

Original Research Article

Knowledge, Awareness and Practices of Preventive Measures for Malaria among Pregnant Women Attending Selected Health Facilities in Gusau, Zamfara State Nigeria

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Abstract: Worldwide, about three billion people have a risk of contracting malaria, and about 400 million cases and 900,000 deaths from malaria have been seen in recent times. This study determines knowledge, awareness and practices of preventive measures for Malaria among pregnant women attending Selected Health facilities in Gusau, Zamfara State Nigeria. A well-structured questionnaire was employed to collect relevant information from the study subjects attending Dr. Karima Primary Health Center Gusau, King Fahad Women and Children Hospital Gusau, General Hospital Gusau and Shagari Primary Health care Gusau for antenatal care. The results indicated that 92% of the respondent knew about malaria while 8% do not. Majority (64.25%) believed mosquito was the causative agent of malaria with major sign such as fever, headache, body and joint pain and vomiting. The respondent's understanding of malaria showed that 365 (91.25%) perceived malaria as a dangerous to pregnancy. About 80.25% heard about malaria preventive measures and 36.5% used mosquito repellent/coil whereas 28% used insect treated net (ITN). Majority of the respondents (94.75%) agreed that preventive treatment to malaria during pregnancy is important. About 43.5% seek treatment within 12 hours and majority of the (69.75%) seek treatment in hospitals. It is concluded that there is knowledge and high level of awareness to malaria prevention measures among pregnant women attending the study centers.

Keywords: Malaria, awareness, knowledge, pregnant women, preventive measures.

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INTRODUCTION

Worldwide, about three billion people have a risk of contracting malaria, and about 550 million cases and 900,000 deaths from malaria have been seen in recent times (WHO, 2022). More recently, an estimated 228 million people have been reported to be infected worldwide with sub-Saharan Africa alone accounting for about 213 million of the infection

which is about 93% of the world's population (WHO, 2023). There are five *Plasmodium* species that are particularly threatening to humans, namely, *P. falciparum*, *P. malariae*, *P. ovale*, *P. knowlesi*, and *P. vivax*. The clinical presentation of malaria varies from being mere asymptomatic to symptomatic, affecting different organ systems, depending upon the host's immune system, ecological factors (e.g., temperature,

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population density, nature of habitats, and feeding habits), and virulence of species (Siddiqui *et al*, 2020). Due to multifactorial contributing conditions, the level of malaria transmission is complicated; for instance, some may develop a degree of immunity to malaria due to rise in exposure times (Apinjoh *et al*, 2018).

Malaria control still remains a major public health problem in Africa where 45 countries, including Nigeria are mostly affected with about 588 million people at risk (WHO, 2022). Each year, more than 30 million women in malaria endemic areas become pregnant and are at risk of infection with *Plasmodium falciparum*. This results to high prevalence of patent parasitaemia and clinical malaria in pregnancy (Nanvyat *et al*, 2024).

In Nigeria, past studies reported malaria parasite prevalence of between 60% and 72% among pregnant women (Akogu *et al*, 2022). Malaria during pregnancy caused up to 10,000 maternal deaths each year and contributes to high rate of maternal morbidity including fever and severe anaemia, especially in first time mothers (Nanvyat *et al*, 2024). A recent study estimated that malaria contributes to 3-5% of maternal anaemia, 8-14% of low birth weight and 3-8% of infant mortality (Chigozirim *et al*, 2015). The harmful impact of malaria is most apparent to the first and second pregnancies of most pregnant women living in areas of relatively stable transmission (Nanvyat *et al*, 2024). Knowledge of malaria prevention during pregnancy is relatively high as malaria is perceived as a serious illness.

Prevention of malaria in pregnancy is a major priority for the roll back malaria partnership. In high transmission areas including Nigeria, the roll back malaria partnership recommends a three pronged approach for reducing the burden of malaria among pregnant women, which are; effective case management of malaria infection, use of insecticide treated nets (ITNs) and intermittent preventive treatment in areas of stable transmission. In line with

this recommendation, approach to prevention of malaria in pregnancy changed since the early 2000 moving from weekly or bimonthly chemoprophylaxis adopted in the year 2005. Despite improved antenatal care services and the health education provided during these services, the prevalence of malaria in pregnancy continues to be high as portrayed by available statistics from health facilities in Nigeria.

