Scientia Africana, Vol. 14 (No.2), December 2015. Pp 157-162
© College of Natural and Applied Sciences, University of Port Harcourt, Printed in Nigeria *ISSN 1118 – 1931*

PLASMODIUM PARASITAEMIA AMONG PREGNANT WOMEN ATTENDING ANTE-NATAL CLINIC AT THE MILITARY HOSPITAL PORT HARCOURT, RIVERS STATE, NIGERIA.

[1] A. E Abah and [2]L Moses

[1]Department of Animal and Environmental Biology,

Faculty of Science,
University of Port Harcourt,
P.M.B. 5323 Port Harcourt 50001, Rivers State, Nigeria.

[2]School of Science Laboratory Technology,
University of Port Harcourt,
P.M. B. 5323, Port Harcourt 50001, Rivers State, Nigeria.
[1]Corresponding author Email: austin.abah@uniport.edu.ng; aeabah@yahoo.com

Received: 11-11-15
Accepted: 09-12-15

ABSTRACT
Plasmodium parasitaemia was determined among pregnant women attending Ante-Natal Clinic at Military Hospital Port Harcourt, Rivers State, Nigeria using the Standard parasitological technique. Venous blood was collected from 200 pregnant women, both thick and thin blood films were made on clean greese-free glass slide and stained with 10% Giemsa stains diluted with 7.2 buffered water for 10 minutes and viewed under the microscope using the oil immersion(X100) objective. Of the 200 samples examined, 52 (26.00%) were positive for Plasmodium falciparum with highest prevalence of 15.50% among those in their first trimester, followed by 7.50% for those in the second trimester and 3.00% for those in the third trimester. Women within the age 21-25 years had greater percentage (10.50%) of infection compared with other age range and was followed by those within 26-30years with 6.00%. It was observed that women within the age of 41-45 years, though few, had zero infection rates. The prevalence rate of infection among pregnant women recorded in this study is relatively high and efforts should be intensified by all stakeholders to bring it to zero as malaria in pregnancy has a devastating effect.

Key words: *Plasmodium*, Pregnant women, Prevalence, Port Harcourt, Rivers State, Nigeria.

INTRODUCTION

Malaria is caused by *Plasmodium* parasites. The parasites are spread to people through the bites of infected female *Anopheles* mosquitoes, called "malaria vectors." There are 5 species of the parasite that cause malaria in humans and they include: P. *falciparum*, *P. vivax*, *P. ovale*, *P. malariae* and *P. knowlesi* (WHO, 2015). Young children, pregnant women and non-immune travellers from malaria-free areas are particularly vulnerable to the disease when they become infected (WHO, 2015). In 2015, approximately 3.2 billion people – nearly half of the world's population – were at risk of malaria. According to the WHO estimates, there were 214 million cases of malaria in

2015 and 438 000 deaths due to malaria (WHO, 2015).

In malaria endemic areas, the World Health Organization recommends prevention and control strategies for malaria parasitaemia in pregnancy, including case management of malaria parasitaemia and anaemia (WHO, 2004). In Africa, 30million women living in malaria- endemic areas become pregnant each year (Adam and Eibashir, 2004). For these women, malaria is a threat both to them and their babies, with up to 200,000 newborn deaths each year as a result of malaria in pregnancy (Adam and Eibashir, 2004). Malaria in pregnancy reduces the immunity of the woman and increases risk of illness, severe anemia and death. Maternal malaria increases the risk of spontaneous abortion, stillbirth, premature delivery and low birth weight which is a leading cause of child mortality (WHO, 2003). It is responsible for one in four deaths below the ages of 5years and could most times lead to miscarriage at the early stage of pregnancy (Bulter, 1997). In Africa, children under the age of five and pregnant women bear the brunt of the burden of malaria diseases; this is because they have lower immunity to the disease compared with other people in the same environment (Raimi *et al.,* 2004;Molyneux *et al.*,1989). Malaria mortality is twice in pregnant women suffering from malaria than non-pregnant women with severe malaria (Brain, 1998). Cerebral malaria is rare in adults except during pregnancy and is responsible for many maternal malaria deaths (Macleod, 1998).

