

## Knowledge, Attitudes, and Perception of Malaria Infection among Pregnant Women in a Semi-Urban Setting in Nigeria

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### Abstract

**Background:** Malaria infection during pregnancy is a major public health problem in tropical and subtropical regions throughout the world. The burden of malaria infection during pregnancy is caused mainly by *Plasmodium falciparum*, the most common malaria species in Africa. This study is aimed at assessing the knowledge, attitudes and perception of malaria among the pregnant women attending the antenatal clinic in general hospital Gboko, Gboko Local Government, Benue State.

**Method:** This research is an ex post facto cross-sectional study that focuses on only pregnant women. Structured questionnaires were developed, validated and administered to the respondents and information on age, occupation, marital status, number of previous pregnancies, number of children, mosquito control methods and educational levels were obtained. Data analysis was done using the Statistical Package for Social Science (SPSS) version 22. Descriptive statistics such as frequencies and cross-tabulations, percentages and mean were used to describe the data.

**Results:** There were 144 participants of which majority, 62.5% were in the age group 20 – 30 years. The majority were secundigravid (79.2%). All have ever heard about malaria, chose IPT as an antimalarial drug for pregnant women, have undergone malaria test in the last 6 months and they all sleep under mosquito nets. They chose headache, 54.2% and fever, 39.6% as major symptoms of malaria. 97.9% were tested positive for malaria in the last 6 months. The majority (97.9%) knew that malaria has a cure, 97.9% knew that it is impossible to cure malaria spiritually, 97.9% knew that antibiotics or antiretroviral therapy cannot cure malaria while 85.4% believed that personal hygiene would reduce malaria. None of the respondents had a university education, yet they had very sound knowledge, attitudes, and perception of Malaria in pregnancy.

**Conclusion:** This study found a very good knowledge, attitude and perception of malaria infection among pregnant women in Gboko, Benue state but the proportion of the women diagnosed positive to malaria parasite within six months to this study was very high (more than 95%). Therefore, further investigation is needed to unravel the causes of the high prevalence of malaria infection in this area.

**Keywords:** Malaria prevention, Pregnant women, Treatment

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### I. Introduction

Malaria is a crucial public health problem and remains a high burden globally. In 2016, WHO estimated that US\$ 2.7 billion was invested in malaria control and elimination efforts globally by governments of malaria-endemic countries and international partners[1]. The majority (74%) of investments in 2016 were spent in the WHO African Region, followed by the WHO regions of South-East Asia (7%), the Eastern Mediterranean and the Americas (each 6%), and the Western Pacific (4%)[1] whereas, Governments of endemic countries contributed 31% of total funding (US\$ 800 million). Among 55 countries where the burden of malaria was estimated, in 2016, 31 countries have a malaria case reporting rate by surveillance systems of less than 50%. This includes the high-burden countries of India and Nigeria[1].

In 2017, the number of global occurrence of malaria was estimated as 219 million (95% confidence interval [CI]: 203–262 million), compared with 239 million cases in 2010 (95% CI: 219–285 million) and 217

million cases in 2016 (95% CI: 200–259 million)[2]. As it was in 2016, the majority of malaria cases in 2017 occurred in the WHO African Region (200 million or 92%), followed by the WHO South-East Asia Region with 5% of the cases and the WHO Eastern Mediterranean Region with 2%. Fifteen countries in sub-Saharan Africa and India carried almost 80% of the global malaria burden[2]. Nigeria was one of the five countries where almost half of all malaria cases worldwide occurred: Nigeria (25%), the Democratic Republic of the Congo (11%), Mozambique (5%), India (4%) and Uganda (4%)[2].

