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Community perceptions and home management of malaria in selected rural communities of Ogun state, Nigeria

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Abstract

Home Management of Malaria (HMM) is a component of the roll back malaria (RBM) programme being implemented for over a decade to reduce the malaria burden. This study examined the extent to which HMM has raised the ability in promptly recognising and treating malaria at home. This was a descriptive cross-sectional study of 262 pregnant women attending antenatal clinics and 233 mothers of under-five children using semi-structured questionnaire in Ijebu North and Yewa North local government areas of Ogun State. Data collection also involved focus group discussions. Quantitative and qualitative data were analysed using EpiInfo 6.04a and Textbase Beta softwares respectively. Only 32.7% of respondents knew about HMM. About 48% preferred analgesics unlike ACTs (0.6%) for malaria treatment. While 45.5% (61.1% Yewa North vs. 29.2% Ijebu North) knew LLIN, only 23.6% used it. Lack of awareness was the major reason for non-use of ACTs (86.1%) and LLINs (71.3%) in HMM. Locality, age, and education significantly determined awareness and use of ACTs and LLIN ($p<0.05$). Adequate information and stock of ACTs and LLINs should be made available and accessible for the RBM and MDG targets to be realised in the study communities.

Key words: Knowledge, Use, Home management of malaria, survey, Ogun State, Nigeria

INTRODUCTION

Malaria is a major cause of child mortality in Nigeria (UNICEF/NPC, 1998; Federal Ministry of Health, 2008) with approximately 100 million episodes in children under five years of age every year (Federal Ministry of Health, 2008). Mortality rate among children under five years is 143 per 1,000 live births in the country (World Health Organisation, 2012) and deaths among this category of children often occur within two days of developing symptoms of malaria (Diallo *et al*, 2001; World Health Organisation/UNICEF, 2003; Federal Ministry of Health, 2008).

Most early treatments for fever and uncomplicated malaria occur through self-treatment at home with antimalarials bought from patent medicine sellers (Okeke *et al*, 2006; Goodman *et al*, 2007). Treatments are rarely sought at health facilities and are most often inappropriate or delayed (Muller *et al*, 2003; Guyatt and Snow, 2004; Kofoed *et al*, 2004). Less than 15% of the malaria episodes treated at home are treated correctly. Most fevers in children (> 60%) are treated with simple fever drugs, such as paracetamol and aspirin, but not with antimalarials. Even when antimalarials are purchased, they are commonly (> 80% of cases) administered in inappropriate doses (World Health Organisation, 2004).

The Roll Back Malaria (RBM) programme was initiated in 1998 by the World Health Organisation (WHO) to make available a number of key evidence-based and cost-effective malaria control interventions that include home management of malaria (HMM) with emphasis on early and appropriate treatment of malaria particularly for children

Figure 1. Ogun State map showing the study LGAs

under five years old (World Health Organisation, 2001; Attaran *et al*, 2004). The RBM target through HMM was to ensure at least 60% and 80% of mothers of children under five years have access to information on HMM and affordable antimalarials for effective malaria treatment by 2005 and 2010 respectively in order to achieve the goal to halve malaria morbidity and mortality worldwide by 2010 and further reduce the burden by 50% in 2015 (Nabarro and Tayler, 1998; TDR News, 1999). This is expected to contribute to attaining the Millennium Development Goal (MDG) of halting malaria and beginning to reverse the incidence of malaria and other major diseases by the target date of 2015 (United Nations, 2000; Teklehaimanot *et al*, 2005).

The study on which this paper is based forms part of a larger study that examined the knowledge, attitude, and practices related to malaria control programme within the context of RBM among pregnant women and mothers of children under five years in selected communities of Ogun State, Nigeria. The need for this was because the systematic study of these factors relating to malaria in pregnancy and children under five years has not been adequately conducted in the State. The focus of this paper is to report on the sub-study that assessed the knowledge, perception and practices of HMM, awareness and adherence to the recent national policies on the prevention and treatment of uncomplicated malaria and factors that influence the use of malaria control tools and describe the extent to which HMM has raised the ability in promptly recognising and treating malaria at home particularly among mothers of children under five years with the 2010 RBM deadline now past and two years to the 2015 deadline of the Millennium Development Goal for malaria.

METHODOLOGY

Study area

The study was carried out in randomly selected Ijebu North and Yewa North local government areas (LGAs) of Ogun State, in the rain forest zone of South-Western part of Nigeria where malaria is holo-endemic and the RBM programme is being implemented. Two communities namely Oru/Awa-Ilaporu and Mamu and Igbogila and Ijoun were randomly selected for the study in Ijebu North and Yewa North LGA respectively. The inhabitants of the two LGAs are predominantly farmers and traders and there is high transmission of malaria during the rainy season between April and November (Ekanem, 1996; Omikunle, 1999; Ayanlade *et al*, 2010). The location of the two study LGAs in Ogun State is displayed in Figure 1.

