Original Research Article

The Impact of Malaria on various stages in pregnancy in Rivers State

ABSTRACT

Malaria parasitaemia has remained an issue of public health concern. The coexistence of malaria and pregnancy is more burdensome with high mortality and other devastating effects on maternal and child health. This cross-sectional study carried out was focused on the impact of malaria among pregnant women attending antenatal clinics in General Hospital, Bori and Braithwaite Memorial Specialist Hospital, Port Harcourt. Four hundred women were involved in this study of which two hundred each from a facility. Pregnant women with pyrexia of unknown origin, HIV and those on anti-malarial drugs were excluded. Simple random sampling technique was used. Primary and secondary data sources were used including the use of a self-structured questionnaire comprising socio-demographic variables and items about gestation and pregnancy history. Statistical analysis involved the use of Statistical Package for Social Sciences version 25 for descriptive and inferential statistics – Chi Square at 0.05 level of significance. Laboratory investigation was according to the recommended standard analytical method for malaria parasite examination. Five milliliters (5mls) of blood was obtained from each subject by venepuncture into EDTA bottles. The samples were used to assay for malaria parasite determination using the Giemsa staining technique. Result revealed that pregnant women in the first trimester had the highest prevalence of malaria; BMSH (43.9%) and GHB (45.5%). Preventive safe practices are recommended including the use of insecticide treated nets, vector control methods and others. Diagnosis and treatment should be done timely especially in the first trimester.

Keywords: *Prevalence, Malaria, Pregnancy, Age, Maternal Age, Gestational Age, Trimester*

1.0 Introduction

Malaria is a parasitic infection and a protozoan originated infection transmitted by female *Anopheles* (Holt *et al*., 2002). Different species of *Plasmodium* has been identified to cause malaria infection. Species such as *P. falciparum, P. vivax, P. malariae, P. ovale* and *P. knowlesi, with P. falciparum* and *P. vivax* are mostly common. Mono and mixed malaria infections have been reported although infection by *P. falciparum* is the most common especially in Africa.

Clinical manifestation of malaria infection is characterized by periodic paroxysm, chills, fever, body pains, headaches, rigors, sweating, nausea, and malaise. More serious health complications may perhaps arise as a result of malaria infection, especially with P. *falciparum*, such as cerebral

malaria, severe anaemia, respiratory acidosis, jaundice, Acute Renal Failure (ARF), and Acute Respiratory Distress Syndrome (Cox-Singh *et al.*, 2008).

Epidemiology of Malaria

Globally, it is estimated that at any given point in time over one billion people are infected with malaria parasite (Guerin *et al.,* 2002), and *P. falciparum* is responsible for the morbidity and mortality caused by malaria globally (Greenwood *et al*., 2005). Malaria-associated mortality has been difficult to estimate owing to the fact that there are no specific symptoms and majority of these deaths occur at home (Guerin *et al.*, 2002).

Malaria Infection in Pregnancy

Pregnancy is a condition that has various physiological changes that come with it and as such is a predisposing condition for malaria infection and its attendant consequences such as anaemia and low birth weight. Pregnant women are more at risk of anaemia especially in primigravidae than in multigravidae (Shulman *et al.,* 1996). It has been reported that fifty percent of these women are in the African continent (WHO 1992, WHO/UNICEF/UNU 2001). Furthermore, over 50% of these pregnant women the world over have been reported to have haemoglobin levels less than 11g/dl, which is the WHO cut-off value for anaemia in pregnancy (WHO, 1994). There are other factors that also contribute to anaemia. These include iron and folate deficiencies, infestation with hookworm, HIV, sickle cell, and thalasaemias (Van den Broek, 1996).

Each year, approximately twenty-five million women achieve pregnancy in Africa, a region known to be highly endemic for malaria (WHO/AO, 2004), accounting for about 80 - 90% of global prevalence of malaria (Guyatt & Snow, 2001). In economic terms, malaria causes huge economic losses (Gallup & Sachs, 2001).

Epidemiology of Malaria in Pregnancy

The effects of malaria infection during pregnancy are of serious public health concern in the tropical and subtropical regions throughout the world (Nosten *et al.,* 1991).

Malaria affects more than three million pregnant women per year in developing countries, where it commonly causes poor birth outcomes, maternal anaemia and deaths (Menendez *et al.,* 2000).