Early 2019, the WHO reported that approximately 70% of the world's malaria burden is very high in 11 countries: 10 on the African continent, plus India[3, 4]. Among the 10 African countries with a high concentration of malaria burden are Nigeria and Republic of Congo as the two major African Countries; Not less than 36% of the malaria cases worldwide occurred in Nigeria and Republic of Congo alone

This large concentration of malaria burden in Nigeria prompted the development and outlining several programs and targets aimed at malaria control, and where feasible, its elimination[2, 5]. The Global Strategy for Malaria, 2016 to 2030 targets a 90% reduction in the incidence and mortality rates of malaria, as well as an elimination of malaria in 35 of its endemic countries by 2030[5 - 7]. The whole population of Nigeria (Over 186 million) is currently at risk of contracting malaria[8], and a very large proportion (76%) of this population at high risk[2]. Nigeria contributed about 29% of the malaria cases and 26% of the malaria deaths worldwide in 2015[9]. The large proportion of malaria cases in Nigeria as reported from 2016 to 2019 implies that Nigeria's success in tackling malaria-endemic will take a large part in the realization of the global goals.

Several studies have reported a high prevalence of malaria, especially among pregnant women and children in Benue state. In 2011, high malaria prevalence of 39.5% was reported among patients attending a hospital in Gboko, Benue state[10]. The prevalence of Asymptomatic malaria in six communities in Benue state was reported as (32.1%) and was highest with the youngest age group (2–10)[11]. In another study conducted to assess malarial infection among antenatal and maternity clinics attendees at the Federal Medical Centre, Makurdi, Benue State, Nigeria, 111 (68.3%) of the 163 pregnant women examined were found to be infected with malaria[12]. The high prevalence of malaria (68.3%) reported among pregnant women is enough reason for the need to assess the knowledge, attitude, and perception of women in Benue on malaria infection; this forms the major objective of this study.

## **II. Methods**

This research is an ex post facto cross-sectional study which assesses the impact of awareness creation on the knowledge, attitudes, and perception of malaria among the pregnant women attending the antenatal clinic in general hospital Gboko, Gboko Local Government, Benue State. Participants were pregnant women attending antenatal treatment. Any other patients attending the Hospital did not constitute the population for the study. Even though it was scientifically difficult to determine the population size of the study, the research adopted the most practical method in getting to the most scientifically realistic population size using the facility's patient enrollment register. Structured questionnaires were developed, validated and administered to the respondents and information on age, occupation, marital status, number of previous pregnancies, number of children, mosquito control methods and educational levels were obtained. Ethical approval for the study was obtained from the Benue State Ministry of Health; confidentiality of information from subjects was maintained while well-informed consents were obtained from subjects before enrolment into the study. Pregnant women attending antenatal clinic at General Hospital North-Bank between April and December 2018 were consecutively recruited for the study. All the willing participants were recruited for the study.

### **2.1 Data Analysis**

Data analysis was done using the Statistical Package for Social Science (SPSS) version 22. Descriptive statistics such as frequencies and cross-tabulations, percentages and mean were used to describe the data. Chi-Square was used to find association and to determine the level of significance between variables at 95 % confidence level. Level of significance was set at  $p \leq 0.05$ .

## **III. Results**

This study was conducted to assess the knowledge, attitudes, and perception of Malaria among the Pregnant Women attending Antenatal Clinic in General Hospital Gboko, Gboko Local Government, Benue State, Nigeria. There were 144 participants with a minimum age of 20 and a maximum age of 45 years. The mean age was  $33 \pm 6.0$  years. Ninety (62.5%) of the respondents were between 20 – 30 years of age, 29.2% of them were in the age group 31 – 40 years while 8.3% were above 40 years. Majority of the respondents, 114 (79.2%) were secundigravid, 18 (12.5%) primigravid while 12 (8.3%) were multigravida. Most of the respondents, 129 (89.6%) were monogamously married, 12 (8.3%) married in a polygamous family while 3 (2.1%) were single. There were 129 (89.6%) respondents from extended families while 15 (10.4%) came from nuclear families. Most of the interviewees, 126 (87.5%) were Christians, 15 (10.4%) were Muslims and 3

(3.1%) were traditionalists. All were Nigerians from five different tribes, 108 (75.0%) from Tiv, 18 (12.5%) Hausas, 12 (8.3%) from Idoma, while there were 3 (2.1%) each from Ibo and Igala (Table 1).

