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Effect of Malaria Parasite on Platelet Among Pregnant Women in Owerri, Imo State Nigeria

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ABSTRACT

Malaria is a formidable global parasitic infection that presents a major health challenge in Tropical countries especially among pregnant women and children. It has a profound alteration or reduction effects on hematological parameters such as platelets in pregnant women. The study was carried out to determine the effects of Plasmodium falciparum on platelets of pregnant women in Owerri, Imo state Nigeria. A total of one hundred and fifty (150) blood samples of pregnant women were collected at Holy Rosary hospital Emekuku in owerri. The blood samples were screened for malaria infection using thick and thin Giemsa blood films. Results showed that 50 (33.33%) were positive for malaria parasite showing significant signs, with visible fever accompanying the infections. Normal platelet number ranges from 150 X 109/ L; 400 X 109/L. The association of hematological parameters and diagnosis of malaria infection among people living in malaria endemic areas were retrieved. The most commonly changed parameters are platelet count. Presence of thrombocytopenia in pregnant women from endemic areas was useful as supportive diagnostic criteria for malaria in cases with low levels of parasite number. Therefore, when used with other clinical and microscopy parameters, it can significantly improve malaria diagnosis and timely treatment for malaria infection.

Keywords: Malaria Parasite, Platelet, Pregnant Women, Owerri, Imo State, Nigeria

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Introduction

Malaria illness imposes great burden on the society as it has adverse effects on the physical, mental and social well being of the people as well as on the economic development of countries endemic for the disease. Pregnancy increases the susceptibility of women to malaria attacks (Rogerson et al., 2007).

Malaria is an infectious blood disease caused by a protozoan parasite, *plasmodium* species, transmitted by the bite of female mosquitoes of the agent, *Anopheles (*Afolabi, 2000). It has continued to be one of the main communicable disease problems of public health importance in the world especially in the majority of the African countries, south of Sahara (Wito, 2000).Its common symptoms include headache, weakness, fever, aches , pains, bitterness of the mouth and loss of appetite. There seems to be no end in sight for the dynamism of the malaria as the biggest health burden for Sub-Saharan African.

Nigeria is known for high prevalence of malaria (Steketee, 2003) which is a leading cause of morbidity and mortality in the country (Walsh, 1985). Available records show that at least 50% of the population of Nigeria suffers from at least one episode of malaria each year (WHO, 2012) with estimated cases in 2000 alone reported to be 2.4 million (Steketee, 2003).

Although any one can get malaria, two groups of people are at the highest risk from malaria such as pregnant women and children under 5 years of age (Nneji et al, 2009). In Southern Nigeria, 35,000 children die annually from direct attack of malaria (Erhabor et al 2014). Increased susceptibility of pregnant women to malaria has been thought to be due either to sequestration of the parasites in the placenta, low immunity or changes in hormonal profiles (Smith,1996). Malaria infection during pregnancy especially its parasite effects on platelet among pregnant women is hematological ally significant. Despite the advocacy for its reduction through Roll Back malaria (R B M) programmes, it continued to cause poverty, morbidity, resistance, mortality and hindrance to economic development (Ejezie et al).

In view of this, it could be said that malaria imposes a great burden on the country in terms of pains and trauma suffered by its victims as well as losses in outputs and cost of treatments (Onwujekwe et al (2014). High level of malaria endemicity, parasite resistance to affordable drugs and inadequate access to treatment facilities has contributed to making the disease the killer of pregnant women and children, accounting for an estimated 300,000 deaths each year.

Similarly, many researchers have reported high prevalence rates of malaria in pregnancy in different parts of the country, ranging from 19.7% to 72. 0% (Hung, et al (2005) with anemia, miscarriages and low birth weight of babies identified as the most debilitating effects of the disease which account for 11% of maternal deaths in the country (Federal Ministry of health doc. 2000), hence this study was carried out among pregnant women attending ante-natal hospital in Holy Rosary hospital Emekuku Owerri, Imo state Nigeria.