Malaria has devastating effects on both the mother's and child's health. However, it is a largely preventable and curable medical disease if detected at times. Therefore, this study determines knowledge, awareness and practices of preventive measures for Malaria among pregnant women attending Selected Health facilities in Gusau, Zamfara State Nigeria.

MATERIALS AND METHODS

Study areas

Dr. Karima Primary Health Center Gusau, King Fahad Women and Children Hospital Gusau, General Hospital Gusau and Shagari Primary Health care Gusau were located in Gusau metropolis, Zamfara State Nigeria. Zamfara State is located in Northwestern Nigeria with a total area of 38,418 square kilometers. It is bordered in the North by Niger republic, to the South by Kaduna State. In the east, it is bordered by Katsina State and to the West by Sokoto and Niger States. The state is geographically coordinated at latitude 12° 9' 51" North and longitude 6° 40' 0" East. It has a population of 3,278,873 according to the 2006 census and projected population of 5,833,500 as of 2022 (NPC, 2024). Zamfara State contains fourteen local government areas. The climatic condition of Zamfara is tropical, with temperatures rising up to 38 °C (100.4 °F) and above between March to May. Rainy season starts in late May to September while the mild season known as harmattan lasts from December to February.

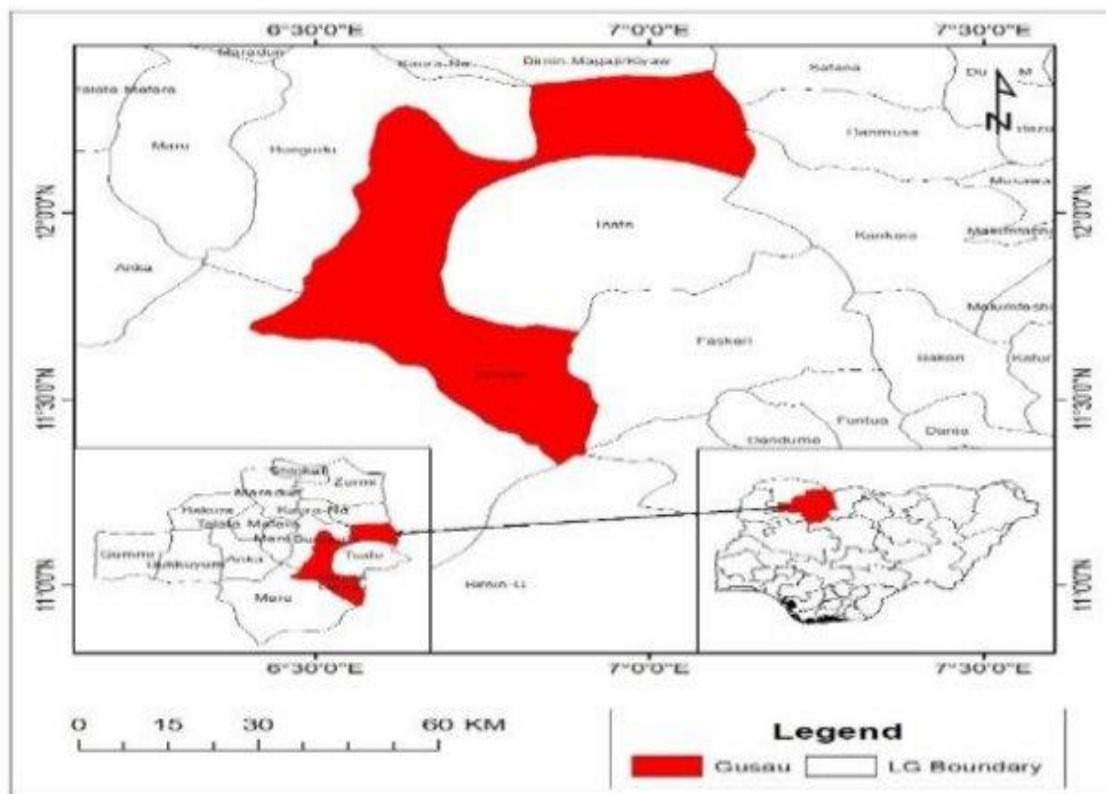


Figure 1: Map showing Gusau Metropolis

Study Design

Descriptive cross-sectional study and qualitative method of data collection was used to collect data from pregnant women on adherence to malaria prevention strategies being implemented by the researcher in the study sites.

