



Prevalence of Malaria among Pregnant Women Attending Antenatal Clinics in Owerri, South Eastern Nigeria

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Abstract

A study was carried out to determine the prevalence of Malaria among pregnant and non-pregnant women attending two antenatal care centres; Federal Medical Centre (FMC) and Divine Hospital and Maternity in Owerri Municipality, South Eastern Nigeria between September, 2013 and February, 2014. Blood samples were collected by vein puncture from 292 pregnant women in different trimesters and 58 non-pregnant women in different age groups, respectively. Malaria parasite was observed microscopically on thin and thick blood smears prepared from each specimen. Personal data on age, parity and gestational period were obtained through the use of a questionnaire. Only the ring *trophozoite* and gametocyte forms of *Plasmodium falciparum* were observed in the infected specimens. The results were analyzed statistically using two-way analysis of variance (ANOVA). Out of 292 pregnant women examined, 203 (69.5%) were infected with *P. falciparum* while 12 (20.7%) of the non-pregnant women sampled were infected. This represents a significant difference ($P < 0.05$). Out of 216 pregnant women examined from Federal Medical Centre, 155 (71.8%) were infected while 48 (63.2%) out of the 76 pregnant women examined from Divine hospital and maternity were infected. There was significant difference between the results obtained in the two hospitals ($P < 0.05$). Peak prevalence was observed in the first trimester 88.9% (128 out of 144) while third trimester had the lowest 40.7% (22 out of 54) occurrence. Pregnant women within the age group (11-15 years), were mostly infected 100% than any other age group. Pregnant women with low packed cell volume (PCV) had higher prevalence of malaria parasite (77.2%) than women with normal PCV (64.6%). Pregnant women with less than 9.1g/dL hemoglobin also had highest prevalence of malaria parasite (91.1%) than others with high hemoglobin levels. Prevalence was also higher in pregnant women that were anemic. The study confirmed that the burden of *falciparum* malaria in pregnant women in the study area was significant.

Keywords: *falciparum*, Malaria, Pregnant and Non-Pregnant Women, Microscopy.

1.0 Introduction

Malaria, a parasitic infection transmitted by mosquitoes, is one of the most devastating infectious diseases and the second most common cause of infectious disease-related deaths in the world after tuberculosis (Shantz-Dunn and Nour, 2009). It is estimated to affect between 350-500 million people annually and accounts for 1-3 million deaths per year. Sub-Saharan Africa has the largest burden of malarial diseases with over 90% of the world's malarial related deaths occurring in this region. Twenty five million pregnant women are currently at risk for malaria and according to the World Health Organization (WHO) malaria accounts for over 10,000 maternal and 200,000 neonatal deaths per

year (Shantz-Dunn and Nour, 2009).

Despite all the extensive work on the prevention, control, treatment and eradication of malaria in Nigeria, the disease still takes a toll on pregnant women.

Malaria infection in pregnant women is associated with high risks of both maternal and perinatal morbidity and mortality. While the mechanism is poorly understood, pregnant women have a reduced immune response and in addition, malaria parasites sequester and replicate in the placenta. Malaria infection during pregnancy can lead to miscarriage, premature delivery, low birth weight, congenital infection, and/or perinatal death (CDC 2013).

2.0 Materials and Method

2.1 Study Area and Population

Owerri (capital of Imo State) is situated at 5.48° North latitude and 7.03° east longitude and 159 meters elevation above the sea level. With a high population density and over farming the soil has been degraded and much of the vegetation lost. This destruction has triggered soil erosion which is compounded by heavy seasonal rainfall. This ecology of Owerri municipality provides suitable breeding habitats for the survival of Anopheles mosquitoes which are vectors of the malaria parasite, *P. falciparum*.

The study population was made up of 292 pregnant women and 58 non-pregnant women aged 15-45 years attending public and private antenatal clinics from September 2013 to February 2014. The blood specimen of the subjects was investigated for the presence of the malaria parasite by using standard methods described by (WHO, 2006).

2.2 Ethical Consideration

Ethical clearance was sought and obtained from the ethical committees of the hospitals used in the study.

