



## Rationalizing knowledge, attitude and practices of Malaria among Pregnant Women in India and Nigeria

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### ORIGINAL ARTICLE



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Received on : 21/10/2021

Revised on : ----

Accepted on : 28/10/2021

Plagiarism : 09% on 22/10/2021



### Plagiarism Checker X Originality Report

Similarity Found: 9%

Date: Friday, October 22, 2021

Statistics: 237 words Plagiarized / 2641 Total words

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Review Article Rationalizing knowledge, attitude and practices of Malaria among Pregnant Women in India and Nigeria ABSTRACT Background: Malaria in pregnancy (MiP) a major public health problem especially in tropical and sub-tropical countries

### ABSTRACT

**Background:** Malaria in pregnancy (MiP) a major public health problem especially in tropical and sub-tropical countries leading to various complications for the mother and the fetus. Infection with any Plasmodium species (specially *P. falciparum* or *P. vivax*) during pregnancy increases the risks of severe anaemia, premature delivery, low-birthweight, neonatal and maternal deaths and stillbirths. Knowledge about malaria in pregnancy (MiP) and its prevention is essential to control its risk and consequences during pregnancy. The objectives of the study were; (a) to explore the knowledge and attitude of malaria among pregnant women (b) to collate the practices opted for the prevention and control of malaria in India and Nigeria.

**Methods:** An extensive literature review was carried out using available search engines; Cochrane Library, PubMed, Science Direct etc. and articles with reference to knowledge, attitude and practices of MiP were assembled using some keywords. Studies conducted among pregnant women from India and Nigeria were included.

**Results:** A total of 17 research articles were included for the final review based on the inclusion criteria. This review suggests that the level of knowledge among pregnant women for malaria and its prevention is associated with the awareness of malaria during pregnancy and its prevention.

**Conclusion:** There were gaps in the knowledge about the preventive measures for malaria in pregnancy in India and Nigeria. Majority of

*studies are from Nigeria which shows that more research is being done in the country on MiP. There is less literature available in India which suggests that more evidence needs to be generated.*

## **KEYWORDS**

**Malaria in pregnancy, India, Nigeria.**

## **INTRODUCTION**

Malaria is one of the most prevalent infectious diseases and is a major cause of very high morbidity and mortality especially among children and pregnant women. It results from the infection of a parasite belonging to the genus *Plasmodium*. It accounts for an estimate of 228 million cases globally, and results in more than 4,00,000 deaths every year. The largest number of malaria cases is seen in the Africa region (93%) followed by the South East Asia region (3.4%), Eastern Mediterranean (2.1%). Almost 85% of all malaria cases globally were in 19 countries: India and 18 African countries (1). Despite decades of implementation of preventive and control measures for malaria, it still remains one of the leading communicable diseases which affects the health as well as lowers the economic growth of the country.

Pregnant women are the second most vulnerable group due to immunological changes occurring during pregnancy which increases vulnerability to infection and illness.(2,3) Malaria in Pregnancy (MiP) possesses a significant risk to the pregnant women, the foetus and the new born child. The consequences of malaria during pregnancy vary with the transmission intensity. Infection during pregnancy with any *Plasmodium* species can be harmful to mother and child as pregnancy reduces the immunity and the women becomes more susceptible to severe symptoms and complications, such as maternal anemia, reduced birth weight caused by preterm delivery and foetal growth restriction as well as miscarriage and still birth(4–6).

Africa accounts for 90% of the mortality burden of malaria, and Southeast Asia accounts for 10% of the burden (2). Malaria control still remains a challenge in Africa with a burden of 91% of deaths with pregnant women, their unborn child being at the highest risk. Overall prevalence of exposure to malaria infection in pregnancy in moderate to high transmission sub-Saharan Africa was 29%. In total, about 11 million pregnancies would have been exposed to malaria infection in these countries in 2018. About 39% (4.4 million) of these pregnancies were in the Democratic Republic of the Congo and Nigeria (1). In Nigeria, almost 97% of the population live in malaria transmission areas, with 76% of the population in high transmission areas, the majority of the infections caused by *P. falciparum* with an estimated case of 53.7 million and 79,800 deaths (WHO country profile- Nigeria).

