Malaria during Pregnancy

Pregnant women form a high risk group for malaria infection which may cause abortions, still births and premature labour. Malaria in pregnancy is a significant health problem in India and requires systematic studies. Almost all the published literature on the topic refers to Africa, which present data referring principally to *Plasmodium falciparum*—the commonest cause of infection. We examined the relationship between malaria infection and pregnancy in central India. This region is of special interest because the population is exposed to both *P. vivax* and *P. falciparum* infections.

Epidemiology of Malaria in Pregnancy

A study was carried out in collaboration with the Government Medical College, Jabalpur, which caters to mixed rural, tribal and urban population (Singh *et al.*, 1999). A malaria clinic was established at the hospital to examine pregnant women for malaria. Analysis of three years data showed significantly higher ($p<0.001$) malaria prevalence among pregnant women, especially primigravid than nonpregnant women. Mean parasite densities were significantly higher in pregnant women compared to nonpregnant women for both *P. falciparum* ($p<0.001$; df =137) and *P. vivax* ($p<0.05$; df=72) infections. Pregnant women with falciparum or vivax malaria were significantly more anaemic than noninfected pregnant women or infected nonpregnant women (Table 2). Cerebral malaria was a common complication of severe *Plasmodium falciparum* infection, with a high mortality rate during pregnancy.

Table 2. Malaria parasitaemia, anaemia during pregnancy and low birth weight babies/neonates among the study subjects in central India

	All cases[a]	Cases with *P. vivax* infection	Cases with *P. falciparum* infection	Control 1[a]	Control 2[a]
No. tested	2127	365	365	1984	
No. selected	365 (17%)	121 (33%)	244 (67%)	150 (8%)	1762 (i.e. 2127-365)
Pregnant	Yes	Yes	Yes	Yes	Yes
Fever	Yes	Yes	Yes	Yes	Yes
Malaria	Yes	Yes	Yes	Yes	No
No. with Hb data available	271 (74%)	83 (69%)	188 (77%)	85 (57%)	88 (5%)
Mean Hb±SD (g/dl)	–	9.05±1.39	6.42±1.98	9.68±1.43	10.03±1.11
No. with birth weight available	155 (42%)	50 (41%)	105 (43%)	–	175 (10%)
Mean wt±SD (kg)	2.18±0.25	2.22±0.30	2.15±0.21	–	2.53±0.43

[a]Women cases with fever; Control 1— Infected nonpregnant women; Control 2—Noninfected pregnant women.

The average weight of 155 neonates from infected mothers was 350 g less than that of 175 neonates from noninfected mothers. This difference in birth weight was statistically significant for both *P. falciparum* ($p<0.0001$; df=278) and *P. vivax* ($p<0.0001$; df=223) infection. Congenital malaria was not recorded.

In another study during malaria epidemic (Singh *et al*., 2001) among 151 malaria infected pregnant women, *P. falciparum* was predominant species (88%) with highest prevalence in II trimester (59.4%) irrespective of parity status. About 3% abortions, 3.7% stillbirths and 2.2% neonatal deaths were documented in *P. falciparum* infected women. Out of six cases examined three of these samples (1 *Pv*; 2 *Pf*) showed evidence of placental infection. The proportion of low birth weight babies was also significantly higher among those born to infected women than among those born to the noninfected (95.2% vs 68%; $\chi^2 = 13.09$; df = 1; $p<0.01$). Four neonates died before Day 20 post-partum—three born to multigravidae infected with *P. falciparum* and one to an apparently uninfected second gravida.

A study was also done to evaluate the efficacy of CQ (25 mg/kg body weight) in the treatment of *P. falciparum* in pregnant women. In a malaria meso-endemic area of District Mandla (Singh *et al*., 2001). Out of 21 positive patients enrolled, six (28.6%) women (2 primi + 4 multi) had a RIII type response (95% C.I., 9–48%), one (4.7%) multigravid showed partial response (RI early/RII). Remaining (66.7%) women (3 primi + 11 multi) had a late RI/S type of response. Thus the cumulative failure rate in this study was 95% (95%C.I., 86.13–100%). The 13 women (2 primi + 11 multi) who did not respond and were treated again with CQ, 10 (1 primi + 9 multi) failed (77%) again (95% C.I., 48-95%) on Day 28 and 35.

To evaluate the feasibility of delivering malaria chemoprophylaxis to pregnant women in urban settings of District Jabalpur, 155 pregnant women were enrolled of which 100 were with malaria and 55 without malaria. Out of 100, 27 were *P. vivax* (parasitaemia ranged from 1025–19700 parasites/µl) and 73 were *P. falciparum* (1175–35000 parasites/µl) (Singh *et al.*, 2002). The results revealed that the chemoprophylaxis to pregnant women was possible only in 30 patients (19.3%)—20 with malaria and 10 without malaria. None of these women developed malaria during the study period. Average birth weight of 11 babies born to women with malaria was 2.41 ± 0.21 kg and of the 5 babies born to women without malaria was 2.48 ± 0.2 kg. This difference was not statistically significant. Studies showed that there is limited understanding of the drug policy at district level and even if the drugs are prescribed for chemoprophylaxis, the compliance among pregnant women for the same is poor. n