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A Review of the Global Prevalence of Malaria in Pregnancy.

OLAYEMI, Oluwamurewa Joel; NNADI, Charity Kelechi; HANSON-AKPAN, Rita Ifeyinwa; EZE-NELSON, Ngozi Ruth; AMEH, Rabi Iye; KWARBAI, Anna; ASOGWA, Blessing Ogechi; AWOYERIJU, Abiodun

National Space Research and Development Agency, NASRDA, Obasanjo Space Research, FCT, Abuja, Nigeria.

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Corresponding Author
Olayemi Oluwamurewa Joel
E-mail: *joelolayemi8@gmail.com*

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ABSTRACT

The global prevalence of malaria in pregnancy is an issue of utmost importance in public health. Understanding the distribution and frequency of malaria in different regions provides valuable insights not only for policymakers, but also for healthcare professionals and researchers. This helps to allocate resources effectively and develop targeted interventions. Thus, this review aims at exploring the current state of global prevalence of malaria in pregnancy; highlighting key findings and trends about the disease across the world. By comparing available data, this work seeks to provide a comprehensive overview of the prevalence of malaria in pregnancy as a major health concern worldwide; shedding light on its disparities, emerging patterns, while highlighting potential areas for further investigations and interventions by all stakeholders involved in the disease's prevention and control.

1.0 INTRODUCTION

Malaria, the mosquito-borne infectious disease caused by parasites of the Plasmodium genus, continues to pose a significant threat to maternal and child health worldwide (Anne et al., 2023).

While the disease affects populations in diverse geographic regions, its impact on pregnant women and their offspring is particularly concerning (Barken and Iversen, 2021). In regions of the world where the condition is endemic, such as sub-Saharan Africa and parts of Southeast Asia, pregnant women are at an increased risk of malaria infection, which can have profound implications for maternal and fetal health (Menaca et al., 2013).

While continuing to represent a substantial public health challenge, there is an estimated 25% of pregnant women affected in areas with high transmission rates (Oyerogba et al., 2023). According to the World Health Organization (WHO), approximately 125 million pregnancies occur in malaria-endemic areas each year, and the majority of these occur in sub-Saharan Africa and other tropical regions where malaria transmission is prevalent (Hill and Kulie, 2018). In these settings, pregnant women are at an increased risk of contracting malaria due to changes in their immune function, making them more susceptible to infection and its associated complications (Desai et al., 2018). The impact of malaria in pregnancy extends beyond the immediate health consequences for the mother, as it also affects the developing fetus. Malaria infection during pregnancy is associated with adverse outcomes, including maternal anemia, low birth weight, preterm delivery, and increased risk of infant mortality (Desai et al., 2018). These adverse effects not only compromise the health and well-being of the mother and child but also contribute to the intergenerational cycle of poverty and poor health outcomes in malaria-endemic regions.

Despite the recognized impact of malaria in pregnancy, several challenges persist in its effective prevention and management. Access to preventive measures, such as insecticide-treated bed nets and intermittent preventive treatment, remains limited in many malaria-endemic regions, particularly in remote and resource-constrained settings (Pell et al., 2013). Additionally, the emergence of drug-resistant malaria strains poses a significant obstacle to the effective treatment of malaria in pregnant women, necessitating the development of safe and effective antimalarial therapies specifically tailored for use during pregnancy (Khaja and Sequeira, 2021).

Furthermore, the complex interplay of social, economic, and environmental factors contributes to the persistence of malaria in pregnancy, highlighting the need for a comprehensive, multidisciplinary approach to address this public health challenge (Almas et al., 2022). Strengthening healthcare infrastructure, improving access to antenatal care, and integrating malaria prevention and control measures into maternal and child health programs are essential components of a holistic strategy to combat malaria in pregnancy (Mills et al., 2008). Addressing the challenges associated with malaria in pregnancy requires a concerted effort from governments, healthcare organizations, and the international community to implement sustainable interventions that can mitigate the impact of malaria on pregnant women and contribute to improved maternal and child health outcomes (Mills et al., 2008).

