Perception of Health Care Workers on Prevention and Treatment of Uncomplicated Malaria in Pregnancy

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Abstract

Introduction: Malaria is the commonest endemic disease, and the most vulnerable group of persons affected by malaria is the pregnant women. This has posed serious public health challenge in Nigeria; it is with these considerations that the Nigerian Government in the past few years has renewed efforts towards controlling malaria. Several interventions have been introduced amongst which were the introductions of Artemisinin-based combination therapies (ACTs) and massive distribution of long lasting insecticidal nets. Statistic has shown that 8 million women are pregnant every year in Nigeria and about 545 women out of every 100,000 die as a result of pregnancy-related complications.

Objectives: This study was done to ascertain the Diagnosis and treatment characteristics of malaria in pregnant women and assessed the training, work experience, knowledge, and perception of health workers regarding malaria in pregnancy, in North Western Nigeria.

Method: Arandom sampling method was carried out across 10 local governments and 15 health facilities in North Western Nigeria. Two participants from each facility gave a total of 300 health care workers recruited into this study.

Results: 91% of the participant believe that RDT /microscopy is the appropriate test for malaria; 38% of them agree that the test miss malaria cases while 14% believe that treatment should be given to a client that test Negative to either of the test. 37% of the participant prescribed Quinine, while 48% of the participant will prefer ACT and the least 2% will still go for Chloroquine.

Conclusion: This study exposed the under-diagnosis as well as miss treatment of malaria in pregnancy and the need for training and retraining of health care workers as well as establishing the malaria diagnosis quality assurance program to ensure the accuracy of malaria microscopy and RDT results at all levels.

Acronyms meaning

ACT   Artemisinin-based Combination Therapy
ANC   Antenatal Care / Clinic
CHEW   Community Health Extension Worker
JCHEW   Junior Community Health Extension Worker
CHO   Community Health Officer
DOT   Directly Observed Therapy / Treatment
HIV   Human Immunodeficiency Virus
IPT   Intermittent Preventive Treatment
LLIN   Long Lasting Insecticidal Net
mRDT   Malaria Rapid Diagnostic Test
SP   Sulphadoxine -Pyrimethamine
EPI   Expanded Programme on immunization

Introduction

Burden of Malaria

Malaria is highly endemic in Nigeria and poses a major health challenge with attendant risk of morbidity and mortality contributing to loss of productivity and economic development 4. In 2004, the Federal Government of Nigeria adopted prevention of Malaria in Pregnancy intervention as a component of Focused Antenatal Care with a view to drastically reduce the burden of malaria in the country. Though the provision of malaria preventive services has been free in all public facilities, across the country, the utilization has remained low due to the consistently low antenatal attendance, especially in some states in northern Nigeria where ANC attendance is still less than 30% (NDHS, 2013). The 2008 NDHS showed an average of 43.7% and 76.9% ANC attendance by rural and urban dwellers respectively. This improved slightly to 46.5% and 86.0% in 2013. This makes the administration of the intervention difficult in higher prevalence rural areas as it is primarily facility based at present and requires supervision by skilled health care providers. However, new strategies are being developed to involve the communities in the intervention(5)

Problems associated with malaria in pregnancy

Pregnancy increases the frequency and severity of most infectious diseases but its effect on malaria seems worse (3). Several theories have been put forward to explain this increased risk including changes to the cellular immune responses that otherwise should offer protection, and increased attractiveness of the pregnant woman to mosquitoes. The former is believed to result from the increased level of circulating maternal steroids in pregnancy (20). This was the subject of the extensive research by Bouyou-Akotet et al in which they surmised that a sustained increase in cortisol level underlies the increased susceptibility of pregnant women to malaria (1) Lindsay et al found that pregnant women attracted twice the number of anopheles' mosquito compared to their non-pregnant counterparts.

The National Malaria Control Program (NMCP) in Nigeria has been in the forefront of managing malaria and is the permanent policy for prevention, and control of the disease in the country. The control rationale focuses on prompt access to the parasitological diagnosis and the provision of the appropriate treatment. Considering the recommended treatment for uncomplicated malaria infection in pregnancyas part of efforts aimed at eliminating cases of Malaria attack in the country by half and deepening the understanding of modern malaria treatment methods the Federal Ministry of Health has announced a name change for its anti-malaria programme from a control program, to Nigerian Malaria Elimination Programme (NMEP).