Malaria infections during pregnancy increases red blood cell destruction and decreases erythropoiesis (Huddle *et al.,* 1999). The risk of malaria is greater in nulliparous than in

multiparous and it is more pronounced on the second trimester of pregnancy. However, the degree of parasitaemia falls with the advancing age of the expectant mother (WHO, 2008).

Malaria Infection and Gestational Age

Intraplacental parasitemia has also been shown to increase with gestational age (Ibhanesebhor & Okolo, 1992), occurring the most in the second trimester (Desai *et al.*, 2007), and often extending to the immediate postpartum period (Nahlen 2000; Diagne *et al.*, 2000; Nguyen-Dinh *et al.*, 1988). The effect of malaria in pregnancy is more pronounced in the first and second pregnancies than in higher pregnancies (Rogerson *et al.*, 2007 &Desai *et al.*, 2007).

A study of pregnant women in Nigerian climate indicates that there is still poor knowledge of malaria infection in pregnancy (Enato *et al.*, 2007). Furthermore, scarcity of data to this regard at the present gave rise to this study. The study was aimed at assessing the impact of Malaria among pregnant women in General Hospital, Bori and Braithewaite Memorial Specialist Hospital, Port Harcourt based on trimester. This was intended to provide the current status of malaria in pregnancy in the given population studied.

2.0 Materials and Methods

2.1 Study Area

The study area covered two Local Government Areas; Port Harcourt and Bori the capital of Khana both in Rivers State. Port Harcourt was founded in 1912 and lies along the Bonny River (of the Niger River) 41 miles (66km) upstream from the Gulf of Guinea (Encyclopediae Britannica, 2010).

Bori is the capital of Khana Local Government Area, Southern Nigeria. It is the traditional headquarters of the Ogoni people and serves as a commercial center for the Ogonis, Andoni, Opobo, Annang and other ethnic nationalities of Niger Delta, Benue and Congo (Kottek *et al.*, 2006). Bori has many adjoining communities such as Bo-ue, Bua kaani and Yeghe. It is located on latitude 4^0 40^1 22" N 7^0 22' 13" on an area of 560km^2. It is the birth place of author and activist Ken Saro-Wiwa (Janice, 2003). Both rain and dry seasons exist there. Agricultural activity is predominant there (Kottek *et al.*, 2006).

2.2 Study Population

This was a cross-sectional study involving 400 pregnant women aged 18 – 39 years attending antenatal clinics at Braithwaite Memorial Specialist Hospital, Port Harcourt (BMSH) and General Hospital, Bori (GHB) both in Rivers State.

2.3 Selection Criteria

Pregnant women with fever, weakness, anorexia, those who had just taken anti malaria drugs and those who were HIV positive were excluded from the study. However, pregnant women within the selected study site without the characteristics mentioned who gave consents were included into the study.

2.4 Sampling Technique

Probability sampling technique was used to randomly select the subjects (Faith *et al.,* 2021; Catherine *et al.,* 2021) based on inclusion criteria and written consent provision.

2.5 Sample/Laboratory Analysis

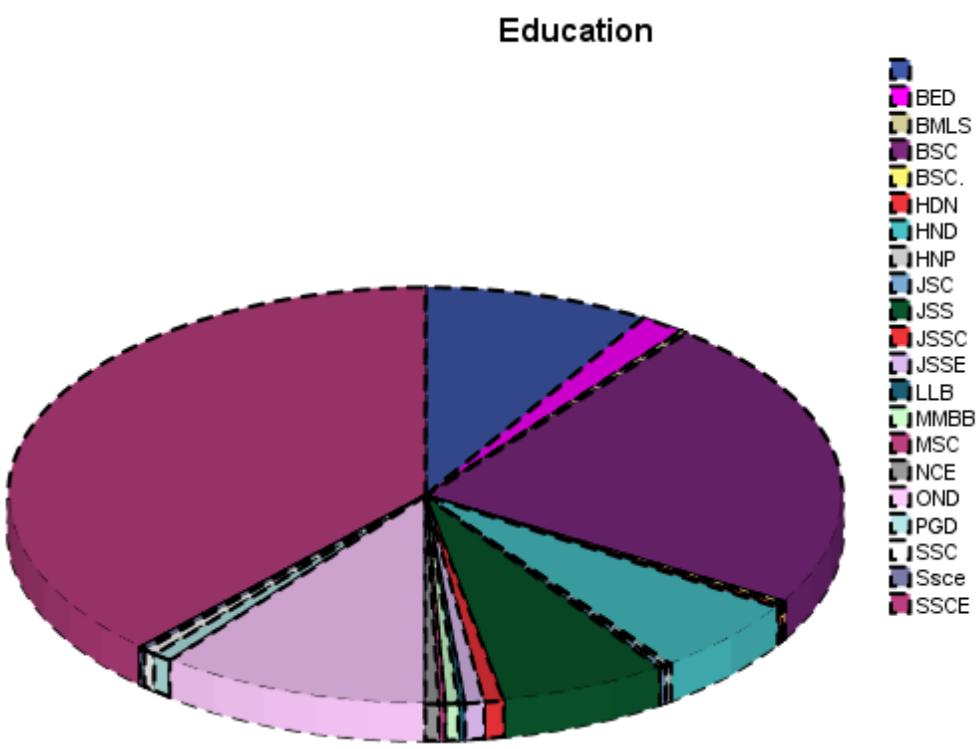
Laboratory investigation was based on the established standard laboratory practices according to Cheesbrough (2009) for malaria thick and thin films.