2.3 Specimen Collection

Peripheral blood specimen was collected using venous procedures. Structured questionnaires were administered requesting information on age, parity and gestational period.

2.4 Microscopic Examination

Thick blood films were stained using field staining method while thin blood films were stained using Leishman staining method. Stained slides were examined under light microscope using x100 objective lens (Immersion oil) (Wogu *et al.*, 2013). Thick blood films were used to determine the parasite densities while thin blood films were used to determine parasite species and infective stages. Slide with malaria parasites <3 in a high power field was scored scanty; 3-10 as (+); 10-19(++); 20 as (+++) or more according to the degree of infection (parasitemia) (Wogu *et al.*, 2013).

3.0 Result and Discussion

Results of this study are presented in Tables 1-3.

Table 1: Prevalence of malaria among pregnant and non-pregnant women.

Hospital	Pregnant		Non-pregnant	
	NE	NI	NE	NI
FMC Owerri	216	155 (71.8%)	34	3 (8.8%)
Divine Hospital and Maternity	76	48 (63.2%)	24	9 (37.5%)
Total	292	203 (70%)	58	12 (20.7%)

("NE" is the number examined; "NI" is the number infected)

Table 2: Malaria prevalence in relation to gestation and parity.

Gestation period	NE	NI	(%)
			Infection
First trimester	144	128	88.9
Second trimester	94	53	56.4
Third trimester	54	22	40.7
Parity			
Primigravidae	195	149	76.4
Multigravidae	97	54	55.7

("NE" is the number examined; "NI" is the number infected)

Table 3: Prevalence of malaria in relation to age

Age (Years)	NE	NI	(%)
			Infection
15-20	30	31	82
21-30	154	108	70
31-40	76	51	67
41-50	24	13	54
Total	292	203	70

("NE" is the number examined; "NI" is the number infected)

In this study, out of 292 pregnant women infected 203 were infected with *Plasmodium falciparum* while 12 of the non-pregnant women sampled were infected. The prevalence of malarial infection in pregnant women in this study was 70% while in non-pregnant women, it was 21%. This rate is higher than 57.5% reported in Gabon, by Boyou *et al.* (2003) and 42.4% recorded in Oturkpo, Benue State, Nigeria by Jombo *et al.* (2010). The malaria prevalence rate observed in this study may be due to environmental sanitation problems and stagnant water bodies that are suitable breeding habitats for malaria vector in the study area. Pregnant women attract twice the number of anopheles mosquito compared to their non-pregnant counterparts. This is believed to be connected to certain physiological and behavioral changes that occur in pregnancy including increased skin temperature associated with pregnancy. These substances may be detected by the mosquito (Lindsay *et al.*, 2002; Martvnez, 2000).

Women in the first trimester had highest prevalence rate (88.9%). Also women in their primigravidae had the highest prevalence rate of (76.4%) while multigravidae women had the least (55.7%) prevalence rate. In this study, pregnant women in their 1st trimester were more infected than those in the 2nd and 3rd trimesters. Antibodies directed against the surface of infected erythrocytes in the placenta protects against malaria complications. The production of these antibodies against infected placental erythrocytes is gravidity dependent. Hence, this mechanism of antibody production is often absent in the first and sometimes second pregnancies (Rogertson, *et al.*, 2007).

The different malaria prevalence rates observed among the age groups could be attributed to the level of acquired immunity that increases with age, which may also be associated with protection from malaria infection. Younger pregnant women have been found to be more susceptible to malaria in some settings (Saute *et al.*, 2002). Awareness on malaria prevention measures during pregnancy should target young women even before they get married preferably at schools, and religious and social gatherings.

4.0 Conclusion

Pregnancy is one of the factors affecting the rate of malarial parasites infection in women living in malaria-endemic communities. Pregnant women should be encouraged to attend antenatal clinics for antenatal care where malaria education is carried out frequently by trained health officers. Early detection and proper case management of pregnant women with symptoms and signs of malaria should be improved. Effective malaria control strategies will have a remarkable effect in controlling malaria infection among pregnant women.

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