Ethical Clearance

Ethical approval for the study with reference number ZSHREC13062025/301 was obtained from Zamfara State Health Research Ethic Committee of Ministry of Health, Zamfara State Nigeria. Participation in the study was voluntary; consent and assent were sought from the participants and guardians after the study processes had been explained to them.

Study Population

The study population comprised of pregnant women that have registered and were attending antenatal clinics (ANC) in Dr. Karima Pimari Health Center Gusau, King Fahad Women and Children Hospital Gusau, General Hospital Gusau and Shagari Primary Health care Gusau and consented to be part of the study and agreed to sign the informed consent forms that were included in the study.

Sample Size Determination

The minimum sample size was calculated using epidemiological formula as described by Nas *et al.* (2017).

$n = Z^2pq/d^2$ where n = minimum sample size
 p = prevalence of malaria (63%) (Nas *et al.* (2017),
 q = complementary probability = $(1.00-0.63)$
 d = 5% confidence interval=0.05
 z = value at 0.05 significant levels=1.96

Minimum sample size of 390 was obtained as minimum sample for the study and 10 was added for attrition making it 400 samples

Data Collection Instruments and Procedure

The primary data collection instrument in this study was a structured questionnaire. This study's questionnaire included an introduction section, as well as four sections: Section A was the consent section including consent to participate, hospital name and interview date. Section B was the socio-demographic data, which included respondents' age, resident, educational level, and occupation. Section C dealt with respondents' malaria knowledge, Section D with respondents' awareness of malaria prevention measures while Section E included practice of preventive measures.

Data Analysis

Statistical analysis was performed using SPSS software. Data from the questionnaire were analyzed descriptively and are presented as frequencies and means \pm standard deviation (SD). Chi square will be used to analyze to respondents'

knowledge and level of awareness to malaria and malaria prevention measures. In every case, *P*-value was set at < 0.05 for statistical significance.

RESULTS

Demographic Characteristics of the Respondents

The age group of most of the respondents were between 26 to 30 years (38%), 21 to 25 years (27%) while least was those aged above 40 years (0.5%). Majority of the respondents were at 2nd

trimester which accounted for 47.5% while 28.75% were at 1st trimester. Urban dwellers were the majority of the study respondents representing 63.5% while urban dwellers make up the 36.5%. Majority of the respondents had secondary education (41.7%). The least category of respondent's education level was tertiary education representing 16.25%. The majority of the respondents were house wife/unemployed (58.5) with farmers forming the least (8.5%) as presented in Table 1.

Table 1: Demographic Characteristics of the Respondents

Variable	Number (n)	Percentage (%)	P-value
Age group (years)			
Less than 20 years	53	13.25	0.00001*
21 – 25	108	27.00	
26 – 30	154	38.50	
31 - 35	59	14.75	
36 – 40	24	06.00	
Above 40 years	2	0.50	
Total	400	100	
Gestation age			
1 st trimester	115	28.75	0.0001*
2 nd trimester	183	45.75	
3 rd trimester	102	25.50	
Total	400	100	
Residential area			
Urban	254	63.5	0.00001*
Rural	146	36.5	
Total	400	100	
Education Level			
Primary Education	126	31.50	0.00001*
Secondary Education	167	41.75	
Tertiary Education	65	16.25	
No formal Education	42	10.50	
Total	400	100	
Occupation			
House wife/unemployed	234	58.50	0.00001*
Civil servant	43	10.75	
Farming	34	08.50	
Trading	89	22.25	
Total	400	100	

Key: * = The result is significant at $p < 0.05$

Respondents Knowledge level on Malaria

The respondents' knowledge level on malaria is presented in Table 2. The results showed that 92% of the respondent knew about malaria while 8% do not. On the causes of malaria majority (64.25) believed mosquito was the causative agent of malaria, 13.25% believed it was rain while few (3.5%) believed that it was due to dirty environment.

The signs and symptoms of malaria mentioned by the pregnant respondent included: fever 60%, headache, 14. 5%, joint and body pain 7.75%, vomiting 5.75%. Other signs and symptoms mentioned were diarrhea 3%, loss of appetite 2.25%, while 6.75% don't know any sign or symptom. The respondent's understanding of malaria showed that 365 (91.25%) perceived malaria as a dangerous to pregnancy.