Methodology

Study site and population:

This study was carried out between July - November 2016 in Holy Rosary hospital, Owerri north in Imo state. Owerri has a land mass of 5,289,49 square kilometers and a total population of 3,928,64. Emekuku has 10 villages that make up the town and also two great rivers; Okitankwo and Oramuru- Ukwa. The presence of these rivers with their water-logged banks , high trading activities peak on Nkwo days serve as potential mosquito breeding sites, and the continued interactions with these water bodies by the inhabitants in normal daily activities, choirs makes the area potentially endemic for mosquito and other water associated infections.

The study population included 150 women who attended antenatal care during the study period. The purpose of the study was fully explained to the head of administration of the hospital, women and parasitology unit of the hospital.

Sample collection

3mls of venous blood sample was collected from each of the pregnant women with the assistance of attendants and nurses. The samples were transferred into fresh EDTA bottles to the laboratory for screening and identification of parasites. The screening was done using Giemsa-stained thick and thin blood films as recommended by (WHO 2014). The films were examined using the 100x oil immersion objective.

Platelet count Test

0.38ml of filtered Ammonium Oxalate diluting fluid was dispensed into a small test tube with 20mls of well mixed anti-coagulated venous blood, placed in the counting chamber and left undisturbed for 20 minutes. It was later observed under the microscope with 10 x objective lens for the small platelets. The number of platelets was counted in the small squares and reported in litre of blood . Normal platelet count falls within the range of 150- 400 x 10^9 / L of blood.

Results

Out of the 150 pregnant women who attended the antennal care during my visiting period, 50 (33.33%) tested positive. The prevalence of the result is seen in table 1.

Table 2 shows the malaria parasite level within the 50 (33.33%) positive tested pregnant women (+) this result was due to *Plasmodium falciparum* infection.

Table 3 shows the platelet level in every individual blood for 50 tested pregnant women with malaria parasite. The high platelet count was as a result of Acute Malaria, Tuberculosis, Myeloproliferative disorders, and low platelet count was a result of bone marrow disease, Typhoid, Deficiency of Vitamin B_{12}.

TABLE 1: MALARIA PARASITES

Bood film	Trophozoite	Schizont	Gametocyle	Confirmed organism
Thick film	Single and double	Not seen	Crescent shaped	*Plasmodium*
	Chromatin dots			
	Comma and ring			
	Forms visible			
Thin film	Normal host RBC	Not seen	Crescent Shaped	*Plasmodium*
	Marginal forms			
	Seen at the edge of RBC, single and Double chromatin Dots visible			

TABLE 2: MALARIA PARASITE RESULT:

S/N	PREGNANCY STAGE	YEARS	PARASITE LEVEL
1.	4months	32years	+
2.	9months	31years	+++
3.	3½ months	26years	+
4.	4months	24years	+
5.	5months	38years	+
6.	4months	38years	+
7.	7½ years	28years	++

8.	5½ months	40years	+
9.	3months	22years	++
10.	4months	28years	+
11.	5months	30years	+
12.	6months	22years	++
13.	9months	27years	++
14.	5½ months	29years	+
15.	7months	28years	+++
16.	5months	21years	+
17.	8½ months	23years	++
18.	4½ months	20years	+
19.	4months	32years	+
20.	3½ months	31years	+
21.	5 ½ months	29years	+++
22.	8b ½ months	31years	++
23.	8months and one week	27years	++
24.	7months	26years	+++
25.	5months	25years	+
26.	6months	24years	+++
27.	3months	21years	+
28.	5months	23years	++
29.	4months	30years	+
30.	9months	35years	++
31.	9months	28years	+++
32.	8½ months	25years	+++
33.	4months	26years	+
34.	5months	19years	+
35.	4months	27years	++
36.	7½ months	29months	++
37.	7 months one week	25years	++
38.	6months	25years	++
39.	6 ½ months	28years	+++
40.	5months	26years	+
41.	8months	31years	+++
42.	8months	34years	++
43.	8 ½ months	25years	+
44.	7months	22years	++
45.	7months	21years	++
46.	6months	28years	++
47.	6½ months	27years	++
48.	5½ months	28years	++
49.	6months	20years	+++
50.	8months	24years	++