Some studies have been conducted on malaria in pregnancy in Nigeria. Prevalence of 7.7%, 52% and 72% were recorded in Lagos and other South-Western area of Nigeria (Agomo *et al.*,2009; Raimi and Kanu 2010; Adefioye *et al.,* 2007). Ogbusu *et al* (2004) recorded 11.0% in Owerri, while 26% and 57.1% were reported in part of Port Harcourt, Rivers State (Wogu *et al.*,2013) and in other part of Niger Delta (Madukaku,*et al.*,2012). Due to the devastating effect of this scourge, especially on pregnant women, the need for more appraisals cannot be overemphasized. Therefore, this study is to assess the prevalence of *Plasmodium* parasitaemia among pregnant women attending Ante-Natal Clinic at Military Hospital Port Harcourt, Rivers State, Nigeria.

MATERIALS AND METHODS

Ethical considerations

Permission was sought and obtained from the authorities of the Rivers State Ministry of Health, Military Hospital and Department of Animal and Environmental Biology research committee. Also informed consents were obtained from the pregnant women who gave their verbal consent.

Study Area

Port Harcourt is the capital city of Rivers State, Nigeria. Rivers State lies on the recent coastal plain of the eastern Niger Delta. It has much surface water and high rainfall of between 3420mm and 7300mm per year. The land surface can be grouped into three main divisions: the fresh water, the mangrove swamp and the coastal sand ridges. Rainfall is seasonal, variable and heavy, generally Port Harcourt is at south of latitude 05^{o}N, so rain occurs on the average every month of the year but with varying duration. The mean annual temperature is in the range of 25^{o}C to 28^{o}C and relative humidity is high throughout the year. Port Harcourt has a population of 1.5 million (Nig.1991).

Source of Samples

The specimens examined in this investigation were collected from pregnant

Scientia Africana, Vol. 14 (No.2), December 2015. Pp 157-162
© College of Natural and Applied Sciences, University of Port Harcourt, Printed in Nigeria *ISSN 1118 – 1931*

women who presented themselves for ante-natal care at the Pathology Department of the Military Hospital located at 4^{o} 49' 36"N and 7^{o} 0'11"E Aba road Port Harcourt.

Sample collection

Venous blood was collected from 200 randomly selected pregnant women that presented themselves for ante-natal care at the military hospital Port Harcourt.

Five milliliters of blood was collected from each participant and was gently dispensed into Ethylene Diamine Tetra-Acetic acid (EDTA) bottle and mixed properly. Collected samples were transported to the parasitology laboratory of the Department of Animal and Environmental Biology of the University of Port Harcourt.

Sample Preparation

Thick and thin blood films were prepared, air dried, stained and examined microscopically using oil immersion objective following the method described by Cheesbrough(2005). The thin films were fixed with methanol and all films were stained with 10% Giemsa stain diluted with 7.2 buffered water for 10minutes following the standard procedure described by Cheesbrough (2005).

RESULTS

Results indicated that out of a total of 200 women at various stages of pregnancy investigated, 52(26.00%) were infected. More women at the first trimester of pregnancy were affected with 15.50% infection followed by those in the second trimester with 7.50% infection and lastly by those in the third trimester with 3.00% infection (Table 1). The percentage rates of infection based on age groups of the pregnant women sampled were 2.0, 10.5, 6.0, 5.0, 2.5 and 0.0% for age groups 15-20, 21-25, 26-30, 31-35,36-40 and 41-45 years of age respectively (table 2). *Plasmodium falciparum* was the only plasmodium species identified in this study.