Table 2: Respondents Knowledge level on Malaria

Variable	Number (n)	Percentage (%)	P-value
Have you heard about malaria?			
Yes	368	92.00	0.00001*
No	32	08.00	
Total	400	100	
What causes malaria?			
Rain	53	13.25	0.00001*
Mosquito	257	64.25	
Dirty environment	14	03.50	
Harvesting period	52	13.00	
I don't know	24	06.00	
Total	400	100	
What are the symptoms of Malaria			
Fever	240	60.00	0.00001*
Headache	58	14.50	
Joint and body pain	31	07.75	
Vomiting	23	05.75	
Diarrhea	12	03.00	
Loss of appetite	09	02.25	
I don't know	27	06.75	
Total	400	100	
Is malaria dangerous to pregnancy?			
Yes	365	91.25	0.00001*
No	35	08.75	
Total	400	100	

Key: * = The result is significant at $p < 0.05$

Respondents Awareness on Malaria Preventive Measures

The response of awareness on malaria preventive measures by the respondents is presented in Table 3. From the results, 321 respondent representing 80.25% heard about malaria preventive measures while 19.75% never heard about. On the methods used to prevent malaria, majority of the

respondents 146 which accounted for 36.5% used mosquito repellent/coil whereas 112 respondents representing 28% used insect treated net (ITN). Only 7 respondents (1.75%) do not use preventive measures. Majority of the respondents 379 accounting for 94.75% agreed that preventive treatment to malaria during pregnancy important.

Table 3: Respondents Awareness on Malaria Preventive Measures

Variable	Number (n)	Percentage (%)	P-value
Have you heard about malaria preventive measures?			
Yes	321	80.25	0.00001*
No	79	19.75	
Total	400	100	
What method (s) did you used to prevent malaria?			
Insect treated net (ITN)	112	28.00	0.00001*
Indoor spraying	72	18.00	
Mosquito repellent/coil	146	36.50	
Window/door nets	45	11.25	
Protective clothes	18	04.50	
None	07	01.75	
Total	400	100	
Did preventive treatment to malaria during pregnancy important?			
Yes	379	94.75	0.00001*
No	21	05.25	
Total	400	100	

Key: * = The result is significant at $p < 0.05$

Respondents Attitude towards Malaria Prevention

The respondents' attitude towards malaria prevention is presented below in Table 4. From the results, majority of the respondents 378 representing 94.5% seek health care to malaria. On the promptness of respondents to seeking treatment majority seek treatment within 12 hours of infection

(43.5%), 32% of the respondents seek treatment within 6 hours. Majority of the respondents about 279 which represent 69.75% seek treatment in hospitals while 73 (18.25%) go to nearest chemist/pharmacy for treatment. On the other hand, only 12 respondents (3%) take herbal preparation for treatment of malaria.

Table 4: Respondents Attitude towards Malaria Prevention

Variable	Number (n)	Percentage (%)	P-value
Did you seek healthcare to malaria?			
Yes	378	94.50	0.00001*
No	22	05.50	
Total	400	100	
How prompt did you seek treatment			
Within 6 hours	128	32.00	0.00001*
Within 12 hours	174	43.50	
Within 24 hours	52	13.00	
Within 48 hours	32	08.00	
Within 72 hours	14	03.50	
Total	400	100	
Where did you seek treatment			
Takes medication at home	36	09.00	0.00001*
Go to nearest chemist/pharmacy	73	18.25	
Go to hospital	279	69.75	
Take herbal preparation	12	03.00	
Total	400	100	

Key: * = The result is significant at $p < 0.05$

DISCUSSION

The socio-demographic characteristics of the study is relevant in the prevention of malaria. Individuals' educational attainment and their age emerged as particularly important factors for understanding the etiology of malaria. In this cross-sectional study, respondents demonstrated a good knowledge of malaria, as is currently observed in other malaria-endemic countries. Majority indicated that malaria was one of the leading problem in the community. Finding of this study was in conformity with that of Chukwurah *et al.* (2016) who found similar result. The knowledge of malaria exhibited by the majority of the respondents supports results obtained from other malaria-endemic areas (Abasiattai *et al.*, 2009; Abate *et al.*, 2013). Knowledge of malaria by the respondent could be due to deliberate attempts by the Ministry of Health through its agencies with the support of Non-Governmental Organizations, such as WHO or UNICEF, to increase knowledge on malaria and malaria prevention. These attempts in Nigeria could be the reason for higher study participants knowing the actual cause of malaria. Due to the support received by most African countries on malaria prevention, it is difficult to get contrary views on the cause of malaria (Trape *et al.*, 2002; Manana *et al.*, 2015).

