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Community perception about the transmission and utilization of treated bed net in the control of malaria in Oyo state, Nigeria

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ABSTRACT

Background: Malaria control is a major challenge in many endemic countries including Nigeria; implementation of evidenced-based control strategies is therefore needful in the sustainability of malaria control programme.

Method: Across-section study was designed to assess perception in two communities of Oyo state using pre-tested structured questionnaire.

Result: Ninety six percent of respondents reported to have heard of malaria, though majority reported mosquito as major transmitter of the infection but only 22.6% has adequate knowledge of the correct transmission route. Misconception about the causative agent of malaria is high, only 13.2% mentioned *Plasmodium species* as the causative agent. The knowledge about the ecology of mosquito was greatly applauded in the study area. Health-seeking behaviors and possession of insecticidal treated bed net were found to be associated with socio-economic status of individual.

Conclusion: In spite of the high knowledge about malaria demonstrated in this study, some misconceptions about transmission and symptom still exist. The need to improve the spreading of information about malaria through rural dispensaries and primary health centers is essential for resounding success to be recorded.

Keywords: Malaria -treated bed net -Oyo state, Nigeria

INTRODUCTION

Malaria has continued as a leading cause of mortality particularly under-five year's children and pregnant women in the tropical African countries (WHO, 2000). Estimate shows that 3.3 billion people are at risk of contracting the disease worldwide (WHO, 2000, Ahmed *et al.* 2009; Snow *et al.* 2005). The infection has same effect on health and wealth of nations and individuals. In Africa, malaria is known to be a disease of poor and severe cause of poverty (Russell 2004; Aderaw & Gedefaw, 2013). This was revealed in a recent economic analysis of 150 countries where 44 countries with intensive malaria transmission grew 1.3 per cent less per year than countries without high levels of malaria. The study further revealed that a 10 per cent reduction in malaria was associated with 0.3 per cent higher economic growth. Thus, malaria reduces country productivity through loss of investment and reduced income

from tourism (Gallup and Sachs, 2001; Chuma *et al.* 2010).

In Nigeria, malaria incidence is increasing significantly accounting for a quarter of global malaria burden with the death rate of 79.3%. This is worrisome in spite of the roll back malaria programme initiated 15years ago (NMCP.2010; WHO 2014). The major control measures exploited in most affected communities include prompt treatment with drugs and vector control using Insecticide treated mosquito nets (ITNs). In spite of these approaches, morbidity and mortality due to malaria have remained unabated in many communities. This was attributed to series of observations among which are indiscreet use of antimalarial drugs, delayed health seeking, and reliance on the clinical judgment without laboratory confirmation in most of the peripheral health facilities (Mboera, *et al.* 2007; Mazigo *et al.* 2010).

A number of studies from different endemic zones have reported the existence of misapprehension and unsatisfactory control practices concerning malaria (Vundule and Mharakurwa, 1996; Hla-Shein *et al.* 1998; Miguel *et al.* 1999). Therefore, the community beliefs and practices with respect to the disease are required to obtain and maintain community participation in surveillance and integrated control approach (Ruebush II *et al.* 1994). This study is thus aimed at evaluating same amongst the residents of Oorelope Local Government Area of Oyo state on malaria to provide needful information in the formulation, implementation and sustainability of malaria control programme.

MATERIALS AND METHODS

The study was conducted in Igboho and Fomu communities of Oorelope Local Government, Oyo state. Igboho (latitude 88.3°N and longitude 37.5°E) is a semi-urban community and headquarters of Oorelope Local Government, while Fomu is a rural community about 12km from headquarters. The inhabitants of both communities are predominantly Yoruba ethnic group. Basic social amenities like pipe-borne water, electricity and health facilities are well established in Igboho and completely inadequate in Fomu. There is high level of illiteracy in Fomu with majority are subsistence farmers.

Data Collection:

Data were collected using semi-pre-tested structured questionnaire. The first part of the exercise was implored to assess the socio demographic variables, Knowledge of malaria, sign and symptoms. Lastly, attitude assessment part of the questionnaire tried to assess attitude towards malaria prevention, mode of treatment and possession/utilization of bed nets. The questionnaires were translated into Yoruba language and pre-tested in the same village.

Ethical clearance:

The study protocol was carefully to family heads, community leaders and local government authorities before the approval was given. Thereafter, respondents were voluntarily enlisted for the study.