There have been collaborative efforts, spearheaded by the World Health Organization (WHO) and including governments and allied agencies to tackle the problem of malaria in pregnancy. The leading efforts have been: to increase the use of Long Lasting Insecticide Net (treated mosquito nets). Intermittent preventive treatment of malaria [IPT]; testing all pregnant women presenting with fever using RDT or Microscopy, and adequate case treatment of acute malaria attacks in pregnancy. The need to confirm malaria before treatment and enforcement of completion of therapy once started.

Consequences of malaria in pregnancy

Malaria in pregnancy is associated with increased risks of maternal anemia, spontaneous abortion, low birth weight, premature delivery, congenital infection, and neonatal and/or maternal death (13). Malaria can occur in pregnancy even when the woman does not have malaria symptoms, in high-transmission settings, where levels of acquired immunity tend to be high, *P. falciparum* infection is usually asymptomatic in pregnancy. Yet, parasites may be present in the placenta and contribute to maternal anaemia even in the absence of documented peripheral parasitism(29) The symptoms and complications of malaria in pregnancy vary according to malaria transmission intensity in the given geographical area, and the individual's level of acquired immunity. Malaria infection during pregnancy poses substantial risk to the mother, her foetus, and the neonate. The prevalence of

parasitaemia appears greatest in the second trimester, and susceptibility to clinical malaria may persist in to the early postpartum period. Due to the endemicity and high transmission rate of malaria in Nigeria, pregnant women have acquired partial being resident in stable malaria area and are susceptible to sub infections, which may result in adverse effects to both mother and child It significantly contributes to anaemia in pregnancy, increases the occurrence of low birth weights and is associated with preterm deliveries, still births and perinatal mortality. Preventing severe anaemia caused by malaria will lead to fewer pregnant women requiring blood transfusion thereby reducing the risk of transfusion-related infections especially HIV and Hepatitis B. The adequate control of malaria in pregnancy should lead to a better outcome of pregnancy, improve survival of mothers and reduce perinatal mortality. Adverse consequences of malaria during pregnancy of stable transmission (31). Malaria in pregnancy has adverse consequences both to the mother and the foetus

All pregnant women should receive at least 3 doses of Sulphadoxine-Pyrimethamine (SP) as Intermittent Preventive Treatment (IPT) except where contraindicated. All pregnant women should sleep under Long Lasting Insecticide Nets (LLINs). This preventive measure against malaria should be encouraged. Pregnant women with symptoms of malaria should be promptly diagnosed and treated(5).

Method

Study site

This study was conducted in 10 local government and 15 health facilities per LGA. Each Facility had 2 participants from the rural health districts selected by random sampling, in north central of Nigeria in September 2016. A well-established collaboration exists between the researcher, the State Ministry of Health and the health unit of the Local Government (LG). At the time of commencing this study, these groups of participant were given training on MIP. Each of this health centers offers ANC for pregnant mothers and are manned by experienced community extension workers.

Sites Selection

A site is referred to a health facility giving Anti-natal services to pregnant mothers. This can be a general hospital, maternity hospital, primary health care center, comprehensive health center, specialist or teaching hospital. The selections of these sites were based on the following criteria;
- The health facility offers anti-natal care to pregnant women,
- The client inflow for the month is above 100,
- It is supported by any of the malaria partners in the state.
- Availability of qualified staff and willingness of the personnel to be part of the survey.

Survey design and sample size

A cross sectional descriptive study is conducted in Kano state. Random sampling method was carried out across 10 local governments and 15 health facilities in North Western Nigeria. Two participants from each facility gave a total of 300 health care workers recruited into this study

Data collection

A well designed self-administered questionnaire was passed to selected participant who are all community extension workers, as well as health workers who attend to pregnant women at ANC. Their consent was obtained before they were given the questionnaire by the research assistant and the researcher. This questionnaire explored respondent knowledge on diagnosis on malaria in pregnancy, it treatment as well as current preventive measures practice and approved by the national guidelines. The questionnaire was pretested and validated before the commencement of the study.

Result

Frequency table

Survey Participants

A total of 300 respondents aged 20-60 years of age were involved in the research more than half 52.7% are Male while 47.3% of them are female.

General characteristics of respondent

Age distribution

In almost of the participants 39.7% are of the age group 30-39 years while age group 40-49 and 20-29 years constitute 29.6% and 24.9% respectively. The least percentage of 1.7%, represent the age group 60years and above.