The health facilities in Ijebu North LGA include a General Hospital, Primary Healthcare Centres (PHCs), health posts

and private clinics. Yewa North LGA also has a General Hospital, PHCs, health posts, private clinics and an alternative health clinic. Many patent medicine sellers abound in the two LGAs (INLG, 1997; Omikunle, 1999; YNLG, 2003).

Study design

This is a descriptive cross-sectional study on the knowledge, perception and practices of HMM, awareness and adherence to the recent national policies on the prevention and treatment of uncomplicated malaria and factors that influence the use of malaria management and control tools in the context of RBM programme in Ijebu North and Yewa North LGAs of Ogun State. The major target populations for the study were pregnant women and mothers of children under five years of age. A total 233 mothers of children under five years old and 262 pregnant women attending antenatal clinics were interviewed during the household and clinic survey respectively in the selected communities using the similar questionnaires but those administered to the pregnant women had an additional section on intermittent preventive treatment of malaria in pregnancy (IPTp).

The mothers of children under five years old were selected for the household survey using multi-stage sampling process with a combination of simple random and systematic sampling (Varkevisser *et al*, 2003). The first stage involved a random selection of two LGAs (Ijebu North and Yewa North) from the list of 20 LGAs in Ogun State using the simple random sampling technique. Adopting the balloting approach, the names of the LGAs were written on pieces of paper and grouped into 3 according to the geo-political zone they belong, placed in 3 containers to represent the 3 geo-political zones in the State, shuffled and one LGA was subsequently picked from 2 of the 3 containers randomly selected. The second stage involved a selection of two communities in each of the LGAs using earlier explained balloting approach without replacement. The third stage involved the random selection of enumeration areas (EAs) i.e. one EA for each rural community and three EAs for each semi-urban community selected. In doing this, a list of all the EAs based on the 2005 national census delineation exercise in the selected LGAs was obtained from the National Population Commission (NPC). Subsequently, a systematic sampling of 96 and 19 households from Oru/Awa-Ilaporu and Mamu in Ijebu North LGA and 109 and 9 households from Igbogila and Ijoun in Yewa North LGA were made. Thereafter, a mother of an under five child from each selected household was selected for interview. In situations where a mother of an under five child was not found in a selected household, the next household was then selected.

For the clinic survey, the sampling frame for the selection of the study units in the clinic survey was the list of pregnant women registered for antenatal care at the selected health facilities. They were randomly selected and interviewed on exit from the clinic. Here, the names of those interviewed on exit from the clinics were noted on each visit to the selected health facilities in order to avoid duplication of respondents. The lists of names noted were subsequently destroyed for the purpose of maintaining confidentiality.

Data collection procedures

The study involved the use of pretested interviewer-administered semi-structured questionnaires and Focus Group Discussions (FGDs). The data collection process first involved a formative qualitative study of people's perceptions, beliefs and practices concerning malaria prevention and treatment through FGDs and in-depth interviews. This was then followed with the use of questionnaires developed based on the outcomes of the formative study.

The contents of the first section of the questionnaires were mainly the identification features of the instrument. The second section of the questionnaires contained questions on the background characteristics of the respondent such as age, religion, level of education, marital status, and occupation. Questions in the third section probed respondent's knowledge on the mode of malaria transmission, knowledge of signs and symptoms of malaria, prevention and treatment of malaria, knowledge and use of LLIN, and type of antimalarials used for malaria treatment. The questions further probed the respondents' health seeking behaviour with emphasis on knowledge, attitude, perception and practices of home management of malaria for children under five years old, types of antimalarials used, and the extent of awareness and use of LLIN in malaria prevention.

Ethical considerations

Approvals at the State, Local, and Community levels were obtained prior to the commencement of the study in the communities. Ethical approval for the research protocol for the larger study with assigned number UI/EC/11/0075 was obtained from the University of Ibadan/University College Hospital (UI/UCH) Ethics Committee and was carried out in

accordance with universal ethical principles. The informed consent of all the research participants for the study was sought and obtained in written form using an informed consent form to signify their willingness to participate in the research.

Data analysis

The quantitative and qualitative data for each phase of the study were analyzed using EpiInfo 6.04a and the textual analysis programme, Textbase Beta softwares, respectively. Statistical analyses of the quantitative data were conducted using analysis of variance and chi-square tests at 95% level of significance. Analysis of variance (ANOVA) was used in showing the relationship between measurements of the mean and the variance or "random error" of each sub-group under study in order to provide information needed to determine if the difference between the two is significant, while chi-square which is a non-parametric test of statistical significance for bivariate tabular analysis, was used to know whether or not two different samples (of people) are different enough in some characteristics or aspects of respondents' behaviour.

