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Degree of Malarial Parasitaemia in Pregnancy

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Pregnant women form a high risk group for malaria infection which may cause abortions, still births and premature labour. The study was conducted in Department of Microbiology, J.N. Medical College and Hospital, AMU, Aligarh, over a period of 5 years to determine the prevalence and parasitaemia in malarial infection. The study group included pregnant and non-pregnant females with signs and symptoms suggestive of malaria. The diagnosis of malaria was done by examining the peripheral blood smear and degree of parasitaemia was determined using standard protocols. Confirmation of the diagnosis was done by quantative buffy coat(Q.B.C.) assay and the detection of malarial antigen.Total number of females diagnosed to be suffering from malarial infection during last 5 years were 150. Out of these 56 (37.3%) were pregnant. 13 were positive by blood smear examination, 135 and 02 were positive by Q.B.C. and R.D.T. respectively. All 13 (23.2%) patients positive by blood smear examination were antenatal cases and in third trimester of pregnancy, had parasitaemia in range of +3 to +4. Other 43 (76.8%) pregnant females were diagnosed by Q.B.C. also had parasitaemia in the range of +2 to +4 in comparison to non pregnant females suffering from Plasmodium infection who had parasitaemia in the range of +1 to +2 in 76% of cases. High level of parasitaemia was found to be associated with serious complications.

Key words: Degree, Malarial parasitaemia, Pregnancy.

The problem of malarial infection in pregnant women was described nearly 65 yrs ago[1]. Malaria in pregnancy is obstetric, social, and medical problem requiring multidisciplinary and multidimensional solution. In region where malaria is endemic, the disease is a recognized cause of complications of pregnancy such as maternal anaemia, low birth weight, spontaneous abortions, premature delivery, intrauterine growth retardation and perinatal mortality. The level of parasitaemia determines the clinical complications associated with malaria in pregnancy both in mother and foetus. Pregnant women in endemic areas are highly susceptible to malaria and both the frequency and the severity of the disease are higher in pregnant than in non –pregnant women. In pregnancy there is depression of cell-mediated immunity that allows foetal allograft retention but also interferes with resistance to various infectious diseases[2]. Cellular immune responses to *P.falciparum* antigens are depressed in pregnant women than in non-pregnant women. Antiadhesion antibodies against chondroitin sulphate A-binding parasites are associated with protection from maternal malaria, but these antibodies develop only over successive pregnancies, accounting for the susceptibility for primigravidae to infection[3].

Objectives

1. To estimate the degree of malarial parasitaemia in pregnant females.
2. To study the level of malarial parasitaemia at different stages of pregnancy.

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3. To compare the level of parasitaemia in pregnant and non-pregnant females with Plasmodial infection.
4. To study maternal and fetal complications as result of malaria in pregnancy.

MATERIAL AND METHODS

The study was conducted in Department of Microbiology, J.N. Medical College and Hospital, AMU, Aligarh, over a period of 5 years to determine the prevalence and parasitaemia in malarial infection. The study group included pregnant and non-pregnant females with signs and symptoms suggestive of malaria. The diagnosis of malaria was done by examining the peripheral blood smear (Giemsa stain)[4], using thick and thin films, and the degree of parasitaemia was determined using standard protocols.

Grading of thick smear[4]:

\+ 1-10 parasites per 100 fields
++ 11-100 parasites per 100 fields
+++ 1-10 parasites per single field
++++ more than 10 parasites per single field

Confirmation of diagnosis of malaria was done by quantitative buffy coat (QBC) assay and detection of malarial antigen (RDT).

Grading of QBC[4]

\+ less than 1 parasite per field
++ 1-10 parasites per field
+++ 11-100 parasites per field
++++ more than 100 parasites per field

RESULTS AND DISCUSSION

150 females who presented to J.N. Medical College with signs and symptoms suggestive of malarial infection during last 5 years were screened by different diagnostic tests for confirmation of Plasmodium infection. Out of these 56(37.3%) were pregnant. Most of the pregnant females were in age group of 18-30 years and most of them were primigravida (57.2%) .13 were positive by blood smear examination, 135 and 02 by Q.B.C. and R.D.T respectively (Table1). All 13 (23.2%) patients positive by blood smear examination were antenatal cases and in the third trimester of pregnancy, had parasitaemia in the range of +3 to +4. Other 43 (76.7%) pregnant females who were diagnosed by Q.B.C., had parasitaemia in the range of +2 to +4. Malaria affected all the three trimesters of pregnancy with predominance in third trimester (67%), while 17.8% and 14.2 % females affected were in second and first trimesters respectively (Table2). Pregnant females suffering from malarial infection had higher degree of parasitaemia in the range of +2 to +4 as compared to non-pregnant females who had parasitaemia in the range of +1 to +2 (Table3&4). *P. falciparum* was more common (62.5%) than the *P. vivax* (37.5%) (Table5). We were able to follow up