Data analysis:

Statistical analysis was done using the SPSS version 16.0 software program. Descriptive statistics were carried out to measure relative frequencies and percentages of the variables. Cross tabulations of variables were done, and chi-squared test (χ^2) was used to determine the statistical significance of differences of relative frequencies. The P. value of less than 0.05 is the base of the judgments.

RESULTS

Table 1 shows characteristics of the participants. A total of 500 people (51.6% males and 48.4% females. Mean age was 40.3 ± 13.0 years) were enrolled in the study. The educational level of respondents in the two communities were comparable, with vast majority 56.4% and 63.6% from Fomu were illiterate farmers and were living in adobe houses, respectively. The standard of living in Igboho is far better when compared with Fomu with 44.4% and 89.6% wage earners and were living in modern houses, respectively.

Table 1: Socio - Demographic Characteristics of the Study Population

Characteristics	Fomu (Rural) N (%)	Igboho (Urban) N (%)	Total N (%)
Age group			
18 – 27	19 (7.6)	61 (24.4)	80 (16.0)
28 – 37	64 (26.6)	61 (24.4)	125 (25.0)
38 – 47	84 (33.6)	72 (28.8)	156 (31.2)
48 – 57	27 (10.8)	28 (11.2)	55 (11.0)
58+	56(22.4)	28(11.2)	84 (16.8)
Sex			
Male	133 (53.2)	125 (50.0)	258 (51.6)
Female	117 (46.8)	125 (50.0)	242 (48.4)
Marital status			
Married	195 (78.0)	163 (65.2)	358 (71.6)
Single	20 (8.0)	59 (23.6)	79 (15.8)
Widow/widower	35(14.0)	28(11.2)	63(12.6)
Educational status			
Not educated	141 (56.4)	21(8.4)	162 (32.4)
Primary	81(32.4)	24 (9.6)	105 (21.0)
Secondary	23 (9.2)	81 (32.4)	104 (20.8)
Tertiary	5 (2.0)	124 (49.6)	129 (25.8)
Occupation			
Wage earner	14 (5.6)	111 (44.4)	125 (25.0)
Farming	148 (59.2)	29 (11.6)	177 (35.4)
Unemployed	21 (16.0)	57(22.8)	78(15.6)
Others	48 (19.2)	53 (21.2)	101 (20.2)
House type			
Vegetal roof	29 (11.6)	19 (7.6)	48 (9.6)
Cement blocks	52(20.8)	224 (89.6)	276(55.2)
Adobe	159 (63.6)	6 (2.4)	165 (33.0)
Others	10(4.0)	1 (0.4)	11 (2.2)

Respondents' knowledge about malaria and its transmission are shown in Table 2. A total of 480 (80%) of the study population had heard about malaria from different sources. Twenty three percent of young people reported to have got the information through radio programme, 43.2% and 55.5% of young and adult respondents respectively got it via being a victim of malaria infection with only 66/480 identified *Plasmodium species* as a causative agent of malaria.

The vast majority of our study population reported that the infection can be transmitted by any mosquito with only 22.6% correctly said that transmission is through bites of mosquito which has bitten malaria patient. Stagnant water was mentioned by more than 2/3 of respondents to be the main areas for mosquito breeding. Farmers were highly believed to be susceptible to infection more, only 10.2% and 9.0% reported that pregnant and children respectively were the most susceptible victim of malaria infection. Lastly, 94.2% of the study population believed that malaria can lead to death.