RESULTS

Socio-demographic characteristics of respondents

Of the 495 respondents surveyed, 262 (52.9%) were pregnant women and 233 (47.1%) were mothers of children under five years. Most respondents were artisans (38.4%) and traders (25.9%) and had some formal education. The ages of the respondents ranged from 16 to 40 years, with a mean age of 28.8 years (27.9 years among pregnant women vs. 28.7 years among mothers of children under five years) and a median of 30 years (30 years among pregnant women vs. 23 years among mothers of children under five years). The socio-demographic characteristics of the respondents are presented in Table 1.

Respondents' awareness of Home Management of Malaria

Table 2 shows that only 32.7% of respondents had heard about HMM (33.0% of mothers of children under five years vs. 32.4% of pregnant women). The LGA and community of residence influenced the women's awareness of HMM. More women in Yewa North knew about HMM than those from Ijebu North as presented in Table 3.

How long the respondents have known HMM programme ranged from 1 to 72 months with an average of 4.4 months. Respondents in Yewa North LGA had longer period of awareness with a mean of 8 months compared to 1 month for those from Ijebu North LGA (χ^2=134.46, df=1, $p<0.05$). Their level of education had a direct association with their awareness of HMM programme (χ^2=24.80, df=3, $p<0.05$). More of the respondents who knew about HMM were younger, with a mean age of 28 years, compared with 29.2 years for those who did not know about it (χ^2=8.46, df=1, $p<0.05$). More (37.6%) pregnant women visiting public hospitals for antenatal care knew about HMM compared to 24.8% among those visiting private hospitals. The odds ratio of 0.55 has a 95% confidence interval of 0.30-0.98, and chi square with Yates correction is 4.15 with a p-value < 0.05.

Previous training on Home Management of Malaria among respondents

When asked if they have actually received health education on HMM, only 30.3% of the 495 respondents had actually received health education on HMM (55.6% Yewa North vs. 4.1% Ijebu North; 21.0% private vs. 32.5% public; 33.0% of mothers of children under five years vs. 27.9% of pregnant women) while 69.7% reported otherwise.

The sources of information on HMM among those who had received health included: health workers (96.7%). college/university (2.7%) and participation in training workshops (0.7%). On asking the respondents who knew about HMM to define what they learnt about it, most (96.0%) reported learning how to promptly and adequately treat malaria particularly in children at home, while 3.3% of the respondents said they were taught how to prevent malaria and 0.7% were indifferent. How long they had received training on HMM ranged from 1 to 48 months with an average of 11 months and a median of 8 months.

Table 1. Socio-demographic characteristics of respondents

Socio-demographic characteristics	Pregnant women		Mothers of under-5 children		Total	
Local Government Area						
	Number	%	Number	%	Number	%
Yewa North	133	(50.8)	119	(51.1)	252	(50.9)
Ijebu North	129	(49.2)	114	(48.9)	243	(49.1)
Total	262	(52.9)	233	(47.1)	495	(100.0)
Communities						
Igbogila	123	(46.9)	109	(46.8)	232	(46.9)
Ijoun	10	(3.8)	9	(3.9)	19	(3.8)
Oru/Awa/Ilaporu	108	(41.2)	96	(41.2)	204	(41.2)
Mamu	21	(8.0)	19	(8.2)	40	(8.1)
Total	262	(52.9)	233	(47.1)	495	(100.0)
Religion						
Christianity	193	(73.7)	146	(62.7)	339	(68.5)
Islam	69	(26.3)	83	(35.6)	152	(30.7)
Traditional	0	(0.0)	4	(1.7)	4	(0.8)
Total	262	(52.9)	233	(47.1)	495	(100.0)
Marital Status						
Never married	3	(1.1)	6	(2.6)	9	(1.8)
Married	258	(98.5)	225	(96.6)	483	(97.6)
Divorced	1	(0.4)	1	(0.4)	2	(0.4)
Separated	0	(0.0)	1	(0.4)	1	(0.2)
Total	262	(52.9)	233	(47.1)	495	(100.0)
Education						
None	52	(19.8)	42	(18.0)	94	(19.0)
Primary	86	(32.8)	52	(22.4)	138	(27.9)
Secondary	103	(39.3)	111	(47.6)	214	(43.2)
Post-secondary	21	(8.0)	28	(12.0)	49	(9.9)
Total	262	(52.9)	233	(47.1)	495	(100.0)
Occupation						
Unemployed	1	(0.4)		(0.4)	2	(0.4)
Housewife	23	(8.8)	20	(8.6)	43	(8.7)
Farming	41	(15.6)	17	(7.3)	58	(11.7)
Artisan	76	(29.0)	114	(48.9)	190	(38.4)
Civil servant	19	(7.3)	25	(10.9)	44	(8.9)
Professional (e.g. Banker)	8	(3.1)	12	(5.2)	20	(4.0)
Trading	86	(32.8)	42	(18.0)	120	(25.9)
Student	5	(1.9)	0	(0.0)	5	(1.0)
Other	3	(1.1)	0	(0.0)	3	(0.6)
No response	0	(0.0)	2	(0.9)	2	(0.4)
Total	262	(52.9)	233	(47.1)	495	(100.0)

