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Incidence of Malaria Parasite in Pregnant and Non Pregnant Women in Ewohimi, Edo State, Nigeria

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Abstract
Malaria is a mosquito borne infectious disease of humans and other animals caused by protozoa of the genus Plasmodium. This study was carried out to determine the incidence of malaria parasite among pregnant and non-pregnant women attending the General Hospital Ewohimi. A total of Eighty (80) females participant visiting General Hospital, Ewohimi, comprising of 40 pregnant females and 40 non-pregnant females were examined for the presence of malaria parasite in their bloodstream. A thick and thin blood films from each participant was examined after Giemsa staining. A total of 50 (62.5%) of the studied population were positive for malaria. Of the 40 pregnant females examined, 26 (65%) were positive while 14 (35%) were negative. The non-pregnant females had 24 (60%) examined been positive for malaria parasite while 16 (40%) were negative. This shows that the infection rate was higher in pregnant females than in non-pregnant females, but the difference was significant ($P > 0.05$) when compared with the non-pregnant females that tested positive for malaria parasite. The research also showed that, women experiencing pregnancy associated malaria exhibited normal symptoms of malaria, but may also be asymptomatic or present with more mild symptoms including a lack of the characteristic fever. It was concluded that pregnancy is tantamount with malaria infection which affect the entire immune system. It therefore becomes necessary to recommend the incorporation of antimalarial drugs to the management of pregnancy. This will help to prevent the pregnant women from the danger of parasitaemia to herself and her unborn child.

1. Introduction

Malaria is a mosquito borne infectious disease of humans and other animals caused by protozoa of the genus *Plasmodium* [1]; [2]. Infection in humans is caused by four species, *Plasmodium falciparum, Plasmodium vivax, Plasmodium malariae* and *Plasmodium ovale* [3]; [4]. These species are associated with different clinical patterns [5]. *Plasmodium falciparum* infection results in the highest morbidity and mortality [6]. Infection begins when the infected female Anopheles mosquito injects the sporozoite parasitic form from its salivary glands into the blood stream during a blood meal [7]; [8]. Malaria is classically characterized by periodic chills, rigors and high fever followed by profuse sweating, which occur at regular intervals of 48-72 hours [9]. Malaria is confirmed by the microscopic examination of blood film or by antigen based rapid diagnostic test. The craving for children is a basic instinct. Unfortunately, attempts to fulfil this desire often ends in disaster as several women lose their lives in the process

[10]; [5]. One of the major factors fuelling maternal death in Nigeria is Malaria in Pregnancy (MiP). MiP reduces a woman's immunity; making her more susceptible to infections and increasing the risk of illness, severe anaemia and death [5]. One of the major hurdles to malaria elimination is the lack of effective agents to prevent and control malaria transmission from mosquito to human [4]. The malaria life cycle requires a mosquito vector ingest sexual stage parasites, called gametocytes, during a human blood meal. In the human host, *Plasmodium falciparum* gametocytes develop through five stages (I–V) over 10–12 days after RBC invasion by a merozoite committed to sexual differentiation [6]. The mature stage V gametocytes then circulate in the peripheral blood for 4–6 days. Once taken up in a blood meal by a mosquito, male and female stage V gametocytes are stimulated to undergo fertilization and form oocysts on the basal surface of the midgut. The infectious form of the parasite, sporozoites, are formed in the oocysts and after maturation they are released and migrate to the salary glands [7]. During a subsequent blood meal the sporozoites are transmitted to humans with the saliva [5]. Most of the current drug development efforts have been devoted to controlling the asexual parasites that are responsible for the disease symptoms in patients. Currently, the only drugs that are active against gametocytes and can block malaria transmission are 8-aminoquinolines such as primaquine. However, 8-aminoquinolines can cause haemolysis in patients with glucose-6-phosphate dehydrogenase (G6PD) deficiency, a highly prevalent genetic condition in malaria-endemic regions [4]. To date, only a few drug candidates in preclinical or clinical stages have the potential to block malaria transmissions [4]. This deficit is partly due to difficulty in producing *P. falciparum* gametocytes in culture, a process that takes at least 12–14 days with very limited yield [5]. This hurdle limits the capacity of malaria gametocytes for compound screening even with the recent development of several high throughput assays [4].

