

## Prevalence of Malaria Parasitaemia and Anaemia Among Pregnant Women in Warri, Nigeria

C. N. ISIBOR,<sup>\*1,3</sup> E. U; OMOKARO<sup>2</sup>, I. AHONKHA,<sup>3</sup> AND J. A., ISIBOR<sup>4</sup>

<sup>1</sup>Laboratory Department, Central Hospital, Warri,

<sup>2</sup>School of Medical Laboratory Sciences, University of Benin Teaching Hospital, Benin City, <sup>3</sup>Dept. of Pharmaceutical Microbiology, University of Benin, Benin City,

<sup>4</sup>Laboratory Department, Central Hospital, Agbor

### ABSTRACT

A total of 319 pregnant women attending the antenatal clinic of Central Hospital, Warri had their haemoglobin levels estimated using standard haematological methods. Forty-seven (14.7%), expectant mothers were found to be anaemic (haemoglobin level less than 9.0g/dl). The Malaria parasites the agent of malaria and a major cause anaemia in pregnancy were found in 105 (32.9%) expectant mothers, based on the examination of peripheral blood smears. Multigravidae recorded 33.2% prevalence of malaria parasitaemia that was comparable with that among primigravidae. There was a statistically significant relationship between malaria parasitaemia and haemoglobin levels of pregnant women ( $p < 0.05$ ). This study emphasizes the need for pregnant women to undergo routine haemoglobin estimation considering the deleterious effects of anaemia on them and their foetuses. An early malaria prophylaxis is recommended if a significant increase in haemoglobin levels in the second trimester is to be achieved.

**Keywords:** Anaemia, Pregnancy, Haemoglobin, Malaria Parasitaemia.

### INTRODUCTION

Malaria is a major health problem in tropical Africa, and an estimated 95% of the world's 200 million infected persons live in Africa(1). It is known that in highly endemic areas the indigenous populations acquire immunity with age. For this reason, the adult population may have parasites in blood circulation rather inconsistently. When present, parasitaemia is scant and usually without marked clinical manifestation. However, in gravidae, the parasites are detected 4 -12 times

more often than in the non-gravidae(2). Thus malaria in pregnant women has a far more severe course with frequent complications than in non-pregnant women and the general population(3,4). Malaria is known to have a detrimental effect on the foetus as well as on the outcome of gestation. There are numerous reports on the aggravating influence of malaria in pregnancy(5). Immunity to malaria is dependent on both humoral and cellular factors.

During pregnancy however, there is an impaired proliferative response of

\*Corresponding Author

peripheral and placental lymphocytes to malaria antigens, which is consistent with the general decrease in cellular immunity and concomitant attenuation of immunity to malaria during pregnancy(6,7). Malaria is a major cause of anaemia in tropical Africa and anaemia in pregnancy has a complex aetiology(8).

Although there are numerous studies on the prevalence of malaria in pregnancy, there is no documented report on Warri, located in Southern Nigeria. This cross-sectional study is designed to assess the prevalence of malaria parasitaemia amongst pregnant women in Warri and find any possible differences in the profile from those of earlier reports.

#### MATERIALS AND METHODS

A total of 319 ethylenediamine-tetra-acetic acid (EDTA) blood samples from pregnant women attending the antenatal clinic, Central Hospital, Warri were collected by venepuncture in sterile vacutainer tubes. The pregnant women in this study were classified according to the following demographic data as described by Gabbe(9).

**Gestational Age:** They were grouped according to the gestational age: first trimester (0-14 weeks), second trimester (15-28 weeks) and third trimester (28-42 weeks).

**Gravidity:** The pregnant women were categorized as primigravid if they were carrying pregnancy for the

first time and multigravid if they had carried more than one pregnancy.

#### Estimation of Haemoglobin:

Haemoglobin was determined using the cyanmethaemoglobin method described by Dacie and Lewis(10). Haemoglobin level less than 9g/dl was considered as indicative of anaemia in this study.

**Detection of Malaria Parasites:** Thick blood films were made for each of the subjects and stained using Giemsa staining method as described by Chessbrough(11).

**Statistical Analysis:** The data generated in this study were analyzed for level of significance using the chi-square test with the aid of GraphPad InStat Software (V2.052).

#### RESULTS

One hundred and five (32.9%) of the 319 pregnant women tested had positive parasitaemia. (Table1). There was no statistically significant difference ( $p>0.05$ ) in the frequency of parasitaemia between the primigravid and multigravid in this study. However, among the primigravid women with parasitaemia, there was a slightly higher prevalence of anaemia than among the multigravid.