Respondents' perceived signs/symptoms of malaria

Many of the respondents had correct knowledge of the signs/symptoms of malaria. The main signs/symptoms mentioned were: high body temperature (97.8%); headache (95.6%); vomit (13.7%); convulsion (6.3%); change in urine colour (72.5%); cold/catarrh (33.1%); loss of appetite (26.3%); body ache/joint pain (83.8%); change in eye colour

Table 2. Respondents' awareness of HMM according to their status

Awareness of HMM	Respondent status				Total	
	Mothers of children under five years		Pregnant women			
	Number	%	Number	%	Number	%
Yes	77	**33.0**	85	**32.4**	162	32.7
No	156	32.4	177	67.6	333	67.3
Total	233	100.0	262	100.0	495	100.0

Note: RBM target on access to information on HMM among mothers of children under five: 60% by 2005 and 80% by 2010 (Nabarro and Tayler, 1998)

Table 3. Respondents' awareness of HMM according to LGA and community

Local Government Area	Awareness of HMM					
	Yes		No		Total	
	Number	%	Number	%	Number	%
Yewa North	151	**59.9**	101	40.1	252	50.9
Ijebu North	11	**4.5**	232	95.5	243	49.1
Total	162	32.7	333	67.3	495	100.0
χ^2 = 172.42 df=1	p<0.05					
Communities						
Igbogila	139	**59.9**	93	40.1	232	46.9
Ijoun	12	**63.2**	7	36.8	19	3.8
Oru/Awa/Ilaporu	10	**4.9**	194	95.1	204	41.2
Mamu	1	**2.5**	39	97.5	40	8.1
Total	162	32.7	333	67.3	495	100.0
χ^2 = 174.22 df=3	p<0.05					

Note: RBM target on access to information on HMM among mothers of children under five: 60% by 2005 and 80% by 2010 (Nabarro and Tayler, 1998)

(3.6%); tiredness (0.6%) and others such as heat rash (0.8%). Given that the defining sign/symptom of malaria is fever, the proportion who mentioned fever was very high. Only 6.3% mentioned convulsion, a sign of severe malaria. The distribution of the signs of malaria mentioned by respondents according to their status is displayed in Figure 2.

How soon treatment is given at home for malaria among respondents

When asked how soon they give or seek treatment, most (65.9%) respondents reported that they take action within the home or seek appropriate healthcare outside the home within 24 hours of onset of malaria signs or symptoms. Furthermore, 26.7% seek care between 24 and 48 hours, and 7.3% reported they usually seek care after 48 hours. However, 0.2% of the respondents were indifferent. The summary of how soon the different categories of respondents take action after onset of malaria signs/symptoms is presented in Table 4.

Older respondents with a mean age of 30 years were more likely to take action within 24 hours compared to younger ones with a mean age of 26.6 years who were more likely to do so after 24 hours (χ^2=47.96, df=3, p<0.05). Similarly, the respondents' level of education significantly had direct influence on their propensity to take action within 24 hours of onset of malaria signs or symptoms (χ^2=96.75, df=9, p<0.05). The LGA of residence also affected the women's health seeking behaviour as 98.4% of women in Ijebu North LGA compared to 34.5% from Yewa North LGA were more likely to take action against malaria within 24 hours (χ^2=228.06, df=3, p<0.05).

Table 4. How soon respondents take action after onset of malaria signs/symptoms

	Pregnant women		Mothers of children under five years		Total	
How soon?	**Number**	**%**	**Number**	**%**	**Number**	**%**
Within 24 hours	170	64.9	156	67.0	326	65.9
2 days	75	28.6	57	24.5	132	26.7
After 3 days or more						
Indifferent	16	6.1	20	8.6	36	7.3
	1	0.4	0	0.0	1	0.2
Total	262	52.9	233	47.1	495	100.0

Table 5. Preferred drugs for home treatment of malaria among respondents

	1st Choice		2nd Choice		3rd Choice		Cumulative	
Drug name	**Number**	**%**	**Number**	**%**	**Number**	**%**	**Number**	**%**
Chloroquine	92	18.6	113	22.8	54	10.9	259	17.4
Sulphadoxine-pyrimethamine	112	22.6	160	32.3	187	37.8		30.9
Analgesics	239	48.3	91	18.4	49	9.9		25.5
Other antimalarials e.g cotecxin & artesunate								
ACTs	18	3.6	49	9.9	46	9.3		7.6
Other e.g. antibiotics, herbs, multi-vitamins & haematics	3	0.6	4	0.8	4	0.8	11	0.7
No response								
	18	3.6	60	12.1	110	22.2	188	12.7
	13	2.6	18	3.6	45	9.1	76	5.1
Total	495	100.0	495	100.0	495	100.0	1,485	100.0

