International Journal of Medical Science and Dental Research

Impact of Malaria in Pregnancy: Implications on The Fetus and Children

Obeagu Emmanuel Ifeanyi[1] and Obeagu Getrude Uzoma[2]

[1]Medical Laboratory Science, University Health Services, Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria
[2]Department of Nursing Science, Ebonyi State University, Abakaliki, Nigeria

Abstract: *Malaria is a serious public health challenge especially in the developing world like Nigeria. It is more devastating in highly endemic areas like our country. The infection has no age and sex limit but is more felt among the les preveiledged because of poor income to cater for medical expenses. Malaria infection is more prevalent among the pregnant women and children due to low immunological status of the patient. Malaria infection impacts negatively on the babies ranging from low birth weight to high mortality and anaemia. More serious measures should be adopted to prevent the speed of malaria and pregnant women should be properly managed to ensure sound life and that of their children.The paper discussed the implications of malaria infection to children.*

Keywords: malaria, pregnancy, implications on the fetus and children

I. Introduction

Obeagu *et al. (2014)* described malaria in pregnancy as a great contributor to adverse maternal and perinatal outcome. They pointed out that in hyperendemic areas like ours in Nigeria, it is a common cause of anaemia in pregnancy in both immune and nonimmune individuals and is aggrevated by poor socio-economic circumstances. It has been shown that severe anaemia was found to be more than twice as common in women with peripheral parasitaemia as in those without parasitaemia. Indeed malaria can cause several perinatal and maternal complications including abortion, still birth, low birth weight and even death (Brabin,1983,McGregor,1987 and Nyirjesy *et al.*,1993). Malaria infection during pregnancy adds significantly to anaemia in pregnancy and low birth weight babies (Deen *et al.*, 2001). Antenatal anaemia has shown positive correlation with low birth weight (LBW) and high Infant Mortality Rate(IMR).The use of effective anti-malaria drug during pregnancy has been found to lower the frequency of LBW and IMR(Steketee *et al.*,2005).

II. Perinatal mortality

Placental malaria and its effects on perinatal mortality (fetal or infant deaths from28th week of pregnancy up to the seventh day after birth) have been investigated in various parts of sub-Saharan Africa. The impact of placental malaria on perinatal death (stillbirth and early neonatal death) is still under debate, and conflicting results have been obtained from various studies that investigated the relationship between them (Menendez *et al.*, 2000).

III. Low birth weight

In sub-Saharan Africa, the rate of LBW (i.e., < 2.5kg) newborns ranges from 3.9 percent to 24 percent (Menendez *et al.*, 2000), and malaria is thought to be an important contributor to the3.5 million LBW babies born annually in sub-Saharan Africa (Brabin 1996). Malaria is thought to reduce birth weight through a combination of systemic and local effects. Although malaria may affect birth weight through malaria-induced anemia, it also may reduce birth weight via the effects of placental infection. In this case, parasites directly cause a mechanical compromise of placental circulation via widespread trophoblast basement thickening and increased fibrinoid necrosis and cytrophoblast prominence or indirectly interfere with placental functions and/or

induce pathological lesions. Despite the prevalence of placental infections for women of all gravidities, ranging from 5percent to 52 percent, infection-associated LBW risk is elevated two to four times in various studies. A contradictory study in The Gambia showed increased birth weight in infected placentas, but widespread trophoblast basement membrane thickening was associated with decreased birth weight. A non-significant correlation was found between LBW and increased fibrinoid necrosis and cytotrophoblast prominence. Similarly, in Ubangi district, Zaire, malarious placentas had no consistent relationship to birth weight, and although infants born to infected mothers with malarious placentas averaged 100 g less, there was, however, no significant difference in the trend.There is still no agreement as to the main mechanisms mediating reductions in birth weight in placental malaria (Menendez *et al*., 2000).When birth weight is stratified and related to the types of placental infections (chronic or active) indifferent studies, there were conflicting findings.

IV. Preterm delivery and intrauterine growth retardation

The relationship between placental malaria and preterm delivery (PTD)/intrauterine growth retardation (IUGR) has been evaluated in various studies. Two earlier studies among semi-immune women failed to show a difference in the proportion of PTD among infected and non-infected mothers, but other reports across sub-Saharan Africa
have shown that placental malaria was significantly associated with PTD and IUGR (Brabin *et al*., 1991).
Although IUGR is more common than PTD with chronic placental infection, chronic infection of the placenta (with pigment and parasites) may be associated with LBW, through both prematurity and IUGR (Brabin *et al*., 1996).Active placental infections were associated with a statistically significant lower risk of LB Was a result of IUGR and with anon-significant increase in the risk of LBW as a result of prematurity. This finding suggests that acute infections toward the end of pregnancy may play an important role in the induction of PTD, consistent with higher rates of abortions and preterm deliveries that have been observed during malaria transmission seasons. Because premature infants are more likely to die than IUGR babies, the prevention of placental malaria particularly toward the end of gestation in malarious are as becomes absolutely imperative.