Statistics show that an estimated 30 million women per year get pregnant in Nigeria [11]. These women are at risk of *Plasmodium falciparum*, especially the most deadly form of malaria which is implicated as the major cause of serious illness for pregnant women [10]; [5]. Most times, the victims do not present any symptoms or feel ill. It is estimated that 10,000 women die as a result of malaria infection during pregnancy [10]. This investigation therefore was necessary to determine the incidence of malaria parasite among pregnant and non-pregnant women attending the General Hospital Ewohimi, Esan South East, Edo State, Nigeria.

2. Materials and Methods

2.1. Study Area and Population

The study area is General Hospital Ewohimi Community, in Esan South East Local Government Area, Edo State, Nigeria. It lies between latitude of 6^0N and 6^0E. The community has estimated population size of 15000 inhabitants. Farming and hunting is their predominant activities while few of the inhabitants mostly women are traders. Eighty (80) subjects was examined, 40 were pregnant females and 40 non-pregnant females. They were all adults aged between 25 and 45 years.

2.2. Collection/Process of Samples

Two (2) ml of blood was collected with the aid of a syringe and poured into the EDTA bottle and mixed to avoid blood clotting. One (1) or two (2) drops of blood were made into round films using spreader or cover slip which was held over the slide at a suitable angle (Preferably 450) to make smeared. The blood film was allowed to dry. The film was then placed on the staining rack and flooded with 1 in 10 diluted Giemsa stain. It was allowed to stain for 15 minutes after which it was flooded with water and allowed to dry in a dust-free environment. The thick and thin blood film was examined under the microscope using x100 objective with dropped of oil immersion on the slides. Morphological characteristics of the malaria parasite were noted by the presence of cytoplasmic Schuffner's dots and sausage shaped and ring gametocytes [3].

3. Results

A total of 50 (62.5%) was infected with malaria parasite. Twenty- six (65%) of the pregnant women examined were positive while 24 (60%) of non-pregnant counterparts examined were positive (Table 1). Pregnant females record a higher infection rate from the data and it was statistically significant ($P > 0.05$) from non-pregnant females. Table 2 shows the incidence of malaria parasitaemia in relation to pregnancy status and state of health of the individuals. The results revealed an infection rate of 20% for apparently healthy non-pregnant female, 100% for clinical cases (non-pregnant women), 40% for apparently healthy pregnant females and 90% for clinical cases among pregnant women. In all malaria positive cases, *P. falciparum* was identified.

Table 1. *Incidence of malaria parasitaemia in relation to pregnancy status of subjects among pregnant and non-pregnant women visiting General Hospital Ewohimi.*

Total number examined	Number infected	Total number of pregnant women (infection rate)	Total number of non-pregnant women (infection rate)
80	50 (62.5%)	26 (65%)	24 (60%)

Where t – test = 0.04, P – value > 0.05

Table 2. *Incidence of malaria parasitaemia in relation to pregnancy status and health status among pregnant and non-pregnant women visiting General Hospital Ewohimi.*

	Pregnant females		**Non-pregnant females**	
	Clinical cases	**Apparently Healthy**	**Clinical cases**	**Apparently Healthy**
Number examined	20	20	20	20
Number infected	18 (90%)	8 (40%)	20 (100%)	4 (20%)

4. Discussion

The determination of malaria parasitaemia in females showed an incidence of 62.5% in the study population. This finding brings to fore the fact that a large number of pregnant women who may look apparently healthy are indeed carriers of malaria parasite in their blood stream and there may also be a heavy sequestration of parasite in the placenta which could result in maternal anaemia, low birth weight and infant death. This is in agreement with [11]; [12], [13] who documented that in some cases of malaria, the infection may occur without clinical symptoms. From this study, the rate of incidence of malaria parasitaemia in pregnant females (65%) was higher than in non-pregnant females (60%). This is in conformity with [14], [15]. The reason for this higher infection is not farfetched; pregnant women generally have a reduced immune response which increases susceptibility to malaria.

5. Conclusion

Pregnant women are three times more likely to suffer from several diseases as a result of malarial infection compared with their non-pregnant counterparts. It is estimated that 10,000 women and 200,000 infants in Nigeria die as a result of malaria infection during pregnancy; severe maternal anaemia, prematurity and low birth weight contribute to more than half of these deaths. The Roll Back Malaria initiative set itself the target of ensuring that 100% of pregnant women receive intermittent preventive Treatment and 80% of all people in affected areas use Insecticide Treated Nets to keep mosquito at bay. Delivering malaria interventions through antenatal care; Intermittent Presumptive Treatment (IPT) where Sulfadoxine / Pyrimethamime (SP) is given to all women two or three times during pregnancy is recommended for all pregnant women in high transmission areas such as in the study area.

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