Table 2: Respondents' knowledge about malaria and its transmission

Variables	Total N (%)	Young N (%)	Adult N (%)	P. value	
Heard of malaria	Yes	480 (96.0)	255(53.1)	225(46.9)	0.062
	No	20 (4.0)	3 (15)	17 (85.0)	
Source of Information?					
Relation(father, mother, sibling & others)	43 (8.6)	26 (9.5)	17 (7.5)	0.419	
Radio /Television	96 (19.2)	64 (23.4)	32 (14.1)	0.008	
Health center	124 (49.6)	71 (57.3)	28 (12.3)	0.871	
Medical officers	61 (12.2)	36 (13.2)	25 (11.0)	0.460	
When I had infection	244 (48.8)	118(43.2)	126(55.5)	0.006	
Others	17 (3.4)	11 (4.0)	6 (2.6)	0.394	
Mode of transmission					
Any mosquito bite	328 (65.6)	181(66.3)	147(64.8)	0.718	
Only infected mosquitoes	113 (22.6)	64 (23.4)	49(21.6)	0.621	
Food	43 (8.6)	20 (7.3)	23(10.1)	0.265	
Do not know	38 (7.6)	18 (6.6)	20(8.8)	0.352	
Do you know <i>Plasmodium</i> as the causative agents					
Yes	66 (13.2)	45 (16.5)	21 (9.3)	0.017	
No	434(86.8)	233(53.7)	201 (46.3)	0.918	
Where do mosquitos breed?					
Stagnant water	366 (73.2)	196(71.8)	170(74.9)	0.437	
Tall grasses	47 (9.4)	18 (6.6)	29 (12.8)	0.018	
Bushes	89 (17.8)	47 (17.2)	42 (18.5)	0.708	
Others	23 (4.6)	16 (5.9)	7 (3.1)	0.140	
Which group suffers malaria more					
Children	45 (9.0)	28 (10.3)	17 (7.5)	0.282	
Pregnant women	51 (10.2)	35 (12.8)	16 (7.0)	0.034	
Farmers	388 (77.6)	201(73.6)	187(82.4)	0.019	
Students	5 (0.01)	3(60.0)	2(40.0)	0.361	
Others	13 (2.6)	9 (3.3)	4 (1.8)	0.283	
Do not know	7 (1.4)	2 (0.7)	5 (2.2)	0.164	
Period of high transmission					
Dry season	227 (45.4)	113(49.8)	114(50.2)	0.480	
Rainy season	273 (54.6)	160(58.6)	113(41.4)	0.213	
Can malaria result to death?					
Yes	471 (94.2)	225(47.8)	246(52.2)	0.405	
No	29 (5.8)	17 (58.6)	12 (41.4)	0.541	

Figure 1 below shows our respondents' understanding on various signs and symptoms of malaria, more than 3/4 of our study population mentioned severe headache, 70.2% and 59.8% associated intermittent fever and general body weakness, respectively to severe malaria infection. Other symptoms mentioned were including thirst, vomiting, restlessness, dark red urine, loss of consciousness and convulsion.

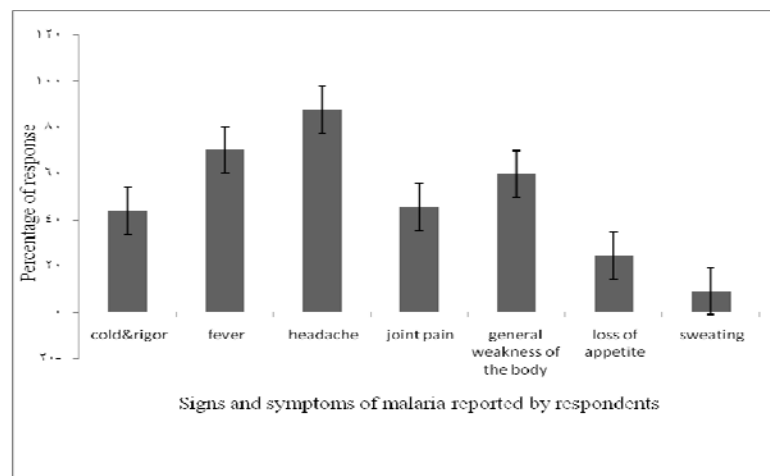


Fig. 1: Symptoms and signs of malaria mentioned by respondents.

Respondents' knowledge about malaria preventive measure is applauded with only 3.0% of the participants had a belief that malaria cannot be prevented (Table 3). More than 40.0% reported that the use of insecticidal treated net is the best measure to be adopted, while a significant variation occur between young and adult on the use of insecticidal spray (25.3% vs. 15.9%, $P=0.010$).

However, 37.8% and 14.8% of the study subjects subscribed to the use of prophylactic treatment and destroying breeding/resting places of mosquitoes respectively as a means of preventing malaria infection. Various way indicated by our interviewers to remove/destroy mosquito breeding/resting places are shown in Table 3 with 46.0% and 26.2% correctly mentioned avoiding stagnant water and clearing bushes around the house respectively. The latter is statistically significant among the young than in adult ($P=0.032$) with former had higher preference for it. Treatment seeking practice of our study population revealed that higher percentage of adult always seeking traditional medicine and 60.4% of young people particularly from Igboho patronize hospital/dispensaries for malaria treatment. A very tiny fraction still affirmed that there is no cure for malaria infection so they don't border themselves with any form of treatment with only 15.0% relied on self-treatment.

Responses about the possession and usage of insecticidal treated bed net (ITN) are shown in Table 4. More than 60% reported to have insecticidal treated bed net (ITN), while 47.1% and 16.2% ascribed their failure to have tounavailability and cost of the net respectively.