Table1. Diagnostic distribution of cases in relation to positivity by different diagnostic techniques

S. No.	Diagnostic Test	No. of Cases (pregnant females)
1.	MP smear1	13
2.	Q.B.C.	43

Table 2. Showing distribution of pregnant females in relation to the time of pregnancy

S.No.	Pregnancy Status	No. of Cases
1.	First Trimester	08
2.	Second Trimester	10
3.	Third Trimester	38

Table 3. Showing distribution of patients in relation to degree of parasitaemia and their pregnancy status

S.No.	Pregnancy Status	Total No. of Cases	Degree of parasitaemia			
			+1	+2	+3	+4
1.	First Trimester	38	02	03	09	24
2.	Second Trimester	10	01	07	-	02
3.	Third Trimester	08	01	02	05	-

only 13 patients due to poor patient compliance. The various complications related to pregnancy in these patients are shown in Table 6. Most common maternal complication seen during the pregnancy was anaemia (100%), followed by caesarean delivery (84.6%), premature rupture of membranes (76.9%), hypoglycemia (76.9%) and premature rupture of membranes (61.5%). Low birth weight was seen in nine cases (69.2%). There was no maternal or fetal mortality.

The prevalence of Malaria in pregnancy is poorly characterized, various prevalence rates have been reported from India[5,6] and world wide[7,8].The parasitaemia was found to be higher in third trimester than second and first trimesters. Similar results were observed by Agan *et al.,* 2010[9].Comparatively higher levels of parasitaemia in pregnant women were noticed by Erhabor *et al*.,2009[10],as in our study parasitaemia was of higher degree than their non-pregnant counterparts.57.2% were primigravida and only 42.8% were multigravida. Parity was found to be significant predisposing factor in malarial infection. Similar results in relation to parity have been observed by Naseem *et al.*[11], 2008 and Shulman *et al.*[12], 1996.In both studies, they found malarial infection more in primigravidae. *P.falciparum* was dominant infection in study group. Our results are in accordance with results of studies than by Surg *et al.*, 2007[13]. Malarial infection during pregnancy adversely affects development and survival of fetus through maternal anemia, low birth weight, premature rupture of membranes and possibly abortion and stillbirth. These malaria induced medical problems constitute major clinical, public health and research challenges[14]. Our study showed a positive and significant correlation between the level of parasitaemia and anaemia

Table 4. Showing comparison of malarial parasitaemia in pregnant and non-pregnant females

Age Group	Non – pregnant females	Degree of parasitaemia				Pregnant females	Degree of parasitaemia			
	N=94	+1	+2	+3	+4	N=56	+1	+2	+3	+4
11-20	22	10	07	03	02	13	01	03	05	04
21-30	56	25	08	07	06	40	03	10	15	12
31-40	14	06	05	02	01	03	-	-	02	01

Table 5. Showing of cases of malarial infection according to species

S No.	Pregnancy Status	Total No of Cases	*Plasmodium vivax*	*Plasmodium falciparum*
1.	First Trimester	08	03	05
2.	Second Trimester	10	02	08
3.	Third Trimester	38	16	22

Table 6. Showing outcome of malarial infection in follow up patients (all of them having *Plasmodium falciparum* infection)

S.No.	Complications	No of Patients
1.	Premature rupture of membranes	10
2.	Low birth weight baby	09
3.	Caesarean section	11
4.	Hypoglycemia	10
5.	Derranged RFT	08
6.	Anaemia	13
7.	Thrombocytopenia	07

among *Plasmodium falciparum* parasitized pregnant subjects. This finding is consistent with previous studies which observed that anemia is one of the most frequent complications related to pregnancy[15-17] and that it is often complicated by malarial parasitaemia.[18-20] particularly in developing malaria endemic countries.

CONCLUSION

Malaria a potential risk in pregnancy which can be a cause of serious complications is usually associated with high level of parasitaemia. Such high parasite count in peripheral blood can lead to significant morbidity and mortality. Thus Plasmodial infection needs early diagnosis and prompt treatment.

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