South Asia alone is home to an estimated 1.4 billion people at risk of contracting malaria. In South Asia where there is unstable transmission of malaria, pregnant women are 2-3 times more vulnerable to developing malaria and malaria related anaemia (7). In India, over 90 per cent of the population live in malaria transmission areas, with two-thirds of infections caused by *P. falciparum* and one-third by *P. vivax* with an estimate of 9.6 million cases and 16,700 deaths (WHO country profile- India).

Despite a growing awareness of malaria very few studies have reported its significance in pregnancy. The burden of malaria in pregnancy (MiP) remains high despite the availability of proven efficacious antenatal care interventions (8). Evidence from malaria knowledge, attitudes, and practices studies reported that misconceptions on malaria transmission and risk factors still exist with adverse impact on malaria control programs(9).

## Objectives

The objectives of the study were to explore the knowledge and attitude of malaria among pregnant women and to collate the practices opted for the prevention and control of malaria in India and Nigeria.

## Methodology

An in-depth literature review being carried out using the PubMed, Elsevier (Science Direct) and Cochrane Library. All articles published with specific reference to knowledge, attitude and practice of malaria among pregnant women were gathered. All the potential articles in above mentioned search engines were gathered, summarized and checked for duplication and finalized based on the inclusion criteria.

The following keywords were searched in the title or abstract of the papers: “knowledge” OR “awareness” AND “attitude” OR “perception” AND “practice” OR “practices” AND “pregnant women” OR “pregnant woman” OR “pregnancy” AND “malaria” AND “India” AND “Nigeria”. Several restrictions criteria were used in the electronic search (a) only articles published in English were considered; (b) only studies published between January 2010 and February 2020 were included; (c) and only original papers and systematic reviews were included.

## Results

Based on the inclusion criteria 17 articles from 2010 till 2020 have been included in the review. Majority of the literature is cross sectional studies with a focus on pregnant women along with health care providers. Methodology adopted for assessing the knowledge, attitude and practices among different studies are different.

The results of the study have been grouped under some broad points under knowledge, attitude and practices:

1. **Knowledge:** awareness about malaria, its mode of transmission, symptoms of malaria, knowledge about preventive practices of malaria during pregnancy like insecticide treated bed nets (ITNs) and intermittent preventive treatment in pregnancy (IPTp), does pregnancy increases the risk of malaria or not
2. **Attitude:** Weather malaria can be prevented or not, use of ITNs, IPTp and sprays is beneficial in preventing malaria or not, is malaria a health concern or not, weather it is safe to sleep under ITNs or not,
3. **Practices:** Utilization of ITNs or IPTp, weather slept one day prior to the survey or not, use of any mosquito repellent (sprays, ointments, coils)

## Knowledge and attitude of pregnant women for malaria

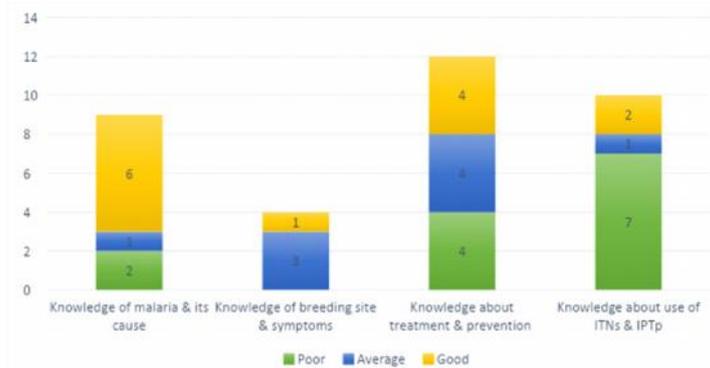
Among all the 17 studies some common factors have been identified for the better understating of the knowledge and attitude of pregnant women for malaria. Table 1 shows the details of the studies along with the common findings.

