The Prevalence of Malaria Parasites in Pregnant Women and other Patients in Awka Urban, Anambra State, Nigeria

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ABSTRACT

Five hundred and fifty five (555) blood samples from pregnant women and other patients from randomly selected hospitals in Awka urban were investigated for the presence of malaria parasites using standard methods. The results revealed that, out of 255 samples collected from pregnant women, 162 were positive indicating the prevalence of 63.50%. Morphological characteristics of the parasites confirmed the presence of *Plasmodium falciparum* and *Plasmodium malariae*, the highest frequency being at the second trimester with 81.1% and 18.9% respectively. The results also revealed that out of 300 blood samples collected from patients suspected of suffering from malaria had *P falciparum* (53.9%), *P. vivax* (23.9%), *P. malariae* (16.80%) and *P. ovale* (5.4%) it was also observed that disease was more prevalent in female patients than in their male counterparts. This infestation was attributed to the mode of dressing and the poor drainage systems prevailing in this area.

Key words: falciarum malaria, anemia, gametocytes, haematim, abortion.

INTRODUCTION

Malaria is a life threatening disease caused by parasite of the genus *Plasmodium* transmitted from person to person through the bite of species of female anopheles mosquitoes. It is characterized clinically by fever, which is often periodic; varying degrees of anaemia; splenic enlargement; and various syndromes resulting from physiological and pathological involvement of certain organs including the brain, the liver and the kidneys[1]

The infection may be acquired wherever there are human hosts carrying the parasite and a sufficiency of susceptible female anopheles mosquitoes, as well as conditions of humidity and temperature which favour the development of the parasite in the mosquitoes[2].

Malaria may also be transmitted by transfusion of infected blood and through placenta of a non-immune infected pregnant woman to the foetus[3,4].

Human Malaria may be caused by the following species of Plasmodium: *Plasmodium falciparum (*malignant tertian, sub-tertian or falciparum malaria*), Plasmodium vivax* (benign tertian or vivax malaria), *Plasmodium malariae* (quartan malaria or malariae malaria) and *Plasmodium ovale* (Ovale tertian or ovale malaria). These four species show the following characters:

The parasites inhabit certain tissue and the red blood corpuscles, and in the latter both asexual and sexual form occur. The asexual forms produce malaria by actively multiplying and destroying the erythrocytes and releasing the toxins.The sexual forms (gamytocytes) are inert and not multiplying but simply waiting for the mosquito to ingest them; in it's body they will multiply by a sexual process[5].

The young parasite, on introduction into the body, circulate for approximately one hour in the blood stream and then invade parenchymal cells of the liver in which they multiply. After a period of 8 days the parasites again enter the blood stream, invade the red cells and grow in them to full size. Then, if asexual, they multiply so greatly as to disrupt the cells whereas, if sexual gametocytes they neither divide, multiply, nor disrupt the red cell but are passive[6].

The parasite, which is unpigmented in its earliest stage in the corpuscle, produces, during growth, a pigment called haematin, which is probably derived from the hemoglobin of the red cell. Parasites living in tissue cells produce no pigment.

In the blood, asexual reproduction repeats itself again and again but sexual reproduction can take place only outside the human body, and only in the tissues of certain mosquitoes of the genus *Anopheles*.

Of these malaria infections, the commonest and most important are those caused by *P.falciparum* and *P. vivax*. The disease (malaria) is known to cause harmful effect in pregnancy such as abortion, still birth, premature delivery, low birth weight and maternal death..It is also known to impair growth in children and adolescents and to cause weakness, mental apathy and generally slowing down economic development[6,7].

The case of Awka urban is being investigated because it is situated in tropical rainforest region with a network of streams and other forms of water bodies. In addition, poor environmental conditions (Low level sanitation) and vegetable structures – encourage the breeding of mosquitoes, the main reservoirs of malarial parasites. Hence, the aim of the study is to determine the prevalence of Human malarial parasites in Awka urban with more emphasis on pregnant women.

MATERIALS & METHODS

The sampling stations were hospitals located in Awka South Local Government Area of Anambra State, Nigeria. Three main hospitals viz Amaku General Hospital, Regina Caeli hospital and maternity and Silgrey hospitals were used for pregnant women while other patients samples were collected from Beakon and Ifebi private hospitals in addition to Amaku and Regina Caeli. This study was carried out between August and September.

Collection of Blood Samples

Blood samples were collected by both the use of sterile needle and syringe (vene puncture) and sterile lancet (finger prick). In each case, sterile cotton wool moistened with methylated spirit was used in cleaning the portion of the body – volar surface of the arm and thumb respectively

Method

The method of Cheesbrough, 1991 for the laboratory identification of malaria parasite was employed[8] The blood collected from either vene puncture or finger prick was used in the production of thin and thick smears.