2.6 Statistical Analysis

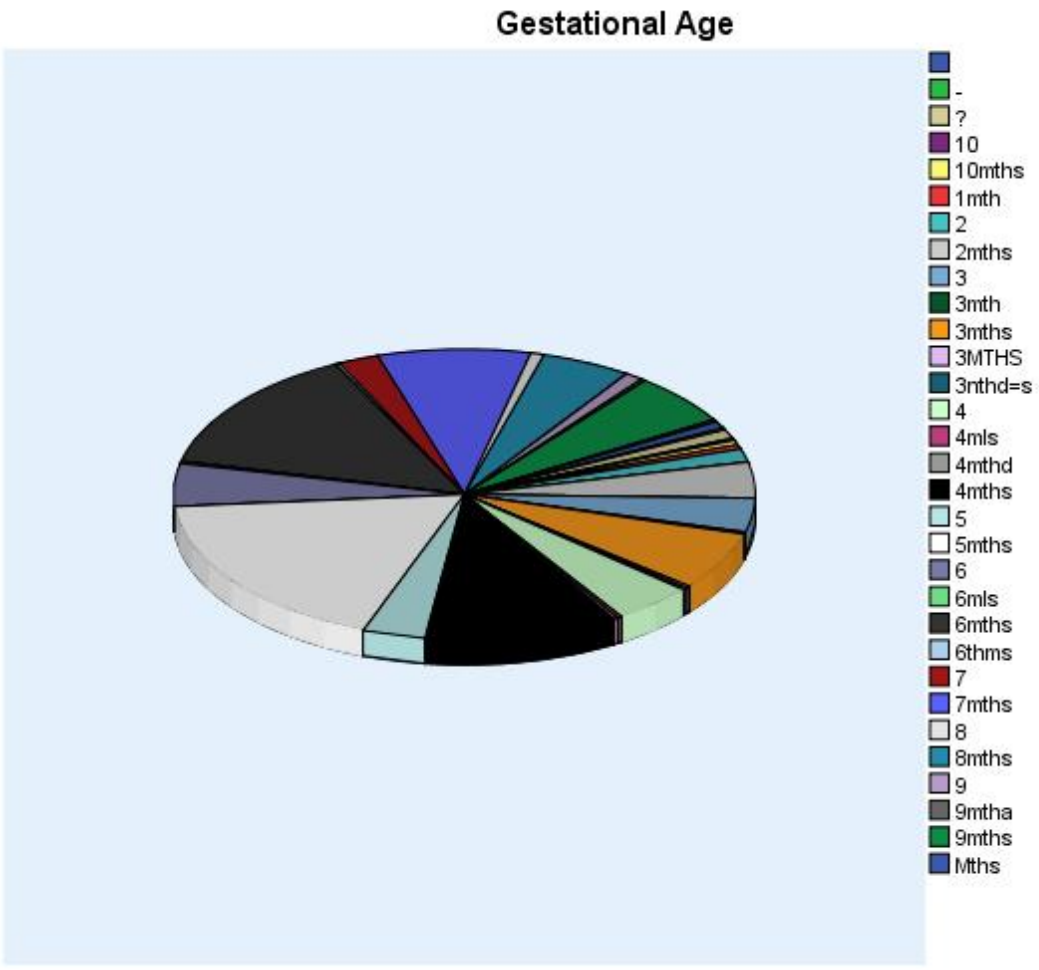
Statistical analysis was performed for descriptive and inferential statistics at an alpha level of 0.05 using Statistical Package for Social Sciences version 25. Frequency and percentage distributions as well as prevalence rates were established; results presented in charts and tables.