**Table 1:** Table showing the summary of the included studies

Summary	
Factors accessing the knowledge	<p><b>Knowledge about malaria and its cause</b></p> <p>In the study by Kutty &amp; Joe, and Hadiza &amp; Abdul, 68% &amp; 62.5% of PW had <i>poor &amp; low knowledge</i> about malaria and its causes respectively(5,10) where as in the study by Iriemenam et al., 78.9% of the PW <i>knew the cause of malaria</i>(11). In the study by Akinleye &amp; Ajayi, 92.3% had <i>knowledge about transmission</i> of malaria, 92.8% <i>knew the cause</i>, 67% knew that malaria can affect pregnant women(12). In the study by Ojong et al., the respondents had knowledge of malaria prevention with 83.9% <i>level of good knowledge</i>(13).</p>
	<p><b>Breeding site and symptoms</b></p> <p>In the study by Hadiza &amp; Abdul, 49.8% cases had <i>low levels of knowledge</i> on breeding sites of malaria(5). In the study by Oladimeji et al., 41.7% of the PW <i>didn't have knowledge</i> of the breeding sites of malaria &amp; 74% of the PW had <i>low knowledge</i> about the symptoms of malaria(9). In the study by Iriemenam et al., 86% of the pregnant women responded <i>correctly to its breeding site</i>(11).</p>
	<p><b>Knowledge about treatment and prevention</b></p> <p>In the study by Balami et al., 92% of the PW were <i>not aware of the ITNs</i>.(14) In the study by Kutty &amp; Joe, only 34.8% were aware of some treatment &amp; preventive measures for malaria.(10) In the study by Adebayo &amp; Akinyemi., only 42.3% of the respondents <i>had good knowledge</i> of malaria prevention.(15)</p>
	<p><b>Knowledge about use of ITNs and IPTp</b></p> <p>In the study by Obieche et al., 68.3% <i>didn't know</i> about the IPTp and ITNs.(16) In the study by Ango et al., &amp; Balami et al., 52.1% &amp; 50% believed that IPTp &amp; ITN is <i>not safe in pregnancy</i> respectively.(14,17) Study by Mens et al., found that only 11.6% of the participants use ITNs.(18) In the study by Obieche et al., <i>only 31.7% had knowledge</i> about the use of ITNs and IPTp in pregnancy. (16)</p>

In the study by Kutty & Joe, 57.4% of the mothers had knowledge about the cause and risk of malaria in pregnancy whereas in the study by Obieche et al., only 34.6 % of the women knew at least one adverse effects of malaria in pregnancy and 22.4% gave reason for the risk of malaria in pregnancy due to decreased immunity while 80% of the respondents attributed the cause of malaria to mosquito bites (10,16).

**Figure 1:** Graph showing the number of studies and the factors accessed for the knowledge of the respondents among the studies



The graph in figure 1 represents the common factors assessed by the studies. Among the 17 studies which assess the knowledge, awareness regarding malaria in pregnancy 12 studies (70%) had accessed the knowledge about malaria among pregnant women. Only 6 studies have reported to have good knowledge about malaria and its cause among the respondents whereas 7 studies have reported to have poor knowledge about the use of ITNs and IPTp among the respondents.

A study in India and Nigeria found that there is no significant association between the level of education of antenatal mothers and the effects of malaria in pregnancy(10,11) whereas few studies in Nigeria found that the level of education of the respondents is associated with the knowledge of malaria and its prevention. The higher the knowledge of the respondents the higher is the knowledge about malaria, its prevention and complications(9,12,15,19).

Only 3 studies have examined the attitude of the respondents toward malaria. In 2 studies respondents have shown a positive attitude where the participants were willing to try modern methods for the prevention of malaria(19,20). In the study by Hadiza and Abdul Rahman, respondents have shown a negative attitude and they believed that malaria cannot be prevented and it was not a health concern for them also respondents having a negative attitude have a higher risk of being infected with malaria during pregnancy as compared to respondents having a positive attitude(5).

