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Research Article

STUDY OF PREGNANCY OUTCOME IN MALARIA AMONG RURAL POPULATION OF WESTERN MAHARASHTRA, INDIA

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ABSTRACT
Women during pregnancy are more prone to severe attacks of malaria, which may result in to abortion, premature labour or still birth. Malaria alters the course of pregnancy by affecting the health of the mother and by interrupting the pregnancy. The most important influence of the disease on maternal health in pregnancy is indirect, by causing anemia. This prospective observational study was carried out in the Department of Obstetrics and Gynecology of Rural Medical College, Loni, India over a period of January to December 2011. A total of 30 cases, clinically diagnosed and confirmed by presence of malarial parasites in the peripheral blood smear, were enrolled in the study. Results were analyzed by using percentages and proportions. Falciparum malaria was the commonest type responsible for malarial fever. Sixty five percent cases were primigravidas and were in 1st and 2nd trimester of pregnancy. Anemia and fever with chills were most predominant symptoms seen in 100% patients followed by headache (73.0%) and body ache (60.0%), while 46.0% patients presented with spleenomegaly and 23.0% patients with jaundice. There were four cases of cerebral malaria, of which, three cases died after delivery. Malarial fever is a preventable condition in pregnancy. If the patients are not treated in time may lead to anemia, abortion, preterm labour, IUGR and stillbirth. Cerebral malaria is an important indirect cause of maternal mortality.

Key Words: *Malaria in Pregnancy, Abortions, Preterm labour, Malaria Chemoprophylaxis*

INTRODUCTION
Currently, 80.5% of the 1.2 billion populations of India live in malaria risk areas. Of this, 4.2%, 32.5% and 43.8% live in areas of high, moderate and low risk to malaria respectively (Dash AP et al., 2008). At present, official figures for malaria in India, available at NVBDCP, indicate 1.5–2 million confirmed cases and about 1,000 deaths annually (Ashwini et al., 2007). According to the WHO South East Asia Regional Office estimates, during 2000-2009, malaria incidence remained between the range 2.16 - 2.83 millions and malaria deaths between 3188 - 6978 in SEA Regions, the proportion *of P. falciparum* being 44 - 60% and more than 70% of these cases being reported from India. The biggest burden of malaria in India is borne by the most backward, poor and remote parts of the country, with >90-95% cases reported from rural areas and <5-10% from urban areas; however, the low malaria incidence in urban areas may be due to almost non-existing surveillance (WHO).

Malaria acquired during pregnancy is one of the major causes of maternal morbidity that may lead to poor maternal and birth outcomes in tropical areas endemic for this disease (Nosten F et al., 2004). The clinical manifestations of malaria in pregnancy depend on the levels of transmission in a particular population with different levels of immunity (Whitty CJ et al., 2005). Although some women may be semi-immune to malaria, pregnancy may render them at risk of complications of malaria because they may lose much of that previous immunity during pregnancy (Steketee RW et al., 2001). Severe anemia predominates as the main feature of malaria in areas with high levels of transmission, while hypoglycemia, respiratory failure, and cerebral malaria may predominate in areas with low levels of malaria transmission (Luxemburger C et al., 2001). Malaria during pregnancy is associated with maternal anemia and low birth weight (Tako EA et al., 2005). In some areas, infection with *P. falciparum* may be associated with up to 35% of preventable low birth weight deliveries (Kalanda BF et al., 2006). Furthermore, pregnancy outcomes such

as stillbirths, miscarriages, and preterm births are common in pregnant women with malaria, particularly *P. falciparum* malaria (Nosten F et al., 1999). Hence the present study was conducted to assess the pregnancy outcome associated with malaria among pregnant women admitted in tertiary care teaching hospital of western Maharashtra, India.

MATERIALS AND METHODS

A prospective observational study was carried out in the Department of Obstetrics and Gynecology of Rural Medical College, Loni which is situated in rural area of Ahmednagar District of Maharashtra, India, over a period of January to December 2011. During the study period, 42 cases with clinical presentation of malarial fever were admitted in the maternity ward, of which 30 cases diagnosis was confirmed by presence of malarial parasites in the peripheral blood smear were enrolled for the study. Following investigations were carried out in the study group. Complete haemogram,Urine microscopy, Peripheral smear- thick and thin for malarial parasite, Blood sugar estimation, LFT, RFT, USG for assessment of fetal well being, examination of placenta and histopathology, Cord blood for malaria parasite, Other special investigations in cases with complications of malaria (e.g. cerebral malaria with hepatitis or pulmonary complications) like ECG, X ray-chest, CSF examinations, Serum electrolytes. The cases were treated by specific antimalarial therapy in the form of tab. chloroquine in standard doses. Most patients with symptomatic *P. vivax* infection during pregnancy were treated as per national treatment guidelines (chloroquine, 25 mg/kg given as stat and 5 mg/kg over a three-day period, followed by 5 mg/kg per week during the rest of the pregnancy). The cases not responding to chloroquine were put on oral or parenteral quinine or artesunate. Cases of cerebral malaria were treated by IV Quinine and inj. Artesunate therapy. The cases were also given symptomatic treatment for e.g. Paracetamol for control of fever oral or by parenteral route. The cases were discharged from the hospital after completion of antimalarial therapy, on iron and folic acid tablets. All cases were advised to come for follow up in the OPD every 15 days. During follow up visit, haemogram and peripheral smears for malaria parasite were repeated. All cases were followed up till delivery to know the maternal and fetal outcome. Relevant data including age, parity, duration of pregnancy, socio economic class, place of residence, symptoms, clinical findings, results of laboratory investigations, pregnancy complications, treatment given and maternal and fetal outcome were noted in the structured proforma. Results were analyzed by using percentages and proportions.