3.0 RESULTS

The study involved 200 pregnant women from BMSH and 200 pregnant women from GHB. 98.25% were married while 7.5% were single. Other demographic variables are presented on figures 1 to 3.



BED: Bachelor of Education
BMLS: Bachelor of Medical Laboratory Science
BSC: Bachelor of Science
NCE: National Certificate of Education
OND: Ordinary National Diploma
HND: Higher National Diploma
JSSC: Junior Secondary School Certificate
SSCE: Senior Secondary School Examination
PGD: Post Graduate Diploma
LLB: Bachelor of Laws
MBBS: Bachelor of Medicine , Bachelor of Surgery
MSC: Master of Science
Figure 1: Pie Chart showing Educational Level of Participants



Mths: months

Figure 2: Pie Chart showing Gestational Age

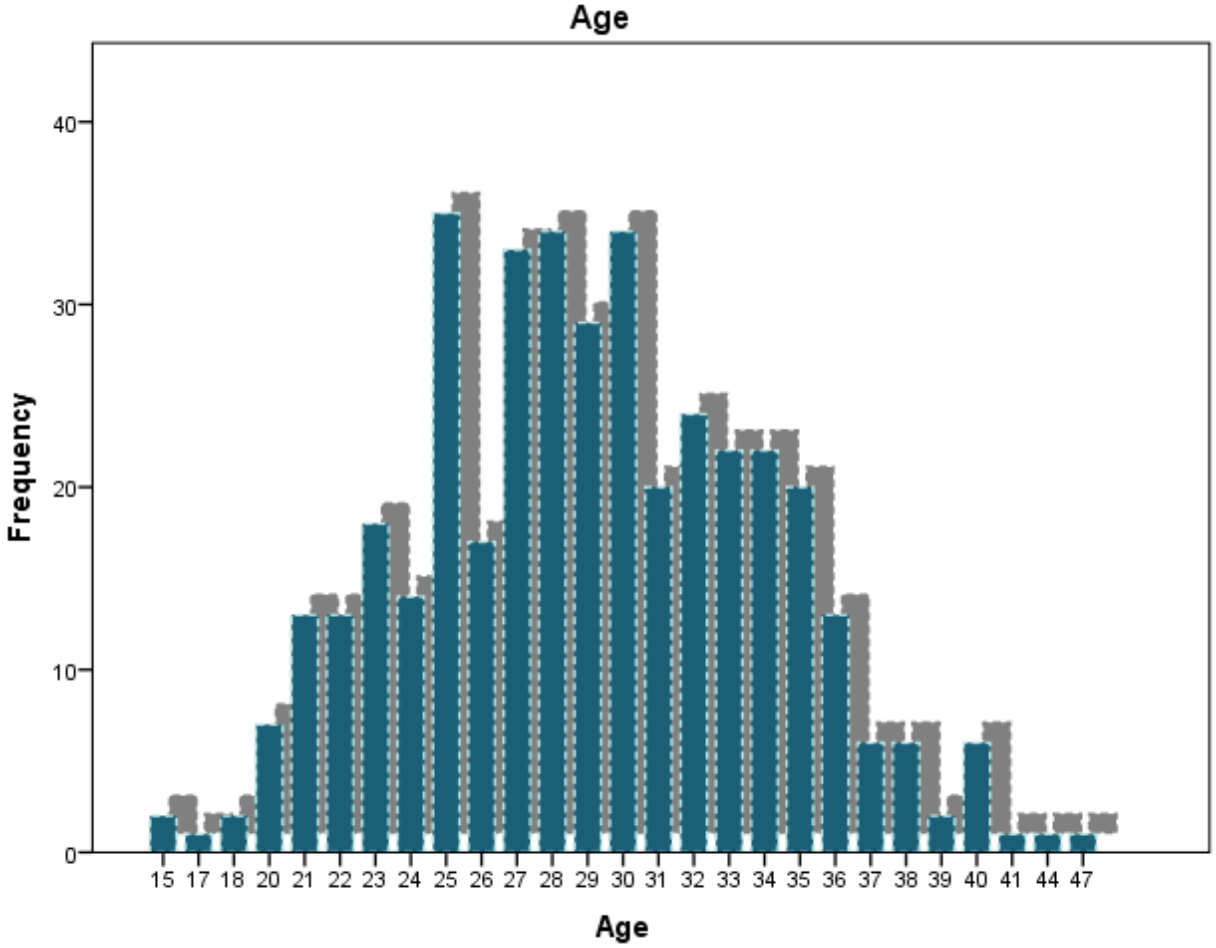


Figure 3: Bar Chart showing Maternal Age Distribution

Prevalence of Malaria Among Pregnant Women in Braithwaite Memorial Specialist Hospital, Port Harcourt (BMSH) and General Hospital, Bori (GHB).

Table 1.0: Trimester Prevalence of Malaria among Pregnant Women by Study Locations (BMSH and GHB)

Trimester	No. of Sample	No. of Positive (%)	No. of Sample	No. of Positive (%)
	BMSH		GHB	
First	98	43(43.9)	130	60(45.5)
Second	48	10(20.9)	42	7(16.7)
Third	54	2(3.7)	28	3(10.7)

p-value = 0.4147

The prevalence of malaria parasite by Trimester among pregnant women from Braithwaite Memorial Specialist Hospital showed that pregnant women in the first trimester had the highest prevalence 43 (43.9) followed by pregnant women in the second trimester 10 (20.9) and those in the third trimesters 2 (3.7). From General Hospital Bori, the prevalence was high among pregnant women in the first trimester 60 (45.5) while pregnant women in the second trimester 7 (16.7) and third trimester 3 (10.7) had the least prevalence. There was no significant statistical difference at $P > 0.05$ from both hospitals.

4.0 Discussion

Study finding has shown that the prevalence of malaria was high among pregnant women in their first trimester from both hospitals. BMSH (43.9%) and GHB (45.5%). This finding is in agreement with the results of Chessed *et al.,* (2013), Wogu *et al.,* (2013) that says peak prevalence of malaria infection occurs in weeks 10 – 20 of pregnancy. Musbau *et al.,* (2014) in Damaturu observed a prevalence of 87.4% and 68.5% in the first and second trimesters of pregnant women. This is in agreement with the report which suggests that malaria parasite infection in pregnant women has distinct antigenic and adhesive property than in non-pregnant Women, and elders. The reason for the high prevalence in malaria by trimester in both hospitals could be attributed to the fact that pregnant women reported at antenatal during second trimester.