The current study revealed that majority of the participants knew that mosquitoes were the main causes of malaria among pregnant women despite the fact that they also added some other causes such as rain, grains harvesting period and dirty environment. This is consistent with a study conducted by Asuamah *et al.* (2021), in Northern Ghana where majority of the subjects knew about the cause of malaria. Also, a study among pregnant women in Badagry Lagos Nigeria showed that overwhelming majority of study participants knew that mosquitoes causes malaria (Chukwurah *et al.*, 2016).

The signs and symptoms of malaria mentioned by the pregnant respondent included: fever, headache, joint and body pain, vomiting. Other signs and symptoms mentioned were diarrhea, loss of appetite. The respondent's understanding of malaria showed that majority perceived malaria as a dangerous to pregnancy. This finding agrees with that of Akinyele *et al.* (2009) who reported fever, headache and body pain as major sign and symptom of malaria. The high level of knowledge realized in this current study about signs and symptoms of malaria, also agrees with a study conducted in South African on the knowledge, attitude and practices on malaria transmission at the Mamfene and KwaZulu—Natal Province where majority of the participants

were able to identify three or four signs or symptoms of malaria (Manana *et al.*, 2015). This could be due to the fact that they are higher proportions of participants being educated and mature in age. This current study also had (99.6%) of participants who had heard about malaria. In addition to that, higher knowledge of respondents on sign and danger of malaria to pregnant women is attributed to their education level and public enlightenment campaign against malaria by both Governmental and Non-Governmental organization.

The response of awareness on malaria preventive measures by the respondents showed majority display good knowledge of malaria preventive measures. This corroborates studies conducted in southwest Nigeria, where more than 70% of pregnant women had good knowledge of malaria preventive measure (Akinleye *et al.* 2009). This study showed that knowledge of malaria preventive measure was influenced by the educational status of the women. Pregnant women that received secondary and post-secondary education were more knowledgeable on malaria preventive measure than those with none or primary education. On the methods used to prevent malaria, majority of the respondents 146 which accounted for 36.5% used mosquito repellent/coil. This finding justifies the finding of Chukwurah *et al.* (2016) who reported the use of mosquito coil as major malaria prevention method in Lagos Nigeria. The high use of mosquito coil in the study area was due to its cheapness and easy accessibility in the area.

The respondents' attitude towards malaria prevention showed majority of the respondents seek health care to malaria. On the promptness of respondents to seeking treatment majority seek treatment within 12 hours of infection and majority of the respondents seek treatment in hospitals. This clearly shows that there is an opportunity to educate the respondents on malaria and malaria prevention during their ANC visits. The ability of respondents in this study to visit hospital as well as to seek for health care to malaria could be attributed to several factors residential area, educational background and age of the respondents. The relevance of age, with the majority of respondents being between the ages of 26 and 30 years. Women at this age were active and have the capacity to take care of themselves and safe guard their pregnancy from malaria. Education, access to information, and awareness campaigns may have a greater impact on knowledge levels about malaria and malaria prevention as well as child protection (Nchetnkou *et al.*, 2020).

CONCLUSION

The findings of the study concluded that, majority of the participants were knowledgeable about the causes, signs and symptoms and preventive measures of malaria in pregnancy. However, few misconceptions still exit on the part of some participants. It was seen that formal education does have influence on participants' knowledge on malaria. There was statistically significant association between mothers' demographic information such as level of education, occupation, religion, and their attitude towards malaria prevention. The study found that mosquito coils, and mosquito spray were the most effective malaria-prevention methods used by pregnant women. In addition pregnant women go to hospital earlier to seek treatment when they suspect having malaria. It is that both Governmental and Non-Governmental organization to implement continuous strategic malaria prevention interventions including health awareness and educational programs, monitoring and evaluation.

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