There were observed decreases in the frequency of parasitaemia with gestational age that were statistically significant ( $p<0.05$ ) (Table 2). Parasitaemia correlated well with anaemia in the first trimester but the effect decreased with increase in gestational age ( $P<0.05$ ). At third trimester, 26.3% of parasitaemic subjects were anaemic.



Table 1: Distribution of anaemia and parasitaemia in pregnant women according to gravidity.

Gravidity Status	No. (%) of subjects positive for:	
	Parasitaemia	Anaemia
Primigravidae (n=75)	24 (32.0) <sup>a</sup>	13 (54.2) <sup>b</sup>
Multigravidae (n=244)	81 (33.2)	34 (42.0)

<sup>a</sup> Percentage is based on no. of subjects of indicated status

<sup>b</sup> Percentage is based on no. of subjects with parasitaemia

Chi-square statistic (with Yates correlation)

= 1.928E-05

P = 0.9965, considered not significant.

Table 2: Haemoglobin values of pregnant women and parasitaemia according to gestational age.

Gestational age	Parasitaemia Status;	No.(%) <sup>a</sup>	No. (%) <sup>b</sup> with Hb (g/dl) of:	
			≤9.0	≥10.0
1 <sup>st</sup> Trimester (n=32)	+	13(40.6)	13(100.0)	0(0.0)
	-	19(59.4)	0(0.0)	19(100.0)
2 <sup>nd</sup> Trimester (n=164)	+	54(32.9)	24(44.4)	30(55.5)
	-	110(67.1)	0(0.0)	110 (100.0)
3 <sup>rd</sup> Trimester (n=123)	+	38(30.9)	10(26.3)	28 (73.7)
	-	85(69.1)	0(0.0)	85(100.0)

<sup>a</sup> Percentage is based on no. of subjects at given trimester

<sup>b</sup> Percentage is based on no. of subjects with or without parasitaemia.

## DISCUSSION

Malaria is a major obstetric problem in tropical Africa, and usually occurs more frequently during pregnancy than in non-pregnant women(2). Pregnant women in malaria endemic areas tend to have more severe infections, which occasionally result in spontaneous abortion, still-births or low birth weights(12).

This study has shown that 32.9% pregnant women examined had malaria parasitaemia, at a prevalence that is lower than the 44% previously reported in South Eastern Nigeria by Uko *et al.* (13). Enormous cultural and economic differences may account for this variation.

The malaria parasite remains a major problem for both the of primigravidae and the multigravidae. The finding of a relative excess of anaemia among the primigravid subjects however, agrees with the earlier reports of Nair and Nair(4) and Barbin *et al.*(5) that anaemia in pregnancy is a common problem of primigravidae. Furthermore, there were decreases in the rate of parasitaemia as the gestational age increased. For instance, the prevalence of malaria parasitaemia was highest in the first trimester. In comparison, our findings do not agree with those of Nair and Nair(4), who reported higher frequency of malaria in the second trimester than in the others. The sequential decrease observed in this study may be due to a recovery of the depressed

immunity usually associated with pregnancy(12).

According to World Health Organisation(14), anaemia in pregnancy is present when the haemoglobin concentration is less than 10g/dl. In this study, 47 of the 319 women examined were anaemic, giving a prevalence of 14.7% in pregnant women attending Central Hospital, Warri. This value is low compared to values obtained from other parts of Nigeria and elsewhere. Usanga *et al.*(15) reported a rate of 17.7% in Calabar Nigeria, while Fleming *et al.* (16) reported 25.4% in the Guinea Savanna region of Nigeria. Desalegn(17) reported a 41.9% prevalence rate in Southern Ethiopia, while in New Guinea, Barbin *et al.*(18) reported a prevalence rate of 18.9%.

Although severe malaria in pregnancy is a major problem in endemic areas, it is important to note that none of the women enlisted in this study had severe anaemia in pregnancy. This may be accounted for by the experience gained during antenatal clinics, health talks and the increased awareness of the need for balanced diet and malaria prophylaxis.

Since the aetiology of anaemia in pregnancy is multifactorial, the contributory effect of malaria parasitaemia is always very difficult to ascertain. The World Health Organisation (19) has recommended the use of an effective anti-malarial throughout pregnancy in order to prevent the adverse effect of the disease on the mother, foetus or the newborn. Chemo- prophylaxis is not administered in this hospital as a



routine practice.

In conclusion, an early malaria prophylaxis is therefore advocated if the contribution of malaria parasitaemia to the decreases in the haemoglobin levels during pregnancy is to be averted. Furthermore, protection against malaria reduces the risks of megaloblastic anaemia resulting from increased folate deficiency (20). It is therefore advocated that pregnant women be encouraged to use the recommended bed nets and take their folate supplementation in order to reduce the dietary folate deficits occasioned by poor nutrition during pregnancy in a depressed economy.

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