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**Original Article**

# Prevalence of Malaria Parasite Infection among Pregnant Women Attending Ante-Natal Clinic in State Specialist Hospital

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**ABSTRACT**

Malaria is lives threaten parasitic disease transmitted by female anopheles mosquitoes and are highly prevalent trophical disease, with high morbidity and mortality and high economic and social impact. This study was aimed to determined malaria parasite infection among pregnant women attending State Specialist Hospital Maiduguri. Out of 108 blood samples tested for malaria parasite, only 52 (48.1%) were positive. highest prevalence was recorded among age 20-24years with the prevalence of 16(44.4%) followed by age 30-34years 11(40.7%), 35-39years 4(50.0%) and 13-19years with 2(13.3%). The distribution based on educational status showed that only 23(48.9%) were positive among those women who have undergone formal education while those that have not undergone formal education had 29(47.5%) positive. Similarly, based on gravidity showed that Multigravidae had higher prevalence of 34(52.3%) than Primigravidae 18(41.9%) and also according trimester showed that pregnant women that were in second trimester have higher prevalence of 35(53.8%), followed by those in first trimester 14(42.4%) and those in third trimester 3(30%). However, no statistically significant difference was recorded between the prevalence of the malaria parasite infection and all these variables of the patients. Therefore, Prophylactic drugs should be administered to pregnant women in other to prevent malaria infections. Also use of insecticide-treated nets decreases both the number of malaria cases and malaria death rates in pregnant women and finally, it is also essential to avoid stagnant pools and poor environmental condition, which encourage the breeding of mosquito.

**Keywords:** Malaria, Prevalence, Hospital and Pregnant women.



## INTRODUCTION

Malaria remains the major and most important infection causing morbidity and mortality in the world and is second only to Mycobacterium tuberculosis as the single most important infection agent. It is one of the biggest impediments to progress in Africa and is the biggest

killer in Africa, with 90% of the global malaria deaths occurring in this continent (Bulter, 1997; Okafor *et al.,* 2012). It is responsible for one in four deaths below the age of 5 years and could most times lead to miscarriage at the early stage of pregnancy (Bulter, 1997; Okafor *et al.,* 2012). In the endemic countries of Africa, children under the age of five and pregnant women bear the brunt of the burden of malaria disease, this is because they have lower immunity to the disease compared to other people in the same environmental locations. The malaria situation is deteriorating as a result of climate changes, including global warming, civil disturbances, increasing travel and increasing drug resistance (Greenwood, 1997; Okafor *et al.,* 2012). According to World Health Organization report, malaria is one of the leading selected causes of mortality with fatality rate put at 1.5 to 2.7 million annually while it comes second among the leading selected causes of morbidity with about 300 to 500 million people reporting to hospital due to the infection5. Maternal mortality is twice in pregnant malaria women than among non-pregnant patients with severe malaria (Okafor *et al.,* 2012).

Malaria infection during pregnancy is a major public health problem in tropical and subtropical regions throughout the world Malaria during pregnancy has been most widely evaluated in Africa South of the Sahara where 90% of the global malaria burden occurs. The burden of malaria infection during pregnancy is caused mainly by *Plasmodium falciparum*, the most common malaria species in Africa. Every year at least 3 million pregnancies occur among women in malarious areas of Africa, most of who reside in areas of relatively stable malaria transmission (Brabin, 1990; Adefioye *et al.,* 2007). The symptom and complications of malaria during pregnancy differ with the intensity of malaria transmission and thus with the level of immunity the pregnant woman has acquired (Adefioye *et al.,* 2007).

Maternal mortality is the death of pregnant women due to complications of pregnancy or during child birth. Out of the global maternal deaths, 99% occur in the developing countries, and Nigeria accounts for 10%, which is the second highest in the world. About 50% of pregnancies are unplanned; therefore, most women are unprepared for pregnancy in that the physical, nutritional, physiological demands are not met. During pregnancy, extra calories are needed due to a woman's increased basal metabolic rate and higher energy demands. Prenatal infection is a major cause of maternal, fetal and neonatal morbidity and mortality (Matthew *et al.,* 2013).