### Practices opted for the prevention

In most of the studies practices opted for prevention of malaria in pregnancy include those as per the WHO guidelines which is use of insecticide treated nets (ITNs), intermittent preventive treatment in pregnancy (IPTp) and early diagnosis. But the use of the preventive measures is varying among each study due to many reasons. In the study by Hadiza and Abdul Rahman, 73.3% of the respondents do not practice any preventive measures for malaria(5). The use of ITNs were 92%, use of IPTp was 64.5% in the study by Ojong et al., 68.9% knew about ITNs in the study by Akinleye & Ajayi, and in the study by Okafor et al., 55% knew about LLINs and 50% knew about IPTp, this showed that respondents were aware of the use of ITNs and IPTp during pregnancy(12,13,21). But in a study by Ojong et al., despite of having good knowledge of MiP, the prevention practice among the respondents of the study was 69% only(13). In the study by Aina & Ayeni, which was conducted in two hospitals of Alimosho LGA one government and one private, 16% and 55% of the respondents had ITNs whereas only 11% and 37.5% actually use it respectively(22).

**Table 2:** Table showing prevention practices opted by the respondent's form included studies

Summary	
<b>Prevention practices used by the respondents</b>	<p>In the study by Ojong et al., in Nigeria, only 69% of the respondents <i>practiced malaria prevention strategies</i>; (13) in the study by Okafor et al., the respondents had good knowledge about the prevention measures for MiP but the <i>use of IRS was more than the LLINs and IPTp</i>; (21) In the study by Oladimeji et al., in Ibadan, <i>only 39.6% of the pregnant women had correct knowledge about the prevention of malaria</i> (9).</p> <p>Only 33.8% respondents <i>slept under ITN</i> and 37.5% <i>used IPTp</i> tablets to prevent MiP in the study by Ango et al., in Sokoto state (17). In the study by Akaba et al., <i>only 27% used AMDs</i> while only 15.9% <i>used IPT-SP</i> during pregnancy as a preventive strategy for malaria prevention (19).</p>

### Prevention practices used by the respondents Summary

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### Discussion

Amongst the 17 studies, 12 (70%) studies assessed knowledge about malaria, 3 (17%) studies assessed attitude of the respondent towards malaria and 11 (65%) studies assessed practices used for malaria prevention. Majority of the studies from Nigeria have found significant association between knowledge of malaria and educational status of the women which shows that pregnant women having higher education have higher knowledge of malaria and its prevention. (12,13,15,19,21) But on the contrary, a study from Nigeria and a study from India found that there is no association between the level of education and the knowledge of pregnant women. (10,11)

In the study by Obieche et al., despite having a high level of awareness of ITNs, the utilization rate was very low. This shows that just having mere knowledge about malaria and its preventive measures doesn't imply its use. There are a lot of other factors that are associated with the proper use of the preventive measures which involves partner's cooperation (husband), clinician's advice, availability and affordability, comfort of the user and ease of application (16).

A study in Nigeria by Mens et al., used peer education as a technique to improve the knowledge of pregnant women about the adverse effects of malaria in pregnancy and has found to increase the knowledge on preventive measures from 50 % to 80 %, which suggests that peer education could be used as an effective tool to increase the knowledge of women about malaria (18).

Despite of high awareness, a study by Obieche et al., has found some factors for noncompliance towards the use of ITNs and IPTp which include; lack of awareness, believed that door and window nets were sufficient control measures, inaccessibility, disliked by the husband, meant for children, cost, causes discomfort and sweating, unnecessary because they believed they have immunity, did not have mosquitoes in the house and difficulty to properly fix the net at home (16).

In some studies respondents have shown a positive attitude towards the prevention of malaria using recommended methods (19,20) whereas in another study respondents have shown a negative attitude towards use of preventive methods(5).

## CONCLUSION

There exist knowledge gaps among the pregnant women related to the breeding sites, mode of transmission of malaria, symptoms, prevention strategies, risk and complications of malaria in pregnancy. Lack of awareness regarding the use and benefits of ITNs and IPTp during pregnancy plays an important role in the utilization of these preventive measures by pregnant women. The review suggests that community's perception also plays an important role in the utilization of the preventive measures for malaria. There is a need to create awareness among pregnant women regarding the modern methods of prevention other than bed nets, such as IPTp and LLINs. More studies need to be documented focusing on the risk of malaria during pregnancy especially in context to India.

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