TABLE 3: PLATELETS COUNTING RESULT

S/N	NUMBER OF PLATELETS	DESCRIPTION	CAUSES
1	140 x $10^9/_L$	Low platelet number	Typhoid
2	110 x $10^9/_L$	Low platelet number	Deficiency of Vitamin B_{12}
3	401 x $10^9/_L$	High platelet number	Acute Malaria
4	440 x $10^9/_L$	High platelet number	Carcinoma
5	410 x $10^9/_L$	High platelet number	Tuberculosis
6	401 x $10^9/_L$	High platelet number	Haemorrhage
7	120 x $10^9/_L$	Low platelet number	Herbal drugs
8-43	151 x $10^9/_L$, 300 x $10^9/_L$, 200 x $10^9/_L$, 202 x $10^9/_L$, 290 x $10^9/_L$, 350 x $10^9/_L$, 180 x $10^9/_L$, 181 x $10^9/_L$, 181 x $10^9/_L$, 201 x $10^9/_L$, 170 x $10^9/_L$, 210 x $10^9/_L$, 199 x $10^9/_L$, 240 x $10^9/_L$, 380 x $10^9/_L$, 160 x $10^9/_L$, 270 x $10^9/_L$, 177 x $10^9/_L$, 280 x $10^9/_L$, 315 x $10^9/_L$, 223 x $10^9/_L$, 215 x $10^9/_L$, 199 x $10^9/_L$, 370 x $10^9/_L$, 341 x $10^9/_L$, 234 x $10^9/_L$, 388 x $10^9/_L$, 291 x $10^9/_L$, 390 x $10^9/_L$, 333 x $10^9/_L$, 390 x $10^9/_L$, 400 x $10^9/_L$, 201 x $10^9/_L$, 150 x $10^9/_L$, 179 x $10^9/_L$, 279 x $10^9/_L$, 152 x $10^9/_L$, 188 x $10^9/_L$, 344 x $10^9/_L$, 398 x $10^9/_L$, 377 x $10^9/_L$, 281 x $10^9/_L$, 240 x $10^9/_L$ and 300 x $10^9/_L$.	Normal platelet number	…….

Platelets has the S.I. Unit of x $10^9/_L$ Where L = Litre Platelet count (per litre) = $\frac{\text{cells counted x } 20^* \text{x } 10^6}{0.2^\div \text{ x } 0.1}$

Where * = 1 in 20 dilution of blood

÷ = 0.2mm^2 area counted

□ = 0.1mm depth of chamber

Discussion

This study revealed that malaria parasite was prevalent in pregnant women in Owerri, Imo state, Nigeria. The only species observed was *p.falciparum* (PF) thus confirming earlier findings that the four species of malaria parasite (PF), *plasmodium falciparum* is the most predominant in sub Saharan Africa (Riley, 2000), Taylor- Robinson (2003), WHO (2012).

Table 2 & 3 revealed that, out of 150 pregnant women screened, 50 showed positive for the disease. However, not all the pregnant women showed signs and symptoms of the disease. This group who were positive for the parasite but were not sick of the disease could be considered to have attained a level of immunity (Obi, et al (2010) whereby the presence of the parasite, which is now protective, will continue to be detected in the blood sample of people living in areas endemic for the disease, as reported by Smith et al., (1991). Unfortunately, this subclinical infection in pregnant women still poses great danger for both the mother and the fetus (Newman et al., 2003).

Result in table 3 also showed decreased packed cell volume, platelet counts and increased platelet factor – 3 (PF-3) availability in pregnant women. The result agrees with previous findings, (Essien, 1997) that cerebral malaria infection causes accelerated turnover of haemostatic mechanism arising from possible disorders of platelets. The mechanism for the production of thrombocytopenia was due to the removal of platelets from circulation by consumption in intravascular coagulation which is evidence in depletion of coagulation factor-3 and presence of fibrin degradation products (Dacie and Lewis 1991). However, this study suggest that both iron sequenstration and dysery thropoiesis may contribute to the development of anaemia but the mechanism of this marrow disturbance and gross elimination by serum feritin which often accompanies, remain unknown (Famomdu, and Elasoji, 2007).