The trimester period of the women from Braithwaite Memorial Specialist Hospital, Port Harcourt was slightly low as compared to General Hospital, Bori. The active involvement of Bori women in farming, trading and other socio cultural activities that draw them outside their homes may have contributed to exposure to mosquito bites and malaria infection. For BMSH, their women were mainly working class with better socio-economic status resulting in better housing and eating habits, better awareness of transmission of parasite. Studies in Rivers state have identified

the difference in settlement (urban and sub-urban) has key impact the degree of health awareness and proper utilization of health facilities. These could serve as contributing factors to the overall health of women (Catherine *et al.,* 2021; Biambo *et al.,* 2021). The result of this study is a reflection of exposure pattern among the various groups. As stated earlier these women in Bori may lack funds or refuse to register for antenatal at the early stages, due to cultural / religious beliefs, and may wish to wait for the pregnancy to be fully established while some prefer going to birth attendants and such cases are not documented.

Conclusion

This study has established different prevalence rates and distribution patterns across trimesters, pointing that women within the early stage of pregnancy are more likely to suffer from malaria than in later stages.

Ethical Approval

Ethical concerns were highly upheld, approval from the Rivers state ministry of health, permission from the selected health facilities and consents from participants were obtained at no risk. Confidentiality remained utmost priority. Data sharing was only to appropriate body/persons.

Consent

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

Recommendation

The pragmatic observation revealed in this study makes it necessary to intensify the achievement of the Roll Back Malaria (RBM) programme due to the huge burden of malaria especially in pregnancy where the lives of the maternal and child are a stake.

The stand point of early detection and timely treatment of malaria is key. Also, the detection and control of epidemics, control of vectors using biolarvicide and bed nets treated with insecticide, and the prevention and treatment of malaria in pregnancy are encouraged.

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