Malaria remains one of the most important diseases of the tropics despite several years of concerted effort towards control. A lot of times the actual statistics is not clear in so many regions due to paucity of data and this leads to neglect of the disease and the devastation. Hundreds of millions of people are affected and pregnant women are more susceptible together with little children. It is dangerous to both the mother and the fetus. The pregnant women are at greater risk of malaria infection and of symptomatic malaria disease than non-pregnant adults (Madukaku *et al.,* 2012). Therefore, the aim of this study is to determined malaria parasite infection among pregnant women attending State Specialist Hospital Maiduguri, Borno State, Nigeria.

## MATERIALS AND METHODS

### Study Site/Design

This study was carried out in Borno State situated in the Northeastern part of Nigeria lies in latitude 10° N and longitude 13° E. The areas share an international boundary with Chad to the North-East and Cameroon to the East, with the public of Niger to the North. It also shares nation and boundaries within the country such as Adamawa to the South, Yobe to the west, and Gombe to the South-West. The state has an area of 69,435 square kilometer, about 7.69% of the total land area of the country. Base on the 2006 census figure, the state has a population of 4,151,193 with population density of approximately 60 inhabitants per square kilometer (NPC 2006). The state is presently structured into 27 local government Areas.

**Questionnaire**

Questionnaire was used in this study to obtained information on socio demographic variable which considered as a risk factor or acquiring malaria parasite infection. The information obtained in the questionnaire includes; age, parity, educational status, gestational age and history of blood transfusion.

**Sample Collection**

About 5ml of blood sample was aseptically collected by venupuncture from each pregnant woman attending State Specialist Hospital Maiduguri and transfer into anticoagulant free bottles.

**Determination of Malaria Parasite**

Whole blood was used, a well labeled of clean grease free slides and a thick blood films were stained using field staining method, and were allowed to air dry. Thick blood films were used to determine the parasite densities and to identify the parasite species and infective stages. Stained slides were examined under the light microscope using x 100 objective lens (immersion oil). Using standard quality and controlled procedures, the presence and level of parasitaemia was observed and recorded as parasite or negative on the microscopic detection of any Plasmodium stage on the slides.

**Statistical Analysis**

The data was subjected to statistical analysis (the $\chi 2$-test, with the level of significance set at $p < 0.05$) using statistical package (R version 2.13.1) to determine the relationship between malaria parasites infection and socio- demographic variable such as age, gravidity, trimester and educational status.

## RESULTS

The result of this study showed that the prevalence of malaria parasite among pregnant women attending State Specialist Hospital Maiduguri. Out of 108 blood samples tested for malaria parasite, only 52 (48.1%) were positive. highest prevalence was recorded among age 20-24years with the prevalence of 16(44.4%) followed by age 30-34years 11(40.7%), 35-39years 4(50.0%) and 13-19years with 2(13.3%). However no statistically significant difference was recorded between the prevalence of the malaria parasite infection and the different age group (X-squared = 5.5362, df = 5, p-value = 0.354) (Table 1).

**Table 1: Distribution of Malaria parasite infection among pregnant women attending State Specialist Hospital Maiduguri based on age**

| Age | Total (%) | Positive | Positive (%) |
|---|---|---|---|
| 13 – 19 | 15(13.9) | 4 | 26.5 |
| 20 – 24 | 36(33.3) | 20 | 55.6 |
| 25 – 29 | 21(19.4) | 9 | 42.9 |
| 30 – 34 | 27(25.0) | 14 | 51.9 |
| 35 – 39 | 8(7.5) | 5 | 62.5 |
| 40 – 44 | 1(0.9) | 0 | 0.0 |
| **Total** | 108(100) | 52 | 48.1 |

(X-squared = 5.5362, df = 5, p-value = 0.354)

The distribution of malaria parasite infection among pregnant women attending State Specialist Hospital Maiduguri according to their educational status, revealed that out of 108 patient tested, only 23(48.9%) were positive among those women that have undergone formal education while those that have not undergone formal education had 29(47.5%) positive, although, no statistically significant difference was recorded between the prevalence of the

malaria parasite infection and the educational status of the patients (X-squared = 0.0141, df = 1, p-value = 0.9054) (Table 2).