Occupation

58.7% of the respondents are trained community health extension workers while Health Tech and Nurses constitute 33.3% and 1.0% respectively. Only 3.3% of the respondents represent other profession.

Educational status

It was observed that most of the Participant 60.5% have obtain a certificate course while 35.7% and 1.3% have Diploma and BSC respectively which represent the highest qualification for this group. 1.7% of them have the least qualification.

Work experience

25% of the respondents have had 1-2 years of work experience which is the minimum work experience while 21% has 6-10 years' work experience. 18.7%, 18.3% are people with 16years above and 3-5 years working experience

Figures and tables

Biodata/work experience

N=300	Frequency	percent	Valid Percent	Cumulative Percent
Gender				
Male	158	52.7	52.7	52.7
Female	142	47.3	47.3	100.0
Total	300	100.0	100.0	
Age				
20-29	74	24.7	24.9	24.9
30-39	118	39.3	39.7	64.6
40-49	88	29.3	29.6	94.3
50-59	12	4.0	4.0	98.3
60 above	5	1.7	1.7	100.0
Total	297	99.0	100.0	
Missing System	3	1.0		
Occupation				
Nurse	3	1.0	1.0	1.0
Health Tech	100	33.3	34.6	35.6
CHEW	176	58.7	60.9	96.5

Others	10	3.3	3.5	100.0
Total	289	96.3	100.0	
Missing System	11	3.7		
Educational Status				
SSCE	5	1.7	1.7	1.7
Diploma	106	35.3	35.7	37.4
Certificate	182	60.7	61.3	98.7
Bsc	4	1.3	1.3	100.0
Total	297	99.0	100.0	
System	3	1.0		
Work Experience				
1-2	76	25.3	26.3	26.3
-5	55	18.3	19.0	45.3
6-10	63	21.0	21.8	67.1
11-15	39	13.0	13.5	80.6
16 above	56	18.7	19.4	100.0
Total	289	96.3	100.0	
System	11	3.7		

Diagnosing malaria in pregnancy

In the diagnosis of malaria during pregnancy, about 50% of the respondents agree that patient who reacted positively to mRDT has malaria, 42% strongly agreed with 3.3% neutral, while 2.7% and 0.7% strongly disagree and disagree respectively.

On the perception that patients who react negative to mRDT have no malaria, 46.7% agree, 19.7% strongly agree, while 13.7% disagreed, and 5% strongly disagree while 14% remained neutral.

39% of respondents agree that mRDTs usually miss malaria cases, 5.7% strongly agree, while 35.3% and 7.3% disagreed and strongly disagreed respectively however 5% are neutral.

39% of respondents agree that negative mRDT result does not exclude malaria, 11% strongly agreed while 26.7% disagreed and 5.7% strongly disagreed that negative mRDT result does not exclude malaria.

On the confidence level of mRDT results, 53.3% agreed and 30.7% strongly agreed while 9.3% have no confidence in mRDT result with only 2.7% remained neutral

N=300	Frequency	Percent	Valid Percent	Cumulative Percent
Patients with +ve mRDT has malaria				
Strong Disagree	8	2.7	2.7	2.7
Disagree	2	.7	.7	3.4
Neutral	10	3.3	3.4	6.8
Agree	150	50.0	50.7	57.4
Strong Agree	126	42.0	42.6	100.0
Total	296	98.7	100.0	
System	4	1.3		
Patients with -ve mRDT have no malaria				
Strong disagree	15	5.0	5.1	5.1

Disagree	41	13.7	13.8	18.9
Neutral	42	14.0	14.1	33.0
Agree	140	46.7	47.1	80.1
strong agree	59	19.7	19.9	100.0
mRDTs Usually miss malaria cases				
Strong Disagree	22	7.3	7.9	7.9
Disagree	106	35.3	38.3	46.2
Neutral	15	5.0	5.4	51.6
Agree	117	39.0	42.2	93.9
strong agree	17	5.7	6.1	100.0
Total	277	92.3	100.0	
System	23	7.7		
Negative mRDT results doesn't exclude malaria				
Strong Disagree	17	5.7	6.1	6.1
Disagree	80	26.7	28.8	34.9
Neutral	30	10.0	10.8	45.7
Agree	117	39.0	42.1	87.8
Strong Agree	34	11.3	12.2	100.0
Total	278	92.7	100.0	
System	22	7.3		
I have confidence in mRDT results				
Strong Disagree	2	.7	.7	.7
Disagree	28	9.3	9.6	10.3
Neutral	8	2.7	2.7	13.1
Agree	160	53.3	55.0	68.0
Strong agree	92	30.7	31.6	99.7
6	1	.3	.3	100.0
System	9	3.0		

