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Original Research Paper

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MANAGEMENT OF MALARIA IN PREGNANCY

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ABSTRACT Malaria throughout pregnancy has a negative impact on delivery outcomes and is a major cause of maternal morbidity across the world. Contrary to nongravid women, pregnant women are more vulnerable to the side effects of malaria infection. Women who have malaria during pregnancy typically experience more severe symptoms and effects, including greater risks of miscarriage, intrauterine death, early delivery, low-birth-weight newborns, and neonatal mortality. They are also more likely to experience severe anaemia and lose a mother prematurely. The right medications, insecticide-treated bed nets, and successful educational outreach programmes can all help to prevent malaria. The most common types of malaria and the factors that cause it should be evaluated, and treatment should start right away. Modern testing techniques and rapid diagnostic tests have advanced illness diagnosis and, consequently, accelerated medical care. In order to improve both the mother's and the foetus's health, additional vitamins should be given. Both simple and complex malaria should receive the proper diagnosis. Antimalarial medications like primaquine and chloroquine are quite helpful. As a successful course of treatment, antibiotics and ACTs have to be used together with antimalarials.The development of malaria vaccines is a preventative approach towards the elimination of the illness. Other non-pharmacological ways to prevent insect reproduction include pesticides, insect repellent nets, lotions, gels, and bed furniture covers impregnated with insecticide.

KEYWORDS : Pregnant Women, Malaria Infection, Rapid Diagnostic tests, Antimalarial Medications, Malaria Vaccine

INTRODUCTION

Placental malaria, also known as pregnancy-associated malaria (PAM), is a form of the disease that poses a serious risk to the mother as well as the growing baby. [1] Plasmodium falciparum infection, the most serious of the four parasite species that cause malaria in humans, is the main cause of PAM.[2] A woman is considerably more likely to have malaria and develop its consequences when pregnant.[3] In tropical and subtropical regions, where parasitic infection is prevalent, prenatal care must include both malaria prevention and treatment. [4][5]Although the ordinary adult resident of an area where the parasite is widespread has some protection to it, [6] pregnancy-related difficulties make the mother and foetus more vulnerable. Due to the parasite's interference with the foetal placenta's ability to transmit critical chemicals, stillbirths, spontaneous abortions, and dangerously low birth weights are frequently experienced. [7].Malaria's earliest signs and symptoms include feeling ill, having headaches and exhaustion, as well as having muscular pains and stomach pain. A fever may ultimately develop from this. Orthostatic hypertension, nausea, and vomiting are some more frequent symptoms. Seizures brought on by malaria may also be followed by a comatose condition.[8]. The VAR2CSA variation of P. falciparum Erythrocyte Membrane Protein 1 (PfEMP1), which is expressed by infected erythrocytes, enables them to adhere to CSA on the membrane of the placenta. [9] In addition to causing local inflammation, the buildup of infected erythrocytes in the placenta prevents the mother and foetus from exchanging nutrients. [10]

Consequences Of Malaria In Pregnancy:

Uncomplicated and severe complicated ailments are two different categories of malaria. A headache, fever, shaking, and sweating that happen every two to three days and persist for six to ten hours are indications of an uncomplicated malaria infection. Anaemia, acute respiratory distress syndrome, cerebral malaria, and organ damage in the mother can all result from severe malaria, a potentially fatal illness. Anaemia may cause postpartum haemorrhage, maternity and infant mortality, and anaemia. [11] A severe type of anaemia that may manifest in the second or third trimester is acute pulmonary edema. [12]

Complications include cerebral malaria, pulmonary edema, severe haemolytic anaemia, hypoglycemia, and hyperpyrexia might result from this. [13].Less likely to survive are newborns weighing below 5.5 pounds (2.5 kg). [14]

DIAGNOSIS:

To track the frequency of malaria, stained blood smears are still often examined under the microscope. Rapid diagnostic tests (RDT) are highly useful for the identification of symptomatic malaria infection, which frequently coexists with high parasitaemia, at the point of care.[15] The RDT will be followed by a microscopic study to validate the outcome and ascertain the quantity of contaminated red blood cells that were found. RDTs are typically utilised in clinical settings without access to microscopy[16].Quantitative PCR may identify very low-density malaria infection owing to the great sensitivity of polymerase chain reaction. [17] Assays, however, take a fair amount of time, and a specialised lab with knowledgeable people is needed. Although it is quicker and more robust than PCR and may be used at the point of care, loop-mediated isothermal amplification (LAMP) has equal sensitivity to PCR. Both are currently restricted to research environments. [18][19]The placental tissue examined histologically after birth is a sensitive method for identifying current or previous malaria infections. Haemozoin, the malarial pigment that is most frequently seen in fibrin

deposits, is a marker for previous infection. Leucocyte infiltrates, primarily monocytes, known as intervillositis, can accompany active infection, especially in first-time moms with low malaria immunity during pregnancy. It has a substantial correlation with maternal anaemia and low birth weight in this population. [20]The parasites produce hemozoin, a polymerized form of heme, due to the presence of haemoglobin. Laser desorption mass spectrometry (LDMS) or polarised light is used to identify it. [21]

MANAGEMENT OF MALARIA IN PREGNANCY:

Both "uncomplicated" and "severe" malaria are possible. Fever, chills, sweats, headaches, muscular aches, nausea, and vomiting are some of the symptoms of simple malaria. In contrast, severe malaria presents with signs and symptoms including coma, disorientation, severe anaemia, and breathing problems. A patient who exhibits severe malaria symptoms has to be evaluated very soon and started on treatment right away. The most harmful parasite, Plasmodium falciparum, is most frequently responsible for severe malaria. [22]For uncomplicated malaria in the first trimester, oral quinine with clindamycin is advised as the first line of therapy. For the treatment of simple or severe malaria in the second and third trimesters, artemether-lumefantrine, an artemisinin-based combination therapy, is used as the first-line choice. For the treatment of complex malaria in the early and late stages of pregnancy, respectively, intravenous artesunate is authorised.[23]. In addition to artesunate-SP, ACTs are also quite efficient in treating vivax malaria, and parenteral artesunate is very successful in treating severe vivax illness.[24] More and more nations advise using ACTs to treat all types of straightforward malaria. [25]IPTp involves giving all pregnant women a curative dosage of an efficient antimalarial medication (now sulfadoxine-pyrimethamine) without first determining whether or not they are infected with the malaria parasite.Folic acid supplements are frequently provided to pregnant women to help prevent neural tube abnormalities in their unborn children. Insecticide-treated nets (ITNs) help prevent malaria, reduce low birth weight, and other unfavourable pregnancy outcomes, according to research, mostly from African studies. Only a little amount of information is available from Asia [26], where P. vivax is common and where mosquito vectors and their biting habits vary. But in India, ITNs are a reasonably priced and possibly efficient method of preventing malaria in pregnant women. In certain regions of Africa and Asia, indoor residual spraying is employed, although the effects on pregnant women are not well documented. [27]

Uncomplicated Malaria In Pregnancy:

Women who are expecting their first child are most at risk of contracting malaria in regions with high transmission, like Africa, compared to regions with low transmission, where the number of pregnancies has less of an impact on infection rates.[28] The first trimester of pregnancy is when pregnant women are most vulnerable to contracting malaria, but as time goes on and the body develops antibodies to the infectious agent, the chance of infection reduces. The risk of infection also declines following subsequent pregnancies.[29]

First Trimester :

ACTs and primaquine are two medications that have been authorised by the World Health Organisation and are frequently suggested by national malaria control programmes in areas where malaria is endemic. [22]Treatments based on artemisinin include Quinine, Chloroquine, Doxycycline, Mefloquine, and combinations of those drugs (e.g., artemether-lumefantrine, artesunate-amodiaquine.Pregnant women and those who lack G6PD (glucose-6-phosphate dehydrogenase) shouldn't take primaquine. Primaquine can induce haemolytic anaemia in persons with G6PD deficiency, hence patients shouldn't take it until a screening test has ruled out the condition or until the prevalence of the condition in the general population is known to be low.

Second Trimester

The goal of treating simplistic malaria is to quickly eradicate the illness. Although there are novel antimalarial medicines in research, resistance should be monitored. [30]In a recent major study, 3428 pregnant women received one of four distinct antimalarial drugs (ACTs) for the treatment of uncomplicated malaria in the second and third trimesters of pregnancy: artemether-lumefantrine, amodiaquine-artesunate, mefloquine-artesunate, or dihydroartemisinin piperaquine (DHA-PQ). [31] The introduction of DHA-PQ was linked to significantly lower rates of maternal malaria and anaemia, congenital malaria, and low birth weight in Papua, Indonesia, where P. falciparum and P. vivax were both resistant to earlier first-line medications. [32]

Future Directions In Relation To Malaria Elimination:

As part of a large-scale trial study managed by WHO, Ghana, Kenya, and Malawi started spearheading the introduction of the vaccine in a few chosen locations in 2019.[33] WHO approved the RTS, S vaccine in October 2021 for kids residing in regions with moderate to severe malaria transmission rates. The complete body of RTS, S evidence, including the outcomes of the current pilot plan for the eradication of malaria, served as the basis for the recommendation. [34]The Asia-Pacific region, including India, has made a commitment to eradicate malaria by 2030. [35] The management of malaria in expectant women and programmes like mass drug administration (MDA) are affected. Since DHA-PQ is now the most popular treatment for MDA but does not yet have a proven safety record during early pregnancy, women who may be pregnant at this time should be kept out of such campaigns. Pregnant women may bear a substantial portion of the residual expense when they are excluded from MDA campaigns. [36]A suitable sentinel population to track changes in malaria may be pregnant women. [37] Since the majority of women visit prenatal care at least once, it is simple to reach them and track the parasite prevalence. [38]

CONCLUSION:

Globally, there are concerns about malaria during pregnancy. There are hazards for both mothers and unborn children, particularly in non-endemic regions like western nations where there is no protection to malaria. Numerous negative consequences, including stillbirth and LBW, have been reported for the foetus as well. Malaria should be viewed as a global health issue that is increasingly affecting western countries because to the large migratory patterns and the high number of individuals who travel annually to endemic locations. Clinicians around the globe need to be ready for this newly developing disease in nations where it is not prevalent.

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