Note: RBM target on access to ACTs for effective malaria treatment particularly among children under five: 60% by 2005 and 80% by 2010 (Nabarro and Tayler, 1998)

Preferred antimalarials in home management of malaria

The cumulative responses highlighted in Table 5 show that only 11 (0.7%) of 1,485 responses mentioned ACTs when asked to name three antimalarials they preferred taking for malaria treatment at home if any members of their household has malaria. This is in contrast to 30.9%, 25.5% and 17.4% that preferred sulphadoxine-pyrimethamine-based, chloroquine-based antimalarials and analgesics respectively. Table 5 further showed that more respondents preferred analgesics with paracetamol (48.3%); chloroquine-based antimalarials (18.6%); and sulphadoxine-pyrimethamine-based antimalarials (22.6%) as their first drug of choice for malaria treatment respectively. Figure 3 illustrates the status of the respondents and their drugs of choice for malaria treatment.

When respondents were asked whether they have ever taken ACTs, only a few (3.6%) [6.0% Yewa North vs. 1.2% Ijebu North and 4.6% pregnant women vs. 2.6% mothers of children under five years] said they had ever taken the new combination drug. Of the remaining 96.4% who have never taken ACTs, their reasons for non-use of ACT included: didn't know about it (85.0%); drug not available around (9.0%); can't afford it (2.0%); doubt its efficacy (1.0%); and 3.0% did not respond.

Preventive measures respondents take against malaria

Preventive measures respondents reported taking against malaria were: chemical spraying with insecticides (70.9%), clean surroundings (24.2%), use of window/door screens (16.2%), using LLINs (15.2%), taking home drugs (2.9%),

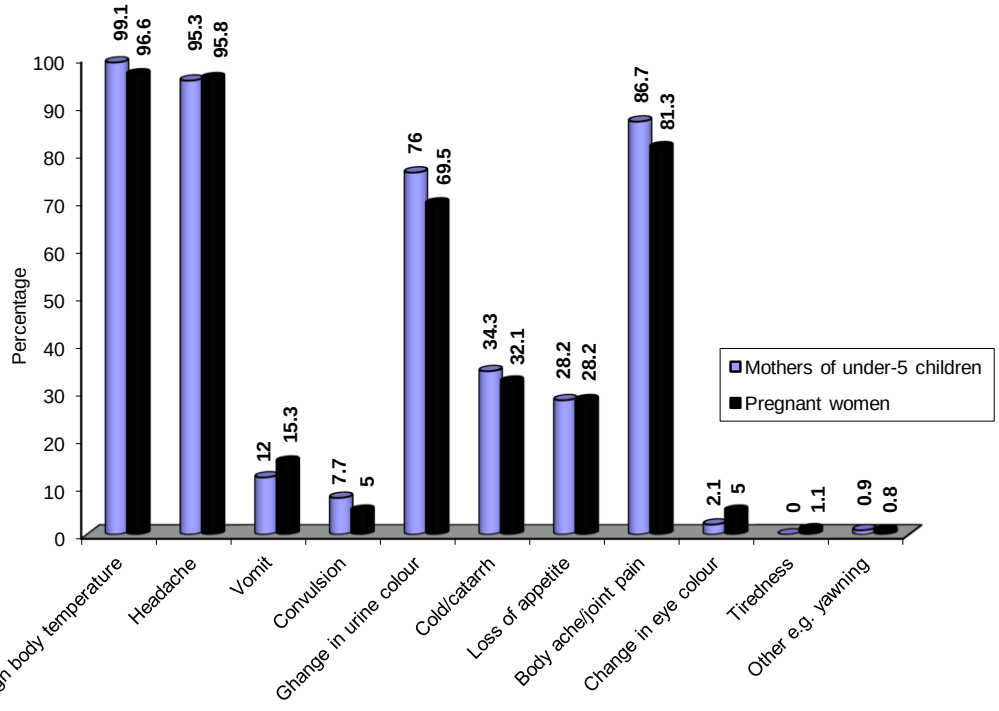

Figure 2 Signs of malaria mentioned by respondents

using untreated nets (2.4%), taking herbs (1.0%) and avoiding stress (0.4%). A very few (1.6%) pointed out not taking any preventive step against malaria. Figure 4 illustrates the different ways of preventing malaria among the different categories of the respondents interviewed.

Reasons for non-use of LLINs malaria prevention by respondents

The most common reason for not using LLIN was lack of awareness (71.0%). Other reasons included: preference for chemical spraying (9.0%); “can’t afford to buy” (7.0%); “net causes heat” (4.0%); “not interested in nets” (4.0%); and “do not know where to buy it” (2.0%). A few (3.0%) did not give any reasons.