Treatment of positive malaria cases

The table below shows the perception of health workers on the treatment regimen for malaria by health workers. 146 out of 290 respondents agree that anti-mal drugs are justified for malaria cases, 109 respondents strongly agree on the justification for administration of anti-mal drugs in malaria cases.25 respondents disagreed on the justification for anti-mal drugs in malaria cases.

About 129 respondents disagree that febrile patients should be treated with ACT without RDTs, 60 disagree strongly on treatment of febrile patients with ACT without RDT, while 62 persons agree on treatment irrespective of RDT.

On another vane, 43% disagree that they will take anti-mal drugs if they feel feverish without doing an mRDT, and 20% strongly disagree; on the hand, 20.7% agree to taking antimal-mal medication if they feel feverish without having a test done.

	Frequency	Percent	Valid Percent	Cumulative Percent
Anti-mal drugs are justified for +ve Malaria cases	N-300			
Strong disagree	5	1.7	1.7	1.7
Disagree	25	8.3	8.6	10.3
Neutral	5	1.7	1.7	12.1
Agree	146	48.7	50.3	62.4
strong agree	109	36.3	37.6	100.0
Total	290	96.7	100.0	
System	10	3.3		
Febrile patients should be treated with ACT even without RDT or micro				
Strong disagree	60	20.0	20.8	20.8
Disagree	129	43.0	44.8	65.6
Neutral	8	2.7	2.8	68.4
Agree	62	20.7	21.5	89.9
Strong agree	29	9.7	10.1	100.0
System	12	4.0		
If I have fever, I'll take anti-mal without mRDT				
Strong disagree	60	20.0	20.8	20.8
Disagree	129	43.0	44.8	65.6
Neutral	8	2.7	2.8	68.4
Agree	62	20.7	21.5	89.9
Strong agree	29	9.7	10.1	100.0
Total	288	96.0	100.0	
System	12	4.0		

Treatment of choice according to national guide line

The table below shows the treatment options for malaria according to the National guidelines. About 46.3% agree that ACT should be the choice drug, 31.3% prefer Quinine, and 14% prefer Fansidar while 2.7% prefer Chloroquine.

N=300		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Quinine	94	31.3	32.0	32.0
	ACT	139	46.3	47.3	79.3
	Chloroquine	8	2.7	2.7	82.0
	Fansidar	42	14.0	14.3	96.3
	Strong agree	11	3.7	3.7	100.0
Missing	System	6	2.0		

Preventive measures

The table below shows the preventive measure taken to prevent malaria and results showed that 53% respondents prefer LLIN (Long Lasting Insecticidal Net), 25.7% prefer anti-malaria drugs are better for prevention, 14.7% believe clean environment is a better while 2.7 believe IPT/Fansidar and nutritious diet are better preventive measures.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Anti-malaria	77	25.7	26.0	26.0
	LLIN	159	53.0	53.7	79.7
	IPT/Fansidar	8	2.7	2.7	82.4
	Clean Environment	44	14.7	14.9	97.3
	Nutritious Diet	8	2.7	2.7	100.0
	Total	296	98.7	100.0	
Missing	System	4	1.3		
Total		300	100.0		

Discussion

Malaria epidemic has posed serious public health issue in Nigeria. It is one of the leading causes of morbidity and mortality and accounts for more than 50% of all cases seen in the hospitals (4). Pregnant women are particularly vulnerable to malaria as pregnancy reduces a woman's immunity to malaria, increasing her risk of illness, severe anemia, and death, while the risk of spontaneous abortion, stillbirth, premature delivery, and low birth weight increases for the fetus (24).