Prevalence of Malaria in Pregnancy in East Africa

In East Africa, over 70% of Kenya's population is at risk for contracting malaria, and this continues to be a serious public health issue and a significant cause of high morbidity and mortality. The burden of the virus in Kenya is non-homogenous with places surrounding Lake Victoria and the Coastal region having the highest risk locations with children below five years of age and pregnant women being the most vulnerable to the infection (Okoyo, 2021). Pregnancy-related malaria infection in the country is a major public health concern as it increases the risk of morbidity and mortality not only in adults but also in both pregnant women and their unborn children. Pregnancy-related malaria symptoms and problems vary depending on a person's geographic location, level of acquired immunity, and the level of transmission in a certain area. Malaria is typically asymptomatic in high-transmission settings where acquired immunity to Plasmodium falciparum infection is prevalent (Okoyo, 2021).

According to a recent Mozambican study that used autopsy investigation to determine the cause of maternal mortality, up to 10% of maternal deaths were directly related to malaria infection and 13% were due to HIV/AIDS, which can be made worse by concurrent malarial infection. (Menéndez, 2018) This shows that malaria may be directly responsible for nearly 25% of all stillbirths in regions of the world where the disease is endemic.

In Ethiopia, the two main malaria-causing species in Ethiopia are P. falciparum and P. vivax, which account for 60% and 40% of cases, respectively. The primary malaria vector is Anopheles arabiensis, whereas minor vectors include An. pharoensis, An. funestus, and An. nili (Assemie, 2022). In a recent study, the prevalence of malaria and associated factors among symptomatic pregnant women attending antenatal care at three health centers in north-west Ethiopia was analysed. The prevalence of malaria was 20.8%, which is comparable to Ghana's prevalence of 22%. However, the prevalence is that of Mali 28.1% and Burkina Faso (Almaw, et al, 2022). To put all of these into perspective, the prevalence of malaria in Ethiopia is quite lower compared to countries with some of the highest malaria prevalence in Africa, such as Mali; which takes 3% of the cases globally, and Burkina Faso; which takes about 3% of the cases globally. (WHO, 2020)

Although. the frequency of malaria among asymptomatic pregnant women has been thoroughly studied (Almaw, et al, 2022), yet, prevalence among symptomatic pregnant women continues to receive little attention. Hence, there is a lack of information regarding the prevalence of malaria and related variables among symptomatic pregnant women. Moreover, Ethiopia has established goals for the eradication of malaria, with one of the primary strategic goals being to treat all suspected instances of the disease under recommended practices and undertake confirmatory testing on 100% of those cases (Bugssa and Tedla, 2020).

Malaria in pregnancy remains a significant public health issue in East Africa, with substantial impacts on maternal and infant health. While strategies such as ITNs and IPTp have proven effective, additional measures are needed to overcome the numerous challenges faced in the fight against this disease. Ultimately, a comprehensive, multi-faceted approach integrating research, policy implementation, and community engagement is required to effectively address the prevalence of malaria in pregnancy in East Africa.

Malaria in Pregnancy in West Africa

Malaria's prevalence in pregnancy across West Africa is influenced by a myriad of factors, including regional climate, healthcare infrastructure, and the presence of malaria-transmitting mosquitoes. Malaria during pregnancy can profoundly impact both maternal and infant health (Williams et al., 2016). Pregnant women with malaria are at an increased risk for severe anemia, which can lead to maternal mortality (Brabin et al., 2000). In a study by Oyerogba et al., (2023), 8.7% of pregnant women who participated in the study at the University College Hospital, Ibadan, Oyo State, Nigeria, had malaria parasitaemia. This rate is however lower than that of Ghana, Burkina Faso, and Malawi, which reported rates of 10.2%, 20.4%, 18.1%, respectively.