**Table 1: Respondent's Background**

SN		Number	Percent
<b>Age Category</b>			
1	20 – 30	90	62.5
2	31 – 40	42	29.2
3	Above 40	12	8.3
<b>Gravidity</b>			
1	Primigravid	18	12.5
2	Secundigravid	114	79.2
3	Multigravida	12	8.3
<b>Marital status</b>			
1	Single	3	2.1
2	Married monogamous	129	8.3
3	Married polygamous	12	89.6
<b>Family type</b>			
1	Nuclear	15	10.4
2	Extended	129	89.6
<b>Religion</b>			
1	Christianity	126	87.5
2	Islam	15	10.4
3	Traditional	3	2.1
<b>Tribe</b>			
1	Hausa	18	12.5
2	Ibo	3	2.1
3	Idoma	12	8.3
4	Igala	3	2.1
5	Tiv	108	75.0

Eighty-one (56.3%) of the respondents had secondary education, 57 (39.6%) had primary education while only 6 (4.2%) had a diploma degree as the highest level of education attained. Fifty-four(37.5%) of the pregnant women were self-employed, 25% unemployed, 16.7% were either trader or small business owners, 14.6% were public servants and 6.3% were farmers. The highest monthly income of the women is within 30,000 naira, 50% earned 5,000 naira or less per month, 35.4% earned between 5,000 to 18000 naira a month while only 14.6% earned between 18001 and 30,000 naira per month. Over 60% of the respondents currently lived in Gboko at the time they were interviewed, 12.5% in Uanise-Ikya, 10.4% in Ushongo, 4.2% each lived in Auade, Kastina Ala and Tarka/Wannune while 2.1% lived in Buruku.

### **Knowledge of respondents on various treatments for malaria**

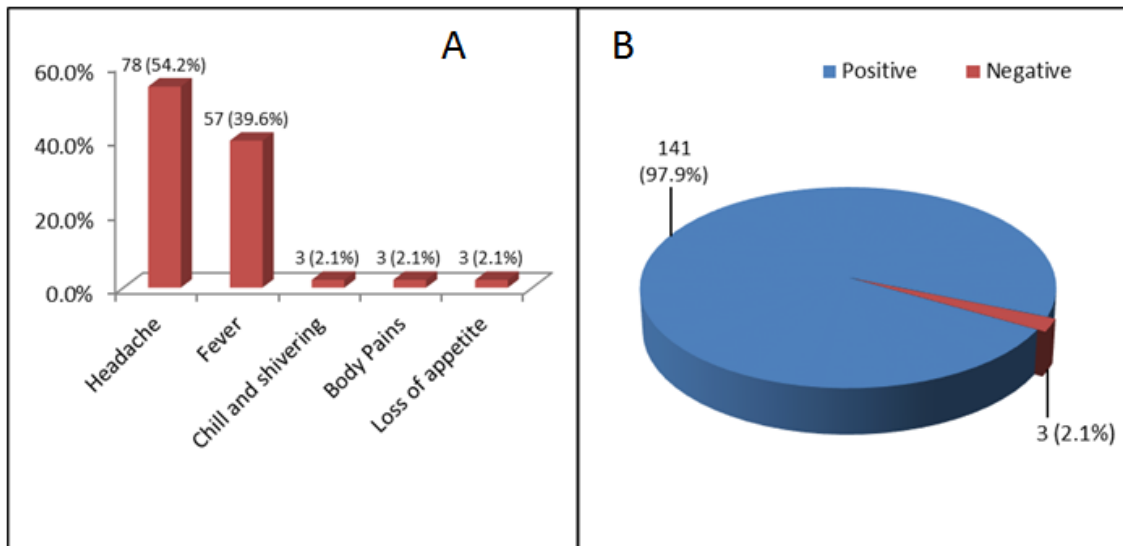
All the respondents have heard about malaria. They all chose IPT as an antimalarial drug that can cure malaria in pregnancy among other options which included Chloroquine and ACT. All of them have been tested for malaria in the last 6 months prior to the day of the interview. They all sleep under mosquito nets in their respective homes, even most nights including the night preceding the interview. Other members of their households use mosquito nets as well. All of them take antimalarial prophylaxis in pregnancy. When asked which of IPT1, IPT2, and IPT3 they take in pregnancy, all chose IPT3. They were asked to choose the type of diagnostic test they knew about, all of them chose Rapid Diagnostic Test among other options which included Self Diagnosis and Microscopic diagnosis. They were also asked how they would rate going for laboratory test before treatment of Malaria, the options included; Very important, barely important, notimportant and Time wasting, they all chose 'very important'. They were also asked how they would like information on Malaria diagnosis to be communicated to them or other community members, they all chose 'through Community Health workers' neglecting other options which included Church, Radio/TV, Pamphlets, Community/Village meetings (Table 2).