A thin blood smear was prepared using apposition smear method – A drop of blood which was placed towards the end of a clean grease free glass slide, was spread along the slide with a second slide with two ends chopped off with a pair of pliers at the angle of 45^0. This smear was air dried and stained

with leishman stain for 2 minutes and Sorenscen's buffer (pH 6.8) for another 8 minutes. At the end, it was rinsed with tap water air dried, a drop of immersion oil placed and examined with (X100) oil objective lens.

A thick blood smear was prepared by placing a drop of blood on the center of a clean grease free slide. This was allowed to air dry and stained with Giemsa stain for 10 minutes. It was then rinsed with tap water, air dried, a drop of immersion oil placed on it, it was then examined with immersion oil (X100) objective lens.

The species of *Plasmodium* were distinguished by their distinct morphological features on the stained thin blood smears. While stained thick blood smear was used to concentrate the parasite and to indicate the presence or absence of malarial parasite.

RESULT

Out of 255 pregnant women examined, 162 had malarial parasites in their blood streams while 93 did not at the time of study. Out of the 162 positive blood samples 150 contained *Plasmodium falciparum* while 12 had *Plasmodium malariae*. Majority of the pregnant women suffered from malaria in the second trimester. (Table 1).

On the other hand, out of 300 blood samples from suspected malaria patients, 280 had malarial parasites. Among the positive cases, 110 were males while 170 were females out of the 280 positive blood samples 151 had *Plasmodium falciparum*, 67 had *Plasmodium vivax*, 47 had *Plasmodium malariae* and 15 had Plasmodium ovale (Table 2)

DISCUSSION

The result revealed that 162 pregnant women had malarial parasites in their blood samples while the remaining 93 did not giving prevalence positive rate of 63.5%. This result agreed with the previous work done by Mvondo et al 1992 with 45%, Nair and Nair 1993 with 57.7% and Bespiator, 1993 with a rage of 36.9 – 42.1%..[9,10,2] It was also observed that *Plasmodium falciparum* is more predominant than *Plasmodium malariae*, being present in 150 blood samples out of 162, positive samples This predominance was also observed by Mvondo et al 1992 Brabin 1983 with the population of pregnant women they studied. They also observed that pregnant women showed increased susceptibility to malaria in sub-sahara Africa which could be attributed to the impairment of humoral and cell mediated immunity possibly due to change in hormonal function and the presence of placenta.

It was also observed that the prevalence of malaria vary according to trimester the highest prevalence was observed in the second trimester with 81.1% for *P. falciparum* and 7.5% for *Plasmodium malariae* this result agreed with the findings repoarted by Mc Gregor 1972, 1987, Brabin 1989, and Nosten 1991. These workers also noted that the severity was greater in primigravidae[11,12,3,13].

The result of the investigation carried out on other patients also revealed that the most prevalent species of malaria parasite was *Plasmodim falciparum* (53.9%) followed by *P. vivax* (23.9%),

Table 1: Prevalence of *P falciparum* and *P. malariae* among the pregnant women categorized from first to third trimesters

Trimester	No of blood samples Examined	No infected with P falciparum	% of infection with P falciparum	No Infected with P malariae	% of infection with P malariae
1st	94	47	50.0	3	3.2
2nd	53	43	81.1	4	7.5
3rd	103	60	58.3	5	4.9

Table 2: Analysis of malarial parasite from the suspected malaria suffering patients blood samples

No of samples examined	The No of positive cases	P. falciparum		P. vivax		P. malariae		P. ovale	
		M	**F**	**M**	**F**	**M**	**F**	**M**	**F**
300	280	64	87	23	44	18	29	5	10

Key : M –Male F - Female

P. U (16.8%) and *P. ovale* (5.4%) respectively. This predominace is attributed to the fact that P *falciparum* has the ability to resist the lethal effect of antimalairal drugs. This resistance stems up from its mode of life cycle-having only the ringed trophozoites and gametocytes in the peripheral blood while the rest are located in the visceral organs. This result agreed with the findings of Mcgregor 1972 WHO 1984, 1985& 1986.[11,14,15,16.]

The results also revealed that the malaria disease was more prevalent in females than in males this could be attributed to the mode of dressing especially in the evenings, males wearing trousers and long sleeve shirts, covering their skins unlike the females.

CONCLUSION

The investigation carried out on pregnant women showed a very high prevalence rate of 63.5%.with *P. falciparum* predominating mainly during the second trimester.

Similarly, high incidence of malaria parasites with *P falciparum* predominating was recorded with other patients. This could be attributed to high drug resistance of *P. falciparum* and it's ability to spend most it's life cycle in the visceral organs.

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