DISCUSSION

It is encouraging that most respondents knew the signs/symptoms of malaria which is a key component of HMM. The high knowledge of the signs/symptoms of malaria by a larger proportion of the respondents is encouraging. This is because correct knowledge of the signs/symptoms would significantly influence one’s ability to take early and appropriate action to treat malaria at the onset of any of its signs/symptoms without delay. In view of the number who knew about HMM, their ability to have correctly mentioned the vital signs of malaria could perhaps be attributed to the fact that malaria has been an age long health problem which information relating to it had been passed on from one generation to another based on personal experience or through informal sources that include relations, friends and neighbours rather than any previous formal training on HMM.

The implication of misconceptions about the sign/symptom of malaria as evident in Figure 2 is that such people will be taking inappropriate steps in both the prevention and treatment of malaria out of ignorance. The consequences of poor knowledge of malaria prevention and treatment attributable to ignorance cannot be overemphasized as reported by WHO (2004) and Ajayi *et al* (2007). Health education emphasizing convulsion in a child as a sign of severe malaria that needs prompt referral to the hospital for appropriate health care is seriously advocated particularly for mothers of children under five years in the communities given that a few of them mentioned convulsion as a sign of uncomplicated

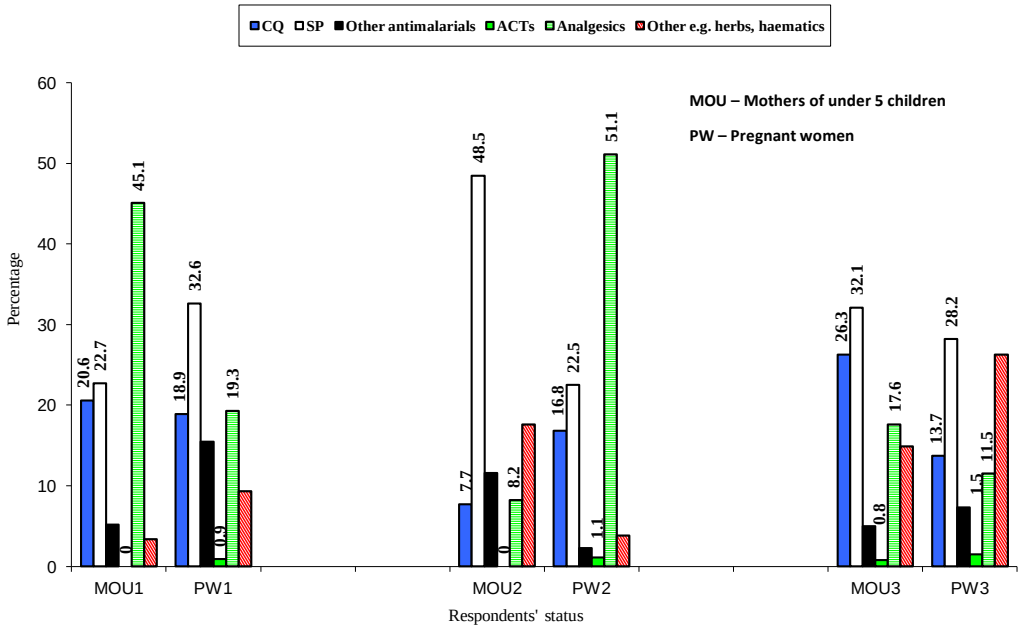

Figure 3. Drugs of choice for malaria treatment among respondents

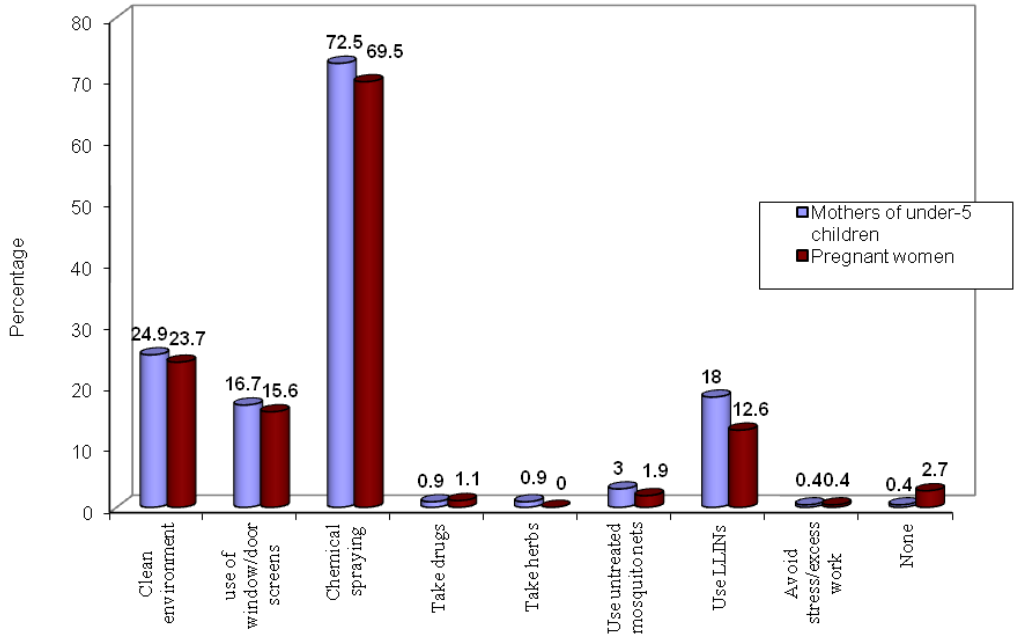

Figure 4. Preferred ways of preventing malaria by respondents according to status