Increased PF-3 availability in malaria could be due to repeated malaria attack in the presence of other infection, shape and functional changes of platelets, centralization of platelet organelles. Previous reports by (Essien, 1997) shows that increased platelets factors-3 with presence of platelet aggregation may lead to spontaneous bleeding and thrombotic complications leading to higher morbidity and mortality of the pregnant women and children.

Conclusion

Malaria indeed constitutes a serious public health problem in Owerri as this study has shown. In spite of all prevention and control efforts, malaria has remained a leading cause of morbidity and mortality worldwide. However, cases of the disease will begin to decrease in endemic areas such as Owerri if all pregnant women could be made to receive an initial anti malarial treatment dose on their first contact with any weekly chemoprophylaxis (intermittent preventive Therapy – IPT) with sulfacloxine – pyrimethamine (SP) given at therapeutic closes. In addition, since the use of insecticide treated nets (ITNS) during pregnancy in areas of stable malaria transmission have been found to reduce the overall risk of morbidity and mortality among pregnant women and their infants, the Federal Government of Nigeria and its partners in the Roll Back Malaria Scheme should strive to ensure that this important preventive measures is introduced into every nook and cranny of this country especially the rural areas where the insect vectors of the disease abound. Finally efforts made towards treatment by malaria for every pregnant women with any form of fever that visit any Government Clinic with artemisinin based combination therapy (ACT) should be sustained and awareness of this policy made to reach all health care providers in both Government and Private clinics in the hinter lands such as Owerri.

References

Afolabi, (2002). Malaria caused by a single protozoan parasite, by bite of Anopheles. *Bio Natl. Tech* 10:3-7.

Dacie, JV., Lewis, SM., (1991)) 'Practical Haematological. 5th Edition Churchill Livingstone. *Edinburg.*

Ejezie, M., Michael, O., Clifford, I., (1991) 'Roll Back Malaria (RBM) programs cause morbidity, resistance, mortality and hindrance to economic development' *Bio. Sci. 19.*

Essien, EM., (1987). The circulating platelet in acute malaria infection. *British journal of haemtology;* 72:589-590.

Famomdu, AA., Elasoji, SO., (2007) Induced platelet aggregation in sickle cell anaemia. *Journal of medical laboratory science.*; 6:39-41.

Federal Ministry of Health doc. 2000.

Fernando, Lozanta, L., Indianzy, Q., (2010). 'Studies comparing cognitive abilities and functions before and after treatment for severe malaria illness. *B.Tech.* 33-44.

Nneji, Magnus, Q., Alexzander, B., Lewis, I., (2009). Pregnant women at the highest risk of malaria. *Science* 104:8-11.

Riley, and Stewart, (2013) Chronic-infection without severe disease can occur in an immune-deficiency syndrome. *Transm* 14:14-17.

Rogerson, I., Vkymazac, V., Wickyson, Q., (2007). 'Effects on haematological parameters that is platelet in pregnant women'. *Medline* 10:89-93.

Smith, (1996). 'Low human immunity or changes in hormonal profiles increase malaria transmission in pregnant women', *B. Tech.* 8:4-5.

Taylor, Kajfasz, Krafts, K., Hempelmann, E., Howith, (2012). 'Bed-nets insecticides, Artemisinin-based combination therapies; *Science* 323: 141-144.

Taylor, Kajfsz, Krafts, K., Hempelmann, E., Howith, (2012). 'Symptoms of malaria as loss of appetite, joint pain, Nausea. *Jcoil. Pathology.* 13-17.

WHO, (2012). Epidemiology and prevalence of malaria parasite study.

WHO, (2014). Estimated number of African death children A 437,000-789,000 as a malaria case.

WHO, (2012). 'Evidence Review Group: Intermittent preventive treatment of malaria in pregnancy.

WHO, (2008). 'Malaria as the biggest health burden in sub-Saharan Africa'.

WHO, (2006). Origin of malaria from the medevial Italian words.

WHO, (2014). Eradication, prevention, control measures of malaria parasite.

Wito, (2000). 'Malaria as the biggest health burden in sub-saharan Africa'. *Microbiology* 14:103-105