**Table 2: Distribution of Malaria parasite infection among pregnant women attending State Specialist Hospital Maiduguri based on Educational Status**

| Educational Status | Total (%) | Positive | Positive (%) |
|---|---|---|---|
| Formal Education | 43(43.5) | 23 | 48.9 |
| Non-Formal Education | 61(56.5) | 29 | 47.5 |
| Total | 108(100) | 52 | 148.1 |

(X-squared = 0.0141, df = 1, p-value = 0.9054)

The distribution of malaria parasite based on gravidity showed that Multigravidae had higher prevalence of 34(52.3%) than Primigravidae 18(41.9%), although, no statistically significant difference was recorded between the prevalence of the malaria parasite infection and the gravidity of the patients (X-squared = 0.7516, df = 1, p-value = 0.386) (Table 3).

**Table 3: Distribution of Malaria parasite infection among pregnant women attending State Specialist Hospital Maiduguri based on Gravidity**

| Gravidity | Total (%) | Positive | Positive (%) |
|---|---|---|---|
| Primigravidae | 43(39.8) | 18 | 41.9 |
| Multigravidae | 65(60.2) | 34 | 52.3 |
| Total | 108(100) | 52 | 48.1 |

(X-squared = 0.7516, df = 1, p-value = 0.386)

Distribution of malaria parasite based on trimester showed that pregnant women that were in second trimester have higher prevalence of 35(53.8%), followed by those in first trimester 14(42.4%) and those in third trimester 3(30%). However, no statistically significant difference was recorded between the prevalence of the malaria parasite infection and the trimester of the patients (X-squared = 2.5976, df = 2, p-value = 0.2729) (Table 4).

**Table 4: Distribution of Malaria parasite infection among pregnant women attending State Specialist Hospital Maiduguri based on Trimester**

| Trimester | Total (%) | Positive | Positive (%) |
|---|---|---|---|
| First Trimester | 33(30.6) | 14 | 42.4 |
| Second Trimester | 65(60.2) | 35 | 53.8 |
| Third Trimester | 10(9.2) | 3 | 30.0 |
| Total | 108(100) | 52 | 48.1 |

(X-squared = 2.5976, df = 2, p-value = 0.2729)

The distribution of malaria parasite infection based on history of blood transfusion showed that those pregnant women that have no history of blood transfusion had higher prevalence of 38(55.9%) than those with history of blood transfusion 14(35%), although, no statistically significant difference was recorded between the prevalence of the malaria parasite infection and the history of blood transfusion of the pregnant women (X-squared = 3.6024, df = 1, p-value = 0.0577) (Table 5).

**Table 5: Distribution of Malaria parasite infection among pregnant women attending State Specialist Hospital Maiduguri based on History of Blood Transfusion**

| History of Blood Transfusion | Total (%) | Positive | Positive (%) |
|---|---|---|---|
| Yes | 40(37.0) | 14 | 35.0 |
| No | 68(63.0) | 38 | 55.9 |
| Total | 108(100) | 52 | 48.1 |

(X-squared = 3.6024, df = 1, p-value = 0.0577)

## DISCUSSION

Malaria is a life threatening parasite disease transmitted by female anopheles mosquitoes malaria is the most highly prevalent tropical disease, with high morbidity and mortally high economic and social impact (WHO, 2001). In the study the overall prevalence showed that 52 (48.1%) of the sampled pregnant women were infected with malaria parasite. This is similar to 58 (72.5%) reported by Sidney *et al.,* (2013) among pregnant women attending Ante natal care at University of Port Harcourt Primary Health Care Centre Aluu, Port Harcourt, Rivers State, Nigeria. But is less than 72% reported by Adefioye *et al.*, (2007) among Pregnant Women in Osogbo, Southwest, Nigeria. This value agrees with the World malaria report which reported that approximately 40% of the world's populations living in the world's poorest localities are in lack of proper sanitation practices, and are at risk of malaria. The prevalence recorded in this study is greater than Uko *et al.,* (1998) who recorded low prevalence rate of (6.8%). Also greater than 26.2% reported by Samia *et al.,* (2011) among pregnant women in Khartoum, Sudan. Similarly, it greater than 26% reported by Michael *et al.* (2013) among pregnant women attending antenatal clinics in Port Harcourt, Rivers State. The higher prevalence in this study may be attributed to poor environmental conditions occasioned by lack of effective sanitary practices.