Table 1: Stages of pregnancy in relation to *Plasmodium* infection in the study area

Pregnancy stage	No Examined	No Positive	% Infected.
1st Trimester	79	31	15.5
2nd Trimester	66	15	7.5
3rd Trimester	55	6	3
Total	**200**	**52**	**26**

Table 2: *Plasmodium* Parasitiaemia in relation to age in the study area

Age	No Examined	No Infected	%infected
15-20	11	4	2
21-25	67	21	10.5
26-30	56	12	6
31-35	34	10	5
36-40	26	5	2.5
41-45	6	0	0
Total	**200**	**52**	**26**

DISCUSSION

Considering the disastrous effect of *Plasmodium* parasitemia in pregnancy and particularly *Plasmodium falciparum*, the prevalence of 26.0% record in this study is relatively high. This is despite the vigorous campaign by the health system towards improving maternal health. This observed prevalence is higher than 7.7% which was reported in Lagos south west Nigeria (Agomo *et al.,* 2009) and 11.0% which was recorded in Owerri south eastern Nigeria (Ogbusu *et al* (2004). But lower than 57.1% reported in part of Niger Delta (Madukaku *et al.,*2012) and 72.0% in Osogbo in south west, Nigeria(Adefioye *et al.,*2007). However, the 26.0% recorded in the present study completely agrees with researchers Wogu *et al.,* 2013 who reported the same 26.0% in other parts of the same Port Harcourt. The differences between our findings and reports from other regions may be attributable to the variation in environmental conditions between Port Harcourt which is in the south-south and the other two regions in both south-west and south east. Favorable environmental conditions enhance the transmission of parasitic infections. Port Harcourt has much surface water, high rainfall, optimal temperature and relative humidity which are suitable for the breeding of mosquito vectors that transmit malaria. However, it was earlier observed that variation in the reported prevalence rates of malaria in pregnancy in Nigeria may be due largely to the accuracy of results of malaria diagnosis which is dependent on training, experience and motivation of microscopist as well as the laboratory facility available (Agomo *et al.,* 2009).

Pregnant women within the 1st trimester were more infected (15.5%) than those in the 2nd (7.5%) and 3rd (3.0%) trimester. This observation is contrary to the report that women in their 2nd trimester were more infected (Raimi and Kanu, 2010). But it seems that stages of pregnancy may play a role in the rate of infection as similar observations to the present finding were reported (Wogu *et al.,* 2013; Madukaku *et al.,* 2012). The reason for this may be as a result of new development in the body of the woman in her 1st trimester which makes the body to work harder (heartbeat and breathing rates are faster; more hormones are secreted which makes the breast to become tender, larger and heavier; uterus getting bigger and putting pressure on the bladder) and discomforting and could compromise the immunity. But as the pregnancy progresses the body gets used to all these signs and the effect is reduced.

Prevalence in relation to age showed that women within the age bracket of 21-25years were more infected (10.5%) followed by those at 26-30 years (6.0%) while those within 41-45 years had zero infection. More women (67) within that same age group 21-25years actually sort ante-natal care compared to the other age groups. So the higher infection rate may be understandable. Similar observations were reported earlier (Raimi and Kanu, 2010; Madukaku *et al.,* 2012).

Plasmodium falciparum was the only *Plasmodium* species identified in the present study. This finding agrees with other earlier studies in the area (Wogu *et al.,* 2013; Pondei *et al.,* 2012; Abah and Temple, 2015). The finding buttress WHO's earlier report that*Plasmodium falciparum* is the most common of the formerly four but now five human malaria parasites across much of Sub-Saharan Africa. It has been earlier established that pregnant women are more susceptible to *Plasmodium falciparum*

Scientia Africana, Vol. 14 (No.2), December 2015. Pp 157-162
© College of Natural and Applied Sciences, University of Port Harcourt, Printed in Nigeria ISSN 1118 – 1931

infection or are more vulnerable to the disease caused by this species because of hormonal, metabolic or mechanical (increased expression of adherence factors in placenta enhancing the conditions for *Plasmodium falciparum* development) changes (Adam*et al.*,2005).

Between 2000 and 2015, malaria incidence (the rate of new cases) fell by 37% globally. In that same period, malaria death rates fell by 60% globally among all age groups, and by 65% among children under 5year. Heartwarming as this development may be, the prevalence of *Plasmodium* parasite among pregnant women in Port Harcourt south- south Nigeria remains high as observed in the present study. Efforts has been on as seen in the WHO recommended Intermittent preventive treatment in pregnancy and the use of long lasting insecticidal nets but there is need to monitor the implementation of these laudable recommendations so as to bring the prevalence rate to zero level.