Table 3: Respondents' knowledge about malaria preventive measures

Variables	Total N (%)	Young N (%)	Adult N (%)	P. value
How do you prevent malaria?				
use insecticidal bed net	205(41.0)	112(41.0)	93(41.0)	0.990
sprays insecticides	105(21.0)	69 (25.3)	36(15.9)	0.010
use mosquitos coil / repellent	74(14.8)	38 (13.9)	36(15.9)	0.543
destroying breeding/ resting places of mosquito	34(6.8)	14 (15.1)	20(8.8)	0.103
use prophylactic drugs	189(37.8)	94 (34.4)	95(41.9)	0.089
Does not know	29(5.8)	15(51.7)	14 (4.0)	0.249
How do you prevent mosquitos breeding				
Clean of houses	190(38.0)	103(37.7)	87(38.3)	0.891
Draining stagnant water/remove water-holders	230(46.0)	126(46.2)	104(45.8)	0.940
Clearing bushes around the house	131(26.2)	61(46.6)	70(30.8)	0.032
Others	23(4.6)	11(4.0)	12(5.3)	0.504
Do not know	17(3.4)	6 (2.2)	11(4.8)	0.104
How do you treat malaria in case you have?				
Traditional medicine	168(33.6)	78(28.6)	90 (39.6)	0.009
Orthodox	300(60.0)	165(60.4)	135(59.5)	0.826
Self-medication	75 (15.0)	44 (16.1)	31 (13.7)	0.443
No cure	14 (2.8)	7 (2.6)	7 (3.1)	0.726

Table 4: Responses about the possession and utilization of Bed Net

Variable	N	%
Do you use bed net		
Yes	430	86.0
No	70	14.0
Type of bed net used		
Treated	303	60.6
Untreated	36	7.2
I don't know	91	18.2
P. value	0.008	
Why you did not possess treated bed net?		
Cost	11(16.2)	
Not available	32(47.1)	
Increase heat/ Reaction	11(4.4)	
Not effective	2(2.9)	
No reasons	9(13.2)	
I don't believe it	5(7.4)	
P. value	0.133	

DISCUSSION

Knowledge of the community beliefs and practices with respect to malaria is essential predictor and can be incorporated into formulation and implementation strategies to ensure sustainable community based intervention and health education scheme in most of the endemic regions of the world (Vijaya kumar *et al.* 2009; Nieto *et al.* 1999).

Our study revealed that there is moderate understanding of malaria causes, symptoms, treatment and, preventive measures in the study area as reported by various authors across different endemic region (Ahmed *et al.* 2009; Hlongwana *et al.* 2009; Mazigo, *et al.*, 2010, Njama, *et al.*, 2003). More than ninety six percent of the respondents reported to have heard of malaria through different means with vast majority believed that it is leading cause of morbidity and mortality in their communities and this was in agreement with Singh, *et al.*, (2014) in his studies in Aliero Local Government area in Northern Nigeria. The chief source of information was from individuals' personal experiences with malaria as earlier reported by Singh, *et al.*, (2014), followed by radio program. This underscores the fact that malaria is endemic in Nigeria especially in the study area and high accessibility of the people to mass media especially radio program respectively. However, this is not enough to preempt the in-depth understanding about malaria but should be seen as a ground through which a whole range of issues about malaria should be understood (Hlongwana *et al.* 2009).

Like in every other high malaria transmission zones in the sub-Saharan Africa, many of our respondents associated mosquito bites with malaria transmission with very few fraction of the study population mentioned transmission route of the infection correctly i.e. bites of mosquito which has bitten malaria patient though none of them knew the mechanism of its contamination. This is similar to the observations of Mazigo *et al.* 2010 and Ahmed *et al.* 2009 in their separate studies in Tanzania and Bangladesh respectively. The interviewers' knowledge about the transmission of malaria is very low particularly among the poor and illiterates in the study area and this may be attributable to their low socio-economic status that disengaged them from enjoying some basic infrastructural amenities that can facilitate their better understandings. Therefore, Public health enlightenment scheme should continue to be designed to bridge up the existing gap of knowledge as found in the study area and be implemented accordingly to ensure sustainable vector control as earlier recommended by Kroeger *et al.* 1996.