Distribution of malaria parasite based on age showed that highest prevalence was recorded among age 20-24years with the prevalence of 16(44.4%) followed by age 30-34years 11(40.7%), 35-39years 4(50.0%) and 13-19years with 2(13.3%). This result similar to the work of Okafor *et al.,* (2012) who reported that pregnant women within the age bracket of 20 to 30 years recorded the highest number of positive result while those of the age group of above 40 years recorded the lowest or no result at all. This result supports the existing knowledge that high prevalence at lower ages and low prevalence at higher ages is due to the existence of natural immunity to infectious disease including malaria (Rogerson *et al.,* 2000: Bouyou-Akotet *et al.,* 2005) which the pregnant women acquires as the age increases. Lander *et al.* (2002) however reported no significant association between malaria infection and maternal age. However no statistically significant difference was recorded between the prevalence of the malaria parasite infection and the different age group (X-squared = 5.5362, df = 5, p-value = 0.354) (Table 1).

The distribution of malaria parasite infection among pregnant women according to their educational status, revealed that out of 108 patient tested, only 23(48.9%) were positive among those women that have undergone formal education while those that have not undergone formal education had 29(47.5%) positive. It was observed that illiterates' pregnant women had the highest prevalence rate in this study. This is probably because they are more exposed to malaria parasite due to bad environmental condition and their life styles. However, no statistically significant difference was recorded between the prevalence of the malaria parasite infection and the educational status of the patients (X-squared = 0.0141, df = 1, p-value = 0.9054) (Table 2).

The distribution of malaria parasite based on gravidity showed that Multigravidae had higher prevalence of 34(52.3%) than Primigravidae 18(41.9%). This result contrary to the work of Okafor *et al.,* (2012) who reported the analysis malaria in pregnancy in Africa revealed that parasiteamia is significantly common and heavier in Primigravidae than Multigravidae. This agrees with the earlier report by Isibor *et al,.* (2003) and Nair and Nair (1994) that anaemia is a common problem of the primigravidae. Achidi *et al.,* (2005) also recorded a higher prevalence of anaemia among the primigravidae (52.1%) than in the multigravidae (47.9%). Although, no statistically significant difference was recorded between the prevalence of the malaria parasite infection and the gravidity of the patients (X-squared = 0.7516, df = 1, p-value = 0.386) (Table 3).

Distribution of malaria parasite based on trimester showed that pregnant women that were in second trimester have higher prevalence of 35(53.8%), followed by those in first trimester

14(42.4%) and those in third trimester 3(30%). This finding agree with those of Nair and Nair (1994), Menendez (1995); Nosten *et al.,* (1991), who reported higher frequency of malaria parasite infection in the second trimester than others. The sequential increase in the intensity of malaria parasite infection as the gestational age increases observed in this study may be due to the depressed immunity usually associated with pregnancy. However, no statistically significant difference was recorded between the prevalence of the malaria parasite infection and the trimester of the patients (X-squared = 2.5976, df = 2, p-value = 0.2729) (Table 4).

## CONCLUSION

This research has shown that malaria parasite have serious impact on the health of mother and foetus. The result of this study showed that the prevalence of malaria parasite among pregnant women attending State Specialist Hospital Maiduguri. Out of 108 blood samples tested for malaria parasite, only 52 (48.1%) were positive. Therefore, Prophylactic drugs should be administered to pregnant women in other to prevent malaria infections. Also use of insecticide-treated nets decreases both the number of malaria cases and malaria death rates in pregnant women and finally, it is also essential to avoid stagnant pools and poor environmental condition, which encourage the breeding of mosquito.

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