**Table 2 Knowledge of malaria and its treatment**

QUESTION	% RESPONSE
Have heard about Malaria	100.00%
Chose IPT as an antimalarial drug that can cure malaria in pregnancy	100.00%
Tested for Malaria in the last 6 months	100.00%
Do use Mosquito Net	100.00%
Do sleep under net most Nights	100.00%
Slept under Mosquito Net last Night	100.00%
Have Bed nets in Household	100.00%
Do take Anti-Malaria prophylaxis in pregnancy	100.00%
Takes IPT3 in pregnancy	100.00%
Know about the Rapid Diagnostic Test	100.00%
Rated laboratory test very important	100.00%
Wants diagnosis information to be communicated through Community Health workers	100.00%

**Knowledge of respondents on the signs/symptoms of malaria and Malaria test within the last six months**

Seventy-eight, 54.2% chose headache as a symptom of malaria, 57 (39.6%) chose fever, while 3 (2.1%) each chose chilling and shivering, body Pains and loss of appetite while none chose ‘vomiting’. The results of malaria tests done in the last 6 months before the interview were positive for most, 141 (97.9%) of the respondents and negative for just 3 (2.1%) (Figure 1). Most of the respondents, 138 (95.8%) have had malaria treatment in less than one year before the interview while just 6 (4.2%) have been treated in the last one year.



**Figure 1(A) Knowledge of respondents on the signs/symptoms of malaria and (B) Result of malaria test**

**Number of households who sleep under ITN/LLIN**

The number of their households who sleep under mosquito net ranges from 2 to 8 with the most frequent number of households being 4 (37.5%), Figure 2.