RESULTS

As observed from Table 1 that, there were 12 (40%) patients in the first trimester, followed by 7 (23.3%) in the third trimester and 6 (20%) in the second trimester.

It was evident from Table 2 that, anemia and fever with chills were most predominant, seen in 100% patients followed by headache (73.0%) and bodyache (60.0%), while 46.0% patients presented with spleenomegaly. Twenty three percent patients had jaundice, and vaginal leaking and bleeding were observed only in 20.0% patients.

Table 1: Distribution of cases according to period of gestation

Period of gestation	No. of cases	Percentage
1st Trimester	12	40.0
2nd Trimester	06	20.0
3rd Trimester	07	23.3
Post partum	05	16.7
Total	30	100.0

Pregnancy outcome in malaria is shown in Table 3. Out of 12 patients in first trimester, 41.6% had full term normal delivery; where as 59% had either abortion or preterm labour. In the second trimester, out of

6 patients, 50% had either abortion or preterm labour, whereas in the third trimester, out of 7 patients, the full term normal delivery rate was 28.5%. There were 3 maternal deaths due to cerebral malaria.

Table 2: clinical presentation of study population (n=30*)

Signs and Symptoms	No. of cases	Percentage
Fever with chills/sweating	30	100.0
Anemia	30	100.0
Headache	22	73.0
Body ache	18	60.0
Spleenomegaly	14	46.0
Pain in abdomen	13	43.0
Jaundice	07	23.3
Vomiting	06	20.0
Per vaginal bleeding	06	20.0
Per vaginal leaking	06	20.0
Altered sensorium	05	16.6
Hepatomegaly	02	6.6
Convulsion	01	3.3
(*Multiple response)		

Table 3: Time of infection and pregnancy outcome in the study population

Pregnancy outcome	Time of infection			
	1st Trimester (n=12)	2nd Trimester (n=6)	3rd Trimester (n=7)	Post partum (n=5)
Threatened abortion	4 (33.33)	2 (33.33)	0 (0.00)	0 (0.00)
Preterm delivery	3 (25.00)	1 (16.66)	3 (42.85)	0 (0.00)
Full term normal delivery	5 (41.66)	3 (50.00)	2 (28.57)	0 (0.00)
Maternal deaths	0 (0.00)	0 (0.00)	0 (0.00)	3 (60.00)
Neonatal death	0 (0.00)	0 (0.00)	0 (0.00)	2 (40.00)
IUGR	0 (0.00)	0 (0.00)	1(14.28)	0 (0.00)
Still birth	0 (0.00)	0 (0.00)	1 (14.28)	0 (0.00)

(Figures in parenthesis indicates percentage)

DISCUSSION

Malaria is a major cause of maternal and fetal morbidity and mortality, and this risk is highest in the areas of unstable malaria transmission. Malaria in pregnancy is inadequately researched in India, and the burden is probably much higher than current estimates. In our study, we observed that pregnant women infected with malaria developed severe hematological abnormalities such as anemia. Furthermore, we observed that many women had either spontaneous abortion or preterm delivery. Severe anemia and thrombocytopenia caused by either *P. vivax* or *P. falciparum* infection (Singh N et al., 1999) can lead to bleeding diathesis caused by hemolysis, reduced cell deformity of parasitized and nonparasitized erythrocytes, increased spleenic clearance, reduction of platelet survival, decreased platelet production, and increased spleenic uptake of platelets. In a series of patients with severe *P. vivax* malaria recently reported from western India (Kochar DK et al., 2005), three pregnant women developed severe cerebral malaria with jaundice, severe anemia, and thrombocytopenia. These hematologic abnormalities were also seen in some of our patients and have resulted in harmful effects on pregnancy, which further resulted in perinatal complications (Whitty CJ et al., 2005 and Nosten F et al., 1999). We were unable to determine levels of parasitemia in the pregnant women and associate these levels with clinical outcomes. However, despite the limitations of our study, we believe that *P. vivax* malaria may negatively impact maternal and perinatal outcomes. Most of the studies evaluating the effect of *P. vivax* have been conducted in low transmission areas of Asia. Moreover, *P. vivax* is increasingly recognized as a cause of significant

morbidity in pregnant women, and there is little information on the clinical, epidemiologic, and molecular aspects of this infection during pregnancy (Nosten F et al., 1999).

The outcomes of pregnancy associated malaria are influenced by different factors in different epidemiologic settings and are depending on the time of infection during the pregnancy period. In our study, there were four cases of cerebral malaria and out of these three cases died after delivery. In areas with a high rate of malaria transmission, infections in early pregnancy are associated with IUGR and abortions, whereas infections in later pregnancy are associated with preterm delivery (Steketee RW et al., 1996).

CONCLUSION

Malaria is the commonest cause of febrile illness during pregnancy. Majority of cases are due to falciparum malaria. Anemia, Abortion, Preterm labour and IUGR are common complications in untreated cases. Majority of cases respond to oral chloroquine therapy. If these cases are not treated in time, cerebral malaria can occur as a fatal complication. Maternal mortality in cerebral malaria is very high. In endemic areas, patients should be advised to take prophylactic chemotherapy throughout pregnancy and puerperium and use personal protective measures.

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