malaria. This suggests the urgent need to intensify health education on malaria emphasizing the signs/symptoms of malaria as essential components of the HMM programme, dispelling all misconceptions about signs/symptoms of malaria. Improved knowledge on these will empower people on how to recognize and promptly take appropriate action to treat malaria at the onset of the signs/symptoms. Minimising delays to treatment is vital particularly for children under five years because death consequent to malaria can come in a matter of hours or days as emphasized by Diallo *et al* (2001), World Health Organisation/UNICEF (2003) and Federal Ministry of Health (2008).

There appeared to be inhibitions to prompt care for febrile children within 24 hours of onset of signs/symptoms among a fairly large number of the mothers of children under five years. Given that prompt treatment of fever is one indicator of measuring the quality of case management, it is pertinent to highlight the fact that the respondents' age influenced their awareness of HMM and how soon they take action in the home particularly for their febrile children under five years. Experience of the women perhaps could have played a major role in this context. Older women tended to start taking action within 24 hours, relying on their wealth of experience as it concerns the importance of child-care and survival in view of the consequences of malaria. This is unlike the younger ones who tended to take action after 24 hours of onset of febrile conditions. The number of mothers of children under five years who treated their children within 24 hours of onset of signs of malaria in Table 4 was higher than that reported by Yusuf *et al* (2009). Efforts therefore need be intensified on health education with emphasis on the importance of identifying vital malaria signs and giving prompt and appropriate care to febrile children within 24 hours of onset of the signs/symptoms as advocated by World Health Organization (2004). Such health education package should target more of the younger women having children under five years particularly those under 30 years of age, mothers with little or no education and those resident in Yewa North LGA.

Given that the World Health Organisation (1995) reported that women in Nigeria and Kenya considered radio as an important medium for receiving health information and that radio programmes have the advantage of being accessible to all family members, so that the information can be shared, referred to and discussed, we suggest the use of the radio for the dissemination of the information promoting HMM. Similarly, schools, markets and religious places could serve complementary effective channels for the public health education.

We believe the health education can be carried out using "mother trainers" or "role model mothers" in training other members of their communities, particularly women, using a treatment protocol designed for that purpose as successfully implemented by Ajayi *et al* (2007). The potential for utilization of "mother trainers" or "role model mothers" in improving access to malaria treatment at the community level is promising. It is believed that women have good potentials to effectively carry out health education activities in the community if appropriately selected, trained and supervised. The implementation of the HMM strategy aimed at improving malaria management at home particularly for children under five years could also work through men, or at least with their support and cooperation in the community. This is in view of the pivotal role they play in decision making and finance in determining the health of their household members.

Table 5 and Figure 3 showed poor chemotherapeutic practices among the respondents. In a situation where the National Policy on Malaria Diagnosis and Treatment (Federal Ministry of Health, 2005; 2010) promote the treatment of uncomplicated malaria with ACTs, one might assume that ACTs would currently be the preferred drug of choice for malaria treatment by people. On the contrary, it is disappointing that the assumption was wrong. Invariably, this is an indicator of poor implementation of the policy change in the use of antimalarials in the study communities as emphasized in the National Policy on Malaria Diagnosis and Treatment document. It is apparent that many people did not know about ACT and that the declassified antimalarials including chloroquine, sulphadoxine-pyrimethamine are still being distributed, marketed and used for malaria treatment. This is contrary to the Resolution 12.5 of the World Health Assembly that advocated for the discontinuation as emphasized in the National Policy on Malaria Diagnosis and Treatment document. This perhaps explains the low use of ACT. To overcome this challenge, drug regulatory authorities such as the National Agency for Food and Drug Administration Control (NAFDAC) therefore need to intensify efforts in stopping further local production, importation, distribution, and marketing of the declassified antimalarials.

The low use of ACTs could similarly be attributed to the fact that treatment for uncomplicated malaria is rarely sought at health facilities where the ACTs could have been prescribed for use. Moreover, a situation where some of the respondents use artemisinin monotherapy contrary to ACT based on self-medication and or prescription by mostly private health providers and patent medicine sellers is worrisome as many of these outlets probably had existing stock of chloroquine. Hence, the behavioural patterns in the use of ACTs relative to other cheaper and ineffective antimalarials by consumers as demonstrated in this study need be taken into account when considering the treatment policy on malaria in the study communities. It is important that social mobilization and public health education be carried out to increase awareness about ACT in the communities emphasizing its efficacy as a way of counteracting the wrong perception a few respondents had.