V. Effects on Neonatal Anthropometric Parameters

Neonatal anthropometric parameters such as neonatal length, head circumference, and placental weight have been related to placental malaria. In southeastern Tanzania, chronic ongoing malaria infection of the placenta was associated with significant reductions in mean head circumference, neonatal length, and body index (weight/length),whereas past infections were associated only with reduced mean length at birth (Menendez *et al*., 2000). In southeastern Nigeria, a slightly higher proportion of infected placenta was not significantly associated with lower neonatal length and lower head circumference; in the Ubangi district of Zaire, malarious placenta shad no consistent relationship with neonatal length or head circumference. Reduction in newborn length and head circumference associated with chronic infections probably indicates a prolonged effect on fetal nutrition, which previously has been suggested. Similarly, it has been suggested that the reduction in the body mass index may reflect the severity and duration of fetal malnutrition (Menendez *et al*., 2000).

VI. Fetal Anemia

The prevalence of fetal anemia, defined as cord hemoglobin level < 12.5g/dl, is reportedly very high in sub-Saharan Africa. In two separate studies conducted in southern Malawi, fetal anemia prevalence of 23.4percent (Brabin *et al*., 1996) and 23.3 percent (Le Cessie *et al*., 2002) were recorded, while in Maputo Mozambique, up to 93 percent of newborns were found to have fetal anemia. Interestingly, a statistically significant link was established between fetal anemia and maternal malaria infection in all of these studies. The contributory role of placental malaria to fetal anemia has been evaluated in a number of studies with varying results.
In southern Malawi, a higher prevalence of fetal anemia occurred with increasing peripheral *P. falciparum* parasite density, and geometric mean placental parasite densities were higher in babies with fetal anemia than in those without it. Other studies have found no statistically significant connection between evidence of malaria infection and fetal anemia. This lack of consistency in the findings from various studies may be explained by the fact that malaria in pregnancy varies with transmission intensity, access to treatment, coverage and quality of antenatal services, and drug resistance, among other factors. The etiology of fetal anemia is complex and multifactorial; placental malaria could play either a major or mino rrole, depending on the local epidemiological situation. It has been suggested that exposure of the fetus to malaria antigens due to damage of the placental barrier may make the newborn more susceptible to immunologically mediated haemolysis or to dyserythropoiesis (Brabin, 1991).

VII. Conclusion

Malaria is a serious public health challenge especially in the developing world like Nigeria. It is more devastating in highly endemic areas like our country. The infection has no age and sex limit. Malaria infection is more prevalent among the pregnant women and children due to low immunological status of the patient. Malaria infection impacts negatively on the babies ranging from low birth weight to high mortality and anaemia. More efforts have to applied to prevent to negative effects of malaria infection on the fetus and children.

REFERENCES

[1.] Brabin, B. J. (1991). Malaria: Risks during pregnancy. *The magazine of the World Health Organization* 26.

[2.] Brabin, B. J. (1996). An analysis of malaria and immunity in pregnancy. *Bull world health organ.*, 61(6): 1005-1016.

[3.] Menendez C., Fleming A.F., Alonso P.L. (2000). Malaria related anaemia. *Parasitology Today*; 16: 469-76.

[4.] Deen,J.L.,Von Seidlein,L.,Pinder,M.,Walraven,G.E. and Green Wood,B.M. 2001. The Safety of the Combination Artesunate and Pyrimethaimine-sulfadoxine Given During Pregnancy. Trans. Roy.Soc.Trop.Med.Hyg.95(4):424-428.

[5.] Obeagu, E.I., Odo, M.C., Anaebo, Q.B. N., Emelike, C.U. (2014). Impact of *Plasmodium falciparum* malaria and hookworm infection on anaemia among pregnant women of ikwuano local government area, Abia state, Nigeria. *Int.J.Curr.Microbiol.App.Sci.* 3(1): 104-111

[6.] Steketee,R.N. and Nahlen,B.L. 1996. The Burden of Malaria in Pregnancy in Malaria Epidemic Areas.American J. Trop. Med. Hygiene. 64(12):28-35.

[7.] Nyirijesy, P., Kavasya, T., Axelead, P. And Fischer,P.R.1993. Malaria During Pregnancy: Neonatal Morbidity and Mortality and the Efficacy of Chloroquine Chemoprophylaxis. Clin.Infect.Dis., 16(1):127-132.

[8.] McGregor, I.A.1987. Thoughts on Malaria in Pregnancy. Parasitologia, 29:153-163.

[9.] Brabin, B.J. 1983. An Analysis of Malaria in Pregnancy in Africa.Bull World Health Org.61:1005-1016.