Generally, the knowledge of the causative agent of malaria is very low in the study area with more of young accurately identified *Plasmodium* species as the causative agent; this may be due to the level of the education and exposure of the young people. Misconceptions about the cause of malaria are common among the respondents as 2.6% and 3.0% reported germs and sunlight as the causative agent respectively even some in the study area ascribed it to be supernatural and this is in concordance with other similar studies in different location, for instance Mazigo *et al.* 2010 reported that only 6% of his study population could identify *Plasmodium* species as the causative organism (Aderaw & Gedefaw, 2013, Singh, *et al.*, 2014). This indicated that preventives activities in the study area and most of endemic region emphasized more on mosquitoes than the actual parasites that causes malaria. Thus, elimination of these misapprehensions is essential in the quest towards malaria prevention and control. The result of our study revealed good knowledge about mosquitos' behaviors which is indispensable if the vector campaign programmes are

to record a resounding success (Singh, *et al.*, 2014). More than two-quarter of the respondents stated correctly the breeding site of the mosquitos' i.e. stagnant water as the breeding site of mosquito and the majority of them did not only reported the female mosquito as the transmitter but also that they are in abundance in the rainy season. The observation agreed with other studies in Nigeria (Erhun, *et al.*, 2005, Singh, *et al.*, 2014). They attributed the abundance of mosquitoes during rainy season to much stagnant water, tall grasses and bushes that characterized the season as good breeding sites for mosquitos. They further indicated their better understanding concerning vector control with large proportion of the participants correctly mentioned that draining stagnant water and clearing of bushes around the house were means of destroying the breeding site of mosquitos. This is no doubt show the level of success of the vector awareness campaign mostly engaged in malaria endemic region.

Investigations on communities' knowledge of the signs and symptoms showed that headache, fever, general body weakness and joint pain were identified as major signs of malaria by large proportion of the our study subjects; and this agrees with the observation reported in other studies across the endemic region (Deressa, *et al.*, 2003, Parajuli & Ghimire, 2004, Chovatiya, *et al.*, 2013, Iwueze *et al.*, 2013). This level of awareness may be due to self-experience of malaria, increased access to mass media and health education by health workers as observed in this study. In spite profound understanding of symptoms, failure to ascribe anemia and convulsion to malaria could lead to delay in seeking appropriate care from health facilities as suggested by different researchers (Mazigo *et al.* 2010; Singh, *et al.*, 2014).

Interestingly, majority of the respondents reported that medical center is a major place they visit for better treatment of malaria infection after trying other means particularly traditional medicine such as herb for long period of time which is consistent with the findings from related studies (Mazigo, *et al.*, 2010, Iwueze, *et al.*, 2013). It was observed that the choice of the preventive measure depends on the socio-economic statue of individual as reported by several authors (Armstrong-Schellenberg *et al.* 2003, Raso *et al.* 2005). This was exemplified in this study, where most of respondents in Fomu preferred self-medication and traditional medicine in case of severity giving reason that they are not financially upright to patronize hospital that is not only far from them but also expensive.

The use of insecticidal treated bed nets (ITN) is another option that reduces the degree of human-vector contact and this is crucial in the control of malaria infection as reported by Erhun., *et al.*, 2002. The data in our study support this finding with large proportion of the interviewers' indicated that ITN is efficacious option stating that it protects them from mosquito bites. De La Cruz *et al.* (2006) and Joshi & Banjara (2008) observed similar high level of knowledge on preventive use of bed net had been observed in Ghana and Nepal respectively. This high percentage of the respondents with bed net may be due to the Government's effort in malaria control through the distribution of free bed net to households. However, the possession of this net varies with socio-economics status of individual in the community because the poorer households were found to be disadvantaged in this respect. Like other studies in Tanzania (Mazigo *et al.* 2010; Mboera *et al.* 2007) unavailability, unaffordability to purchase a net and lack of maintenance culture (the hurdle of re-treating the net) were the major reported barrier in owning a net, though very small fractions of the participant do not belief in its efficacy. Therefore, effort has to be intensified in this regard in order to integrate these categories of people into compliance level of vector control programme.

The findings of this study show that the participants demonstrate high

knowledge on malariatransmission, symptoms, and preventivemeasures though some minute misconceptions about transmission and symptom still exist. However, low education and socio-economic status were observed as major clogs for the effective vector control programmeadvocated in the communities thus, intervention measures and information campaigns should focus on this high risk group. The need to improve the spreading of information about malaria through rural dispensaries andprimary health centers is essential for the resounding success to be recorded. The health care delivery system needs to align its services accordingly to influence the health-seeking behaviors of people by making vouchers available for low socio-economic statusgroups or by offering free or subsidized prevention andtreatment services.

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