It needs be re-emphasised that the implication of the poor treatment practices of taking analgesics instead of recommended antimalarials exhibited by many of the respondents is that they tended to neglect the real cure of malaria by taking analgesics which are mere pain killers. This could perhaps be attributed to the fact that more than three quarters of all malaria cases are first treated at home with drugs purchased from small local drug shops without the advice of a health professional as reported by earlier studies (Muller *et al*, 2003; Guyatt and Snow, 2004; Kofoed *et al*, 2004; World Health Organisation, 2007). The prompt use of ACT as the first-line treatment drug as emphasized in the National Policy on Malaria Diagnosis and Treatment document particularly in the home will help reduce the evolution of uncomplicated malaria to a severe one and thereby minimize the life-threatening consequences of poor treatment or

delays. This finding is similar to results reported by Salako *et al* (2001) and Nsimba and Rimoy (2005) in studies on home management of malaria among mothers of children under five years in rural communities of Nigeria and Tanzania respectively.

In view of how long the HMM initiative has been in implementation, its poor awareness, the low proportion of ACT use presented in Table 5 and Figure 3 and LLIN use in Figure 4 for example are nowhere near the RBM target of 60% expected to be achieved by 2005 not to mention the 80% target expected for 2010. The results are however higher than those of the Nigeria Demographic Health Survey 2003 and 2008 on household ownership and use of LLINs by children under five years in the country in general and Ogun State in particular (National Population Commission and ORC Macro, 2004; National Population Commission and MEASURE DHS ICF Macro, 2009). Moreover, the low use of ACTs reported in this study is higher compared to the finding of Ajayi *et al* (2008) in which none of the respondents had heard of ACT in a study of the feasibility and community perception on effectiveness of ACT use in the context of HMM in some communities of Oyo State, Nigeria.

The low use of ACTs and LLINs is perhaps not unconnected to respondents' ability to pay for ACTs and LLINs. The overwhelming health expenditure coming mainly from out-of-pocket expenditures vis-a-vis the expenditure share of household reported by the National Bureau of Statistics (2012) cannot be overemphasized in a situation where about 50% of the adult population experience at least one episode of malaria and children under five years have 2 to 4 attacks of malaria per year (Federal Ministry of Health, 2010). Given that the retail market price of an adult treatment course of ACT ranged from ₦130.00 (US$0.81) to ₦640.00 (US$4.00) with an average price of ₦340.00 (US$2.13) and the course for children ranged from ₦130.00 (US$0.81) to ₦480.00 (US$3.00) with an average price of ₦256.67 (US$1.60) in contrast to a cheaper prices of artemisinin monotherapies, and chloroquine- and sulphadoxine-pyrimethamine-based drugs that ranged from ₦50.00 (US$0.31) to ₦350.00 (US$2.19) with an average price of ₦130.00 (US$0.81) for a treatment dose (Adeneye pers. comm.), the challenge of choice of and preference for the cheaper declassified antimalarials for malaria treatment in the study communities over ACTs due to cost becomes imminent. Despite ACT's proven efficacy of improving malaria health outcomes, its cost and affordability as demonstrated in the study communities remain key areas for policy debate as emphasized by Muheki *et al* (2004). Hence, the behavioural patterns in the use of ACTs relative to other cheaper and ineffective antimalarials as demonstrated in this study need be taken into account when considering the treatment policy on malaria in the State in particular and country at large.

CONCLUSIONS

It is apparent that the low level of ACT use in home management of malaria as demonstrated in the study appears to provide an optimistic foundation for future wider acceptance and use in the communities; there is, however, the need for caution. This is because there could be possible mis-diagnosis and management of malaria for other febrile illnesses at home thereby contributing to over-diagnosis of malaria and irrational use of antimalarials which has the potential for facilitating resistance to these drugs by greatly increasing the number of people who are treated unnecessarily but will still be exerting selective pressure on the circulating parasite population as emphasised by Oliver *et al* (1991), Greenwood (1999) and WHO (2010). This becomes more challenging knowing that HMM is based on presumptive treatment through the recognition of symptoms and signs of malaria particularly fever. Knowing that accurate diagnosis is a vital part of good disease case management, the potentials of introduction of rapid diagnostic tests (RDTs) at the community level need be explored as RDTs become more widely available.

The HMM component of the RBM programme as currently implemented in the study LGAs falls short of ensuring that the RBM target of 80% coverage of LLIN and ACT awareness and use by 2010 are achieved. Poor malaria treatment practice heightened by poor awareness and low use of LLINs and ACTs in NMM below RBM targets was highly demonstrated in the study. Adequate RBM commodities with particular focus on LLINs and ACTs, and information through health promotion package need be made available and accessible for mothers and other care-givers of children under five years for the RBM targets of the HMM component and the MDG on malaria to be realized in the study communities and Ogun State in general.

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