Moreover, malaria in pregnancy is a leading cause of low birth weight, a critical risk factor for neonatal mortality and impaired child development (Guyatt and Snow, 2004). Indeed, a study conducted in Nigeria revealed that about 25% of low birth weight cases and 20% of infant deaths were attributable to malaria in pregnancy (Menendez et al., 2000). The 2021 World Malaria Report asserts that nearly 30% of pregnant women in malaria-endemic areas in West Africa experience at least one incident of malaria during their pregnancy (WHO, 2021). In some regions with high transmission rates, such as parts of Sierra Leone and Nigeria, this percentage can increase to approximately 50% (Steketee et al., 2021).

Research has indicated that there is a substantial correlation between the frequency of malaria among pregnant women in Nigeria and demographic characteristics such age, education level, and occupation. Compared to their older, more educated, and wealthier peers, younger pregnant women, those with lower educational attainment, and those in low-income employment are more susceptible to malaria (Gontie et al., 2020). These results highlight the necessity of focused interventions that take these demographic characteristics into account in order to effectively control the malaria load among Nigerian pregnant women (Mbachu, 2020).

In the West African nation of Ghana, the burden of malaria in pregnancy (MIP) has been a significant concern, with data from 2014 revealing that MIP accounted for 17.6% of outpatient department attendance, 13.7% of hospital admissions among pregnant women, and 3.4% of maternal deaths. However, there is reason for cautious optimism, as subsequent data from 2015 indicated a decline in the first two indicators to 14% and 11%, respectively (NMCP, 2015). This trend suggests that efforts to combat malaria in pregnancy, such as the implementation of preventive measures and improved access to healthcare services, may be yielding positive results. Nonetheless, ongoing vigilance and continued research are essential to further alleviate the burden of MIP and improve maternal and child health outcomes in Ghana and beyond.

The significance of malaria in pregnancy cannot also be overstated for the women of Côte d'Ivoire, as every individual within the nation—a populace numbering approximately 24 million—is constantly exposed to the threat of malaria year-round, with heightened transmission occurring during the rainy season (Impact Malaria, 2020).

Addressing malaria in pregnancy in West Africa is fraught with challenges, including limited access to healthcare, socio-economic disparities, and a lack of safe and effective antimalarial drugs for pregnant women (Bello and Ayede, 2019). To counter these issues, the WHO recommends the use of insecticide-treated nets (ITNs), intermittent preventive treatment in pregnancy (IPTp) with sulfadoxine-pyrimethamine (SP), and efficient case management (WHO, 2021).

However, problems such as drug resistance, difficulties in ITNs distribution, and socio-cultural beliefs that hinder the adoption of preventive measures impede progress (Hill et al., 2013). Therefore, research into novel drugs and strategies, extensive community education, and efforts to strengthen healthcare systems are urgently needed in the western region of Africa.

Malaria in pregnancy in the Asia-Pacific region

The Asia-Pacific area is home to the majority of pregnant women who are susceptible to Plasmodium vivax infection (Rijken et al., 2012). Nevertheless, few governments, policymakers, and donors in this region recognize malaria in pregnancy as a priority. There are few reliable statistics on the true impact of malaria during pregnancy. India, Papua New Guinea, and Thailand are where the majority of information on the epidemiology, impact, treatment, and prevention of

malaria in pregnancy in the Asia-Pacific area is found. The morbidity and mortality of malaria in pregnancy need to be better estimated immediately. Accurate diagnosis and timely treatment are required to avoid hazardous symptoms of sickness and minimize damage on fetuses when malaria in pregnancy cannot be averted (Al Khaja and Sequeira, 2021).

With 229 million infections and 409,000 fatalities from malaria reported in 2019, the disease continues to pose a severe threat to public health. The Southeast Asia area recorded around 6.3 million cases, the majority of which were in India (Restrepo-Posada et al., 2020). Health organizations have made a consistent and concentrated effort over the past 20 years to minimize malaria infection, with some degree of success; nonetheless, places with a high burden among the most susceptible populations continue to be an issue (Restrepo-Posada et al., 2020).

