residual spray. Although these later methods were effective preventive measures (Beier *et al* .,1999). Only a few in Rumuekpe use them because of the socio-economic reasons. These measures reduce parasite-host interactions and indirectly malaria prevalence. However, integrated control measures that will yield significant decline in malaria prevalence at minimal cost is advocated for, hence the malaria endemicity and poverty level are reasonably high in this community. The use of insecticide- treated bednets should be encouraged and made more available, accessible and affordable to the inhabitants. There is need for massive and aggressive health enlightenment campaigns in Rumuekpe community because contact with the vectors in this area is mostly done outside home hence there was no significant reduction in malaria prevalence among herbal therapy users and the elite group using ITNs in the study population.

Gender norms and values that influence the division of labour, leisure patterns, and sleeping arrangements may also have contributed to different patterns of exposure to mosquitoes’ bite to both gender. A thorough understanding of the gender- related dynamics of treatment-seeking behavior, as well as of decision-making, resource allocation and financial authority within households will positively effect malaria control programmes in these rural communities.

From the result of this study it seemed there was no association between age and the prevalence of *Plasmodium infection*. Age-group 11-25 years had the highest prevalence of 93.5%, followed by 26-40 years with 82.4% while 41-55 years had the least, 66.7%. The high malaria prevalence observed in this study could be attributed to several factors associated with high malaria endemicity like abandoned and lapidated homes in the neighbourhoods serving as good breeding sites for mosquito vectors. The psychosomatic effects of living in fear of further attack and horror of the past evidenced in their immediate environment could be debilitating enough to lower their immunity to diseases or course some emotionally induced illnesses capable of lowering their resistance to diseases. Factors influencing malaria prevalence in Rumuekpe include low standard of living, ignorance, poverty, socio-cultural and socio-economic backgrounds. These findings are in agreement with a preious report on Plasmodium



parasitaemia in Ababa-Adoni, Rivers State, which indicated that poverty could serve as a factor uniting the effects of poor educational background, defects on socio-cultural background, poor personal hygiene and ignorance (Wokem, 2006).

Of the 134 (87%) participants that were infected, males had a higher malaria prevalence (90.6%) than females (85.1%) although it is not statistically significant. This observation could be as a result of higher exposure rates due to more involvement of males in outdoor jobs like farming, fishing, besides, they could comfortably partially undress while working outside homes under hot weather whereas culturally females are forbidden to do same.

The Rapid Diagnostic Test (RDT) strips used were *Plasmodium falciparum* protein specific (histidine rich protein 11). It could only detect the presence of a corresponding antibody while in the microscopy, which is the routinely used and none species specific was able to identify only *Plasmodium falciparum* throughout the study. Earlier researchers have made similar observations in different parts of the country, showing that *Plasmodium falciparum* is most prevalent in this part of West Africa. Although the use RDT technique (54%) made the parasite identification easier without being electricity power dependent, faster and less skill demanding but microscopy technique (59.1%) remains the gold standard and more cost effective in poverty-stricken communities like Rumuekpe although the difference in prevalence rates was not statistically significant. The findings are in agreement with reports of earlier researchers (Endeshaw *et al.*, 2008; WHO, 2008). The use of the both diagnostic techniques when possible is commendable since accuracy of malaria diagnosis is becoming increasingly important due to problems of drug resistance and improper treatments, high endemicity, ignorance and poverty among this rural population.

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