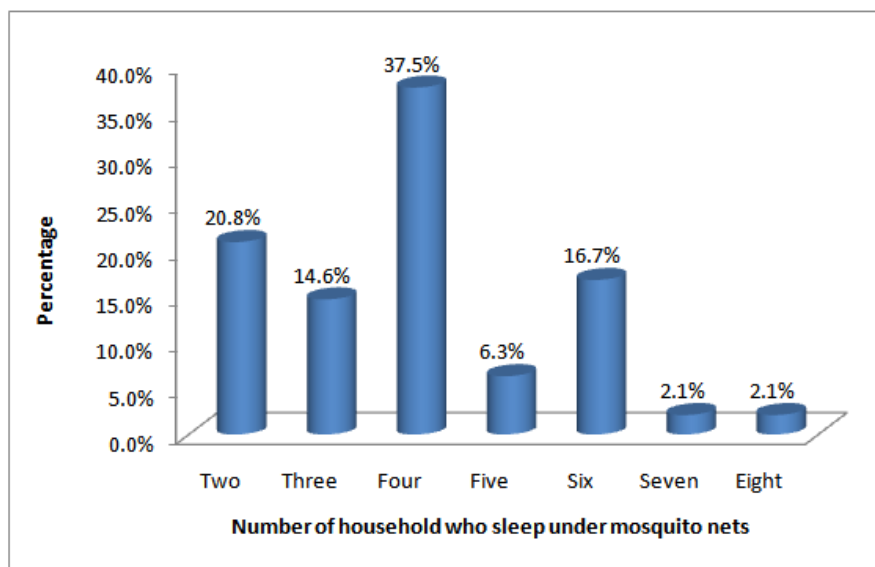


Figure 2 How many of your household sleep under ITN/LLIN

**Knowledge of malaria treatment**

Majority of respondents (141; 97.9%) were of the opinion that malaria has a cure while only 3 (2.1%) said malaria has no cure. On the other hand, just 3 (2.1%) believed that malaria can be cured spiritually while a majority, 141 (97.9%) said it is not possible to cure malaria spiritually. In the like manner, 2.1% said antibiotics can cure HIV/AIDS while 97.9% said it is impossible. The majority, 141 (97.9%) said antiretroviral therapy cannot cure malaria while just 3 (2.1%) said it can. 123 (85.4%) believed that personal hygiene would reduce malaria cases in their environment while 21 (14.6%) did not agree. 97.7% have been tested for malaria in their lifetime while 3 (2.1%) have never been tested. Most of the respondents, 140 (97.2%) did not use IRS at home while just 4 (2.8%) use it, Table 3.

**Table 3: Knowledge of malaria treatment**

Question	Response (%)	
	Yes	No
Malaria has a cure?	141 (97.9%)	3 (2.1%)
Malaria can be spiritually cured?	3 (2.1%)	141 (97.9%)
Antibiotics can cure HIV/AIDS	3 (2.1%)	141 (97.9%)
Anti-retroviral therapy (art) can cure malaria	3 (2.1%)	141 (97.9%)
Personal hygiene will reduce malaria case in my environment	123 (85.4%)	21 (14.6%)
Ever tested for malaria	141 (97.9%)	3 (2.1%)
Do you do IRS at home	4 (2.8%)	140 (97.2%)

The knowledge of malaria is high among pregnant women in Gboko as shown in Table 4, though the awareness level was higher among secondary and diploma degree holders than among those who only attended primary schools, however, the differences were not statistically significant (P>0.05).

**Table 4: Knowledge of Malaria with the level of education**

	Level of Education	Response		P
		Yes	No	
Does malaria have a cure?	Primary	54 (94.7%)	3 (5.3%)	0.097
	Secondary	81 (100.0%)	-	
	Diploma	6 (100.0%)	-	
Malaria can be spiritually cured?	Primary	3 (5.3%)	54 (94.7%)	0.097
	Secondary	-	81 (100.0%)	
	Diploma	-	6 (100.0%)	
Antibiotics can cure HIV/AIDS	Primary	3 (5.3%)	54 (94.7%)	0.097
	Secondary	-	81 (100.0%)	
	Diploma	-	6 (100.0%)	
Anti-retroviral therapy (art) can cure malaria	Primary	3 (5.3%)	54 (94.7%)	0.097
	Secondary	-	81 (100.0%)	
	Diploma	-	6 (100.0%)	
Personal hygiene will reduce malaria case in my environment	Primary	48 (84.2%)	9 (15.8%)	0.579
	Secondary	69 (85.2%)	12 (14.8%)	

#### IV. Discussion

The objective of this research is to assess the knowledge, attitudes, and perception of malaria among pregnant women. The fact that these women must have been attacked by mosquitoes in their homes before attending the health facility makes the research *ex post facto* because the researcher is only measuring the effect of the causal variable after it has occurred.

In Nigeria, the most vulnerable groups to malaria infection are pregnant women, under 5s and infants[2]. Over sixty percent of respondents in this study were between the age of 20 and 30. The result was slightly higher than the findings of Obolet *et al.*[13] in which 54% of pregnant women among internally displaced persons in Northern Uganda were found in the age group 20 – 29 and similar to 60% found by Raimi & Kanu[14] among pregnant women living in the suburb of Lagos, Nigeria.

Almost 80% of respondents were Primigravidae followed by Secundgravidae. In similar research conducted by Ogbogoet *et al.*[15], majority 124 (45.5%) of the Eastern Nigeria pregnant women were Primigravidae. This might be as a result of Primigravidae women attending healthcare during pregnancies more than the women the Secundgravidae and the rest.

