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MATERNO-FETAL HAEMATOLOGICAL RELATIONSHIP IN MALARIA AT MONGOMO, GUINEA EQUATORIA

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This study is aimed to determine the effects of maternal and fetal parasitaemia on maternal and fetal haemoglobin. A nine-month (January - September 1997) prospective study was carried out at the labour unit of the Regional Hospital in Mongomo, Guinea Equatoria. One hundred and twenty-four patients with singleton deliveries were studied. The prevalence rates of maternal and fetal parasitaemia were 102 (82.25%) and 33 (26.61%) respectively. The mean maternal haemoglobin was 10.11 + 1.35 gm/dl, those with parasitaemia 9.26+0.85 gm/dl and those without parasitaemia 11.45+1.20 gm/dl (p<0.005). There is a close correlation between maternal parasitaemia, worsening maternal haemoglobin level and fatal parasitaemia (p<0.005 df=3 95% CI). Fetal parasitaemia is significantly commoner in fetuses with severe anaemia compared to those with negative fatal parasitaemia (p<0.005). The author emphasized curative treatment of all pregnant women at the first antenatal care visit to be supplemented by adequate prophylaxis throughout pregnancy. Choice of drugs for treatment and prophylaxis must be guided by the local sensitivity patterns and safety profiles of the drugs to the mothers and the developing fetuses.

INTRODUCTION

Malaria infection remains one of the most serious tropical diseases in many parts of the world. Currently, over 300 million cases of malaria are reported annually, about 85% of these from Africa (1-3). Two to three million deaths are estimated to occur annually with over 90% in Africa alone.

Malaria infection has profound effect on pregnancy outcome and neonatal life. *Plasmodium falciparum* infection prevalence increases in early pregnancy (9-16 weeks gestation) and parasite density is also increased in pregnant women (4-6). Consequently, materno-fetal complications such as anaemia, abortions, stillbirths, prematurity, intrauterine growth retardation, hypoglycaemia, cerebral malaria and even maternal mortality have been reported in pregnant women with malaria (1-5, 7-10).

The aims of this study are to determine the prevalence of maternal and fetal parasitization, and to determine the effects of maternal and fetal parasitaemia on maternal and fetal haemoglobin.

MATERIALS AND METHODS

This prospective cross-sectional study was carried out within a nine months period (January-September 1997) at the 'Hospital provincial de Mongomo, Guinea Equatoria" on all women who delivered at the labour unit of the hospital. All the 124 women with singleton deliveries were unselected and included in the study as they presented at the labour unit. At delivery, a 4 millimeters venipuncture sample of maternal peripheral blood was collected and a standard glass microscopic slide preparation of the mother's peripheral blood was immediately prepared from this and labeled "A". Each newborn's peripheral blood sample was obtained through a heel prick, and a thick blood film sample was prepared on the glass microscope slide "B". Each slide was stained with Geimsa stain

after adequate dehaemoglobinization and examined under the light microscope using the X100 oil immersion objective. A positive slide is one that contains any of the parasites. No species identification was done. The cyanmethaemoglobin technique of Haemoglobin determination described by Decle and Lewis (11) was adopted.

RESULTS

The prevalence rates of maternal and fetal parasitaemia were 102 (82.25%) and 33 (26.61%) respectively. The mean age of the women in this study was 26.86 ± 8.09 years, those with parasitaemia 22.54 ± 4.30 years and those without parasitaemia 25.80 ± 3.36 years ($p<0.005$). (Table1). The mean maternal haemoglobin was 10.11 ± 1.35 gm/dl, those with parasitaemia 9.26 ± 0.85 gm/dl and those without parasitaemia 11.45 ± 1.20 gm/dl ($p < 0.005$). Severe anemia (haemoglobin < 7 gm/dl) was seen in two women both of whom had maternal and fetal parasitaemia. When compared with those with mild anaemia (72% and 54.5% maternal and fetal parasitaemia respectively) and without anaemia (63.3% and 22.2% maternal and fetal parasitaemia respectively), it is obvious that there is a close correlation between maternal parasitaemia, worsening maternal haemoglobin level and fetal anaemia. ($p < 0.005$, df = 3, 95%CI).

The mean fetal haemoglobin was 12.37 ± 1.64 gm/dl, those with parasitaemia 11.46 ± 1.23 gm/dl and those without parasitaemia 13.68 ± 0.82 ($p < 0.005$). Table 2 shows mean fetal haemoglobin concentrations in fetuses with or without parasitaemia. Parasitaemia is significantly commoner in fetuses with severe anaemia compared to those without parasitaemia ($p<0.005$).

Table 1: Prevalence rates of malaria parasitaemia in mothers and babies

Group	Positive Parasitaemia (%)	Negative Parasitaemia (%)	Total (%)
Maternal	102 (82.25)	22 (17.75)	124 (100)
Fetal	33 (26.61)	91 (73.39)	124 (100)

Table 2: Mean values of maternal and fetal indices in all women and in those with positive and negative parasitaemia

Variable	All Patients	Positive Parasitaemia	Negative Parasitaemia	P Value
Mean age (years)	26.86 + 8.9	22.54 + 4.30	25.80 + .26	P<0.005
Mean maternal haemoglobin (gm/dl)	10.11+ 1.35	9.26 + 0.85	11.445+ 1.20	P<0.005
Mean fetal haemoglobin (gm/dl)	12.37+1.64	11.46+1.23	13.68+0.82	P<0.005

DISCUSSION

The prevalence rates of maternal and fetal parasitaemia as recorded in this study were 82.25% and 26.62% respectively. These values are higher than the studies of Lamikanran (12), Uko *et al* (13), McGregor *et al* (6), Morgan (14) and Ezeoke and Braide (15) but lower than the values of Tanzanian (16) and Congolese (17) studies. A cursory look at these studies may suggest that the West African countries had relatively lower values than the East-Central African countries, this study inclusive.

This study has also shown that the maternal parasitaemia predisposes to maternal anaemia, placental parasitization and consequently fetal parasitaemia and anaemia (Tables 1 and 2). The presence of the parasite induces haemolysis of both parasitized and non-parasitized red blood

cells in both the maternal and fetal reticulo-endothelial systems (1, 4, 5, 7). Haemoglobin F (fetal haemoglobin) is said to confer some resistance to parasitization and subsequent haemolysis of fetal red blood cells (1, 4, 7, 18). This, coupled with the protective uteroplacental barrier, may be partly responsible for the lower prevalence rates for fetal parasitaemia and anaemia. Fetal anaemia has been suggested in this study to positively correlate with the level of fetal parasitaemia.

Increasing maternal parasitaemia, if not properly treated, increases the risk of poor fetal outcome. The authors support the line of management proposed by Ogunbode *et al* (19) which emphasizes curative treatment for all pregnant women at the first antenatal visit to be supplemented by adequate prophylaxis throughout pregnancy. It is hoped that this will reduce the prevalence rate of maternal malaria in pregnancy with its attendant maternal and fetal complications. Advent of drug resistance has made this proposal more difficult in clinical settings and consequently, the choice of drugs for treatment and prophylaxis must be guided by the local sensitivity patterns and safety profiles of the drugs to the mother and the developing fetus (20). Cost is also an important consideration since one of the goals of good antenatal care is to provide for as many women as possible. Supplementation of antimalarial prophylaxis with haematinics have been shown to be beneficial to all pregnant women in endemic areas, particularly primigravidae, some of whom were shown to significantly grow more and had less anemia than the control group who were not supplemented (21).

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