A study conducted in Gujarat, West India, revealed that pregnant women are more susceptible to contracting malaria than non-pregnant women. Another study from Odisha, east India, discovered that primigravidae are more likely to develop parasitaemic infections than multigravidae women, and that newborns are more susceptible to infection overall (Nhama et al., 2020). At health care facilities from Madhya Pradesh, the prevalence of malaria in pregnant women was discovered to be somewhere between 6.4 and 55% (Jain et al., 2023). More interventions to curb the prevalence of malaria in the region is necessary.

Malaria in Pregnancy in South Africa and Central Africa

In all 10 provinces of Zambia, malaria is endemic, and Plasmodium falciparum is responsible for almost 95% of cases (Chaponda et al., 2015). A Malaria Indicator Survey (MIS) has been carried out by the National Malaria Control Programme every two years since 2006 to assess the prevalence of malaria in children under the age of five in particular sites. Controlling malaria therefore continues to be a top concern for public health in endemic nations like Zambia. Children under five years old and pregnant women are two of the categories most at risk of contracting malaria. Adverse birth outcomes that impact the mother, fetus, and infant are linked to malaria infection. It has been demonstrated that HIV infection raises the risk of malaria during pregnancy (Chaponda et al., 2015. First-trimester treatment for uncomplicated malaria in pregnancy is quinine, but the second and third trimesters are when ACT should be used (Enesia et al., 2015).

In terms of malaria burden, the Democratic Republic of the Congo (DRC) is the second-highest country in the world (WHO, 2020). The general population frequently has asymptomatic malaria, and the local prevalence can reach 48.2%. The average malaria prevalence in the country is 37.2%. In four maternity centers in Kinshasa in 2006, the proportion of measured malaria parasites was higher among first-time moms (26.5%) than multiparas (18.8%) (Mudji et al., 2021).

Since the 1970s, South Africa (SA) has used IRS at homesteads to implement vector management techniques that provide control for the general population in malarious environments. So, the goal of malaria prevention is to protect the entire population, not only expectant women. While IPTp has been introduced in other malaria-endemic nations, South Africa has not, mostly due to a lack of knowledge regarding the prevalence of malaria in pregnant women (Njau et al., 2021).

In South Africa, although malaria is only present in three provinces, which are Limpopo, Mpumalanga, and KwaZulu-Natal (KZN)—it nevertheless poses a severe threat to public health across the country (Njau et al., 2021).

Malaria in Pregnancy in Europe

With 87 million migrants (30.9%), Europe is presently the most popular destination for international migrants, according to the World Migration Report 2022. In 2020, the majority of African-born migrants living outside of the area resided in Europe (Marascia et al., 2023). Although pregnancy-related occurrences of malaria are rare, there is a definite group most at risk: newly arrived immigrants and young sub-Saharan moms visiting friends and relatives without receiving pre-travel counseling. Anaemia and stillbirth were the most frequent unfavorable consequences on mothers and fetuses. Patients with unexplained anemia arriving from endemic areas should always be evaluated for malaria, as the disease might present silent. These results should raise awareness among doctors and assist planners and implementers of Maternal Health programs in focusing preventive interventions on the immigrant community (Jiménez et al., 2020).

CONCLUSION

Understanding the global prevalence of malaria in pregnancy is a critical data point in the larger picture of malaria eradication and control across the world. Knowledge of the prevalence of malaria in pregnant women can guide health policy and resource allocation. As high prevalence is detected in certain regions, more resources can be allocated for preventive measures, treatment, and follow-up care in such areas. Thus,, understanding global prevalence helps to target interventions more effectively. These interventions can specifically include distribution of insecticide-treated nets, intermittent preventive treatment, and effective case management.

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