This study showed that more than half of the respondents did not have a post-secondary education. Less than 5% had a diploma degree and none had a university degree. Also, a very high number of respondents were self-employed and one-quarter were unemployed. Fifty percent earn a maximum of five thousand naira in a month while less than 15% earned between 18001 and 30,000. This cannot be unconnected to a high rate of unemployment among respondent. Previous studies have reported high that the prevalence of malaria was about 10 times higher in mothers who had less than post-secondary education[5].

The majority chose headache and fever as major symptoms of malaria while only a few chose other options such as chilling and shivering, body pain and loss of appetite. The results of malaria tests done in the last 6 months before the interview was positive for 97.9% of the respondents, this shows that malaria is very common in Gboko local government area of Benue State despite the fact that most households use mosquito nets. This calls for intervention and further research to ascertain the causes of or factors responsible for high malaria cases in this area. Most respondents knew that malaria has the cure but it cannot be cured spiritually or by antibiotics and antiretroviral drugs. Most also knew that malaria can be reduced by personal hygiene.

The knowledge of malaria: prevention, tests was 100% accurate among respondents. All have heard about malaria, all knew the right drug that can cure malaria during pregnancy, they all slept under mosquito nets and have had malaria tests within six months to the day of the interview and all knew that the right information about malaria should come from health workers. More than 95% have had a malaria test within a year to the time of the interview. Not only the pregnant women slept under mosquito nets, but members of their households also did. In a study conducted by Abasiattai to assess the awareness and practice of malaria prevention strategies among pregnant women in Uyo, South-South Nigeria, they reported a lower knowledge of adverse effect of malaria in pregnancy as 71.2%, while 76.0% had received treatment for acute malaria infection, 76.4% have heard Insecticide Treated Nets (ITNs) but 47.4% had no reason to use it Abasiattai *et al.*[16] In another study conducted in a semi-urban setting in Malawi, there was a very low uptake (25.4%) of preventive treatment for malaria[17] whereas most women in this study had the right attitude towards malaria treatment.

None of the respondents had a university education, yet they had very sound knowledge, attitudes, and perception of Malaria in pregnancy. It is not a surprise that the highest monthly income of the women is within 30,000 naira. This corroborates their level of education which is more of secondary and primary with few diploma certificate holders. However, their low income does not in any way affect their knowledge, attitudes, and perception of Malaria. Most of the respondents (95.8%) have had malaria treatment in less than one year before the interview. High prevalence of malaria in Gboko might be one of the factors responsible for the high level of knowledge, attitudes, and perception of Malaria in the area.

Similar to the findings of this study, Obol *et al.*[13] found that most pregnant women in the post-conflict IDP camps have relatively high knowledge about malaria transmission, signs, symptoms, and consequences during pregnancy. They reported that the majority of pregnant women (85%) have ever heard about malaria. Most (80%) attributed malaria to be transmitted by mosquito bites, most slept under the net. However, the report of this research differs from the finding of Andrew *et al.*[18] who found that though there was a general awareness of the term “malaria”, it was often conflated with general sickness or with pregnancy-related symptoms.

The proportion of the women who admitted that their households slept under ITNs in this study is higher than the 37% reported for households and 50% for pregnant women Nigeria in 2015[2]

Ejikeet *et al.*[19] in a similar research carried out among pregnant women in Abia South local government of Abia state Nigeria found that regarding symptoms associated with malaria in pregnancy, the respondents had varied opinion which included fever (47.2 %), headache (22.2 %), cold (13.2 %) amongst

others with corresponding increase in the level of education. Many of the respondents alluded to visiting health centres (36.3 %), while a few others resorted to self-medication (17.1 %). They, therefore, concluded the need to enlighten women of childbearing age on the usefulness of adequate and prompt preventive therapy to reduce the risk of malaria infection during pregnancy unlike the findings of this study which revealed high knowledge, preventive measures, and treatment of malaria among pregnant women of Gboko local government of Benue State, Nigeria.

This study found a very good knowledge, attitude and perception of malaria infection among pregnant women in Gboko, Benue state but the proportion of the women diagnosed positive to malaria parasite within six months to this study was very high (more than 95%). Therefore, further investigation is needed to unravel the causes of the high prevalence of malaria infection in this area.

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