We are grateful to the authorities of Military Hospital Port Harcourt for the permission to collect the samples, the pregnant women that obliged us to use their blood, Mrs. H. Onoja for her assistance during the laboratory work and O.C Umeozor for reading through and making his comments.

REFERENCES

Abah AE and Temple B (2015), Prevalence of Malaria Parasite among Asymptomatic Primary School Children in Angiama Community, Bayelsa State, Nigeria. *Tropical Medicine and Surgery* 4(1): doi: 1000203

Adam I and MI Eibashir (2004), Maternal death due to severe pulmonary edema caused by *falciparum* malaria. a case report. *Eastern Mediterranean Health Journal* 10(4-5):685-687 Adam I ,Amar HK, Mustafa IE (2005), Prevalence and risk factors for *Plasmodium falciparum* malaria in pregnant women of Eastern Sudan. *Malaria Journal* 4: 18

Adefioye OA, OA Adeyeba, WO Hassan and OA Oyeniran (2007), Prevalence of Malaria Parasite Infection among Pregnant Women in Osogbo, Southwest, Nigeria. *American-Eurasian Journal of Scientific Research* 2 (1): 43-45,

Agomo O Chimere, Wellington A Oyibo, Rose I Anorlu and Philip U Agomo (2009). Prevalence of malaria in pregnant women in Lagos, south-west Nigeria. *Korean Journal Parasitology* 47(2):179-183

Brain BJ (1998). An analysis of malaria in pregnancy in Africa, *Bulletin World Health Organization* 61: 1005-1016

Bulter D (1997). Time to put malaria control on global agenda. *Nature* 386:535-541

Cheesbrough M. (2005), District Laboratory Manual for Tropical Countries. 2nd Edition Updated Vol. 1. Bulterworth –Heinemann Ltd. Oxford Ox28dp.pp. 249.

Macleod C (1998). Parasitic Infections in Pregnancy and New Born. Oxford Medical Publishers, pp. 10-25.

Madukaku Chukwuocha Uchechukwu, Dozie Ikechukwu Nosike and Chukwuocha Adanna Nneoma(2012), Malaria and its burden among pregnant women in parts of the Niger Delta area of Nigeria. *Asian Pacific Journal of Reproduction* 1(2): 147-151

Molyneux ME, TE Tayor, JJ Wirima, A Borgstein (1989). Clinical Feature and Prognostic Indicators in Pediatric cerebral malaria: A study of 131 comatose Malawian children *The Quarterly Journal of Medicine*.71:369-371.

Nigeria National Population Census (Nig.) (1991). Federal Government of Nigeria pp41

Ogbusu FI, BE Nwoke, AJ Njoku, JC Anosike and JC Uwaezuoke(2004). Prevalence of malaria among pregnant women in Owerri municipality, *African Journal of Applied Zoology and Environmental Biology* 6: 31-35

Pondei Kemebradikumo, Ebidor Lawani and Eno Ndiok (2012), Prevalence of the malaria parasite in screened blood in a tertiary health centre in the malaria-endemic Niger Delta region of Nigeria. *Global Advance Research Journal of Microbiology* 1(11):188-193.

Raimi OG, BO Elemo and L Raheem (2004). Malaria in Pregnancy: Serum Enzyme level in pregnant malaria patients in Lagos, Nigeria *Journal of Science Technology and Research* 3(3):60-63

Raimi, OG and CP Kanu, (2010). The prevalence of malaria infection in pregnant women living in a suburb of Lagos, Nigeria.*African Journal of Biochemistry Research* 4(10):243-245,

WHO (2003), Global defense against the infectious disease threat. Department of Communicable Diseases. WHO press.

WHO (2004), World Health Organization Antenatal care randomized trials: Manual for the Implementation of the new model WHO Geneva.

WHO, (2015), World Health Organization, Malaria Fact Sheet No. 94 . WHO Geneva.

Wogu Michael N, Florence O. Nduka and MacDonald D. Wogu (2013), Prevalence of Parasite Infection among Pregnant Women Attending Antenatal Clinics in Port Harcourt, Rivers State, Nigeria. *International Journal of Tropical Disease & Health* 3(2): 126-132,