In this study, health workers were interviewed to know their perception on the prevention and treatment of uncomplicated malaria in pregnant women in Nigeria. Their perception on the diagnosis of malaria, showed that positive reaction to mRDT, is an indication for the presence of malaria parasite. They also agree that mRDTs can miss malaria and and if the result of mRDT is negative it does not exclude malaria. For RDT to be a useful diagnostic, it must achieve greater than 95% sensitivity (30). Today, most RDTs have achieved this goal for *P. falciparum,* but not for non-*P. falciparum* (27). RDTs can be useful in screening febrile returnees from endemic areas in developed countries (16). In developing countries, RDTs make obsolete the sole dependence on clinical diagnosis for malaria in remote areas, where good microscopy has failed or never reached. RDTs are also recommended in situations exceeding microscopy capability, such as in an outbreak or in occupationally exposed groups (31). As RDTs improve, including in sensitivity for *P. vivax* and in ability to measure parasitemia levels, at least semi-quantitatively, the scope of RDT applications will expand. Current RDTs are not intended to replace microscopy (   ). RDT has been indicated to be useful in the diagnosis of malaria in pregnant women due to placental sequestration of parasites and

thus reducing the sensitivity of microscopy (12). The ability to detect placental infection by antigen detection when microscopy does not identify parasitaemia could have a significant impact on material and fetal health care (17)

There was high acceptance of the use of antimalarial drugs for cases with malaria. They however disagree with the administration of ACT drugs to febrile patients without conducting an RDT. The general perception and practice of the health workers is that an RDT should be done before considering the choice of drugs for the treatment. Nigerian government in 2005, adopted its first line drug to the arthemisinin based combination therapy (ACT) and recommended that all fevers be treated presumptively with ACTs where confirmation cannot be made (4). This was also in line with WHO recommendation for endemic countries where the availability and use of laboratories are limited. The respondents' choice is however in line with the current WHO treatment guideline for countries on malaria diagnosis and treatment (28). This guideline places emphasis on testing for malaria with RDTs or microscopy before treating while reaffirming the use of ACTs. In Africa, reports of RDT use have been relatively recent 2011 in Malawi (10) and 2012 in Nigeria (21), compared to in Asia 2007 in Cambodia (Population Services International Research and Metrics, 2007), and only a fraction of providers reported using RDTs (range 22%–34%) (Population Services International Research and Metrics, 2007; Onwujekwe *et al.*, 2012; 10).

The health workers preferred ACT as a choice drug for the treatment of malaria, followed by Quinine then Fansidar. The national antimalarial treatment guidelines have stipulated the use of quinine for treatment of uncomplicated malaria in the first trimester and an ACT in the second and third trimesters (10) (11).(15). It has been reported that health care providers in public hospitals adhered to the national policy of prescribing ACTs in the second and third trimester than private hospitals (21). Private hospitals predominantly prescribed SP (70%) (21). More public than private sector providers prescribed quinine in the first trimester (35% versus 15%); private sector providers predominantly prescribed SP (65%). Okonta found that whilst 56% of doctors had prescribed quinine during the first trimester, the fear of quinine causing miscarriage was a significant consideration, with all but one physician prescribing quinine at lower than the recommended dose, and showing a preference for CQ (18). Similarly, Okoro and Nwambu found very low prescription of quinine in the first trimester (2.5%), and ACTs constituted 51% and 29% of antimalarial drugs prescribed in the second and third trimesters, respectively (19).

The highest percentage of respondent believes that the best way to prevent malaria is in the use of long lasting insecticidal nets (LLIN) while others suggest the use of anti-malaria drugs. The LLIN has reduced the need for treatment and the pressure on health services, which is particularly important in view of the increase in drug resistant falciparum malaria parasites. It has been reported in Lagos, Nigeria that since 2000 more than One Million Insecticide Treated Nets have been distributed in the State to mothers of children under the age of 5 years either during integrated programs with immunization campaigns or during stand-alone campaigns in some local government areas of the state. It is often considered that one of the main drawbacks of LLINs is the low re-treatment rate; however, with the newly developed long lasting insecticidal nets (LLINs), the issue of net re-treatment may be resolved as long as the price is not prohibitively increased by the specific treatment.

Conclusion

The United States also supports the Nigerian people by training medical personnel and community health workers to care for people with malaria. This past year alone, PMI (President's Malaria Initiative) supported training for nearly 7,000 health workers around the world in malaria case management. PMI also provides the test kits and medicines to help those patients who come to them. In just the past year in Nigeria, PMI procured 19 million anti-malarial treatments and more than 6 million rapid diagnostic tests kits. It is in view of these that, there is a need for all the stake holders in the country to maintain the present momentum of interventions as well as rapidly scale up of these interventions in order to sustain the declining trend of Malaria prevalence in pregnant women through

the improved knowledge of the Health care provider who is provided necessary trainings.

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