Original Article

Assessment of The Level of Awareness And Acceptance of the Malaria Vaccine Among Medical Doctors in Benue State, Nigeria: A Cross-Sectional Survey

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ABSTRACT

Malaria continues to be a significant public health threat in Nigeria, despite ongoing measures to combat the disease. Healthcare professionals, especially doctors, play a crucial role in advocating for and adopting malaria vaccines. However, there is limited research on their perspectives regarding malaria vaccines. This study aimed to evaluate the awareness, acceptance, and perceived barriers to the malaria vaccine among medical doctors in Benue State, Nigeria. A descriptive cross-sectional study was conducted between March and April 2025. Data were collected from 67 medical doctors using a structured online questionnaire distributed via professional WhatsApp groups using a convenience sampling technique. The data were analyzed using SPSS version 26. Awareness of the malaria vaccine was exceptionally high at 97%. However, the majority (62.7%) sourced their information from online and social media platforms, while only 10.4% cited official public health campaigns. Despite a high acceptance rate (91%) and readiness to prescribe the vaccine, significant concerns were identified. The primary barrier to implementation was limited in-depth clinical knowledge among healthcare professionals (70.1%), followed by concerns regarding vaccine safety and side effects (59.7%), and potential cost (28.4%). Medical doctors in Benue State demonstrate high awareness and acceptance of the malaria vaccine, establishing a strong foundation for its roll-out. However, the reliance on informal information sources and a self-reported lack of clinical knowledge are critical barriers. The government must initiate active, structured, and evidence-based educational campaigns to equip doctors to confidently advocate for and administer the vaccine.

Keywords: Acceptance, Awareness, Malaria Vaccine, Medical Doctor, Perceived Barrier.

INTRODUCTION

Malaria is a major cause of illness and mortality in sub-Saharan Africa, with Nigeria bearing the highest burden globally, and according to the recent World Malaria Report by the World Health Organization (WHO), Nigeria accounts for approximately 24.3% of all estimated global malaria cases and 30.3% of global malaria deaths.[1] It is a life-threatening disease transmitted by certain mosquito species, primarily in tropical regions.[2] Vulnerable groups include infants, children under 5, pregnant women, girls, travellers, and people living with HIV/AIDS.[2,3] In Benue State, malaria remains a significant public health challenge, straining healthcare and hindering socio-economic development.[4,5] Efforts to combat malaria in Nigeria have largely focused on preventive measures like insecticide-treated nets (ITNs), indoor residual spraying (IRS), intermittent preventive treatment in pregnancy (IPTp), and artemisinin-based combination therapies (ACTs). While these strategies have led to a modest decline in malaria prevalence, challenges such as insecticide resistance, poor health-seeking behaviour, and limited access to healthcare persist. Climate change and rapid urbanization also affect vector behaviour and breeding patterns, hence complicating control efforts.[6] The RTS, S/AS01 malaria vaccine, or Mosquirix, marks a significant advancement in the fight against malaria, having received a positive scientific opinion from the European Medicines Agency and WHO recommendations for pilot implementation in selected African countries. The vaccine shows promise in reducing malaria episodes among children in high-burden areas, especially when used with existing preventive measures.[7]

In 2021, the WHO recommended the broader use of the

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malaria vaccine for children in areas with moderate-to-high transmission. The success of this vaccine depends on awareness, acceptance, and effective implementation, particularly among healthcare providers. Medical Doctors play a crucial role in shaping public perception and influencing healthcare decisions. Their attitudes toward the malaria vaccine can significantly affect its uptake, as they are often the primary contact for patients and responsible for administering vaccines and educating the public. Their support can determine community acceptance of this new intervention.[8,9] Since the introduction of malaria vaccines to sub-Saharan Africa, particularly Nigeria, few studies have examined the role of healthcare professionals, especially medical doctors, in promoting vaccine uptake. Understanding doctors' awareness, acceptance, and perceived barriers to the malaria vaccine is essential, notably in Benue State, which has a high malaria prevalence. Addressing this gap can help develop targeted awareness campaigns and training programmes to improve vaccine advocacy among healthcare providers. Consequently, this study aims to evaluate the awareness, acceptance, and perceived barriers to the malaria vaccine among doctors in Benue State. The objective therefore is to identify knowledge gaps and provide evidence-based information to stakeholders and policymakers in supporting the vaccine's integration into Nigeria's routine immunisation programme.

MATERIALS AND METHODS

Study Setting

A descriptive cross-sectional study design was used to assess malaria vaccine awareness and acceptance among doctors in Benue State, Nigeria. The study was conducted over one month between March and April 2025.

Study Population

The target population consisted of registered medical doctors who are practicing in both public and private health facilities in Benue State, Nigeria. According to the Benue State branch of the Nigerian Medical Association, there are approximately 600 qualified medical doctors across various specialities and cadres working in the state.

Sample Size Estimation

The sample size was calculated using the Modified Cochran's formula.[10]

$$n = \frac{n_0}{1 + \frac{n_0 - 1}{N}}$$

where n^0 = sample size computed by the Cochran formula, N = the size of the population = 600, n = sample size computed by the modified Cochran formula.

Therefore, Cochran's formula;

$n^0 = (Z^2p\ (1 - p) / E^2$, where 'Z' = Z- score =1.96 for 95% confidence interval, p' = estimated population proportion= 0.5, and 'E' = acceptable margin of error =5% =0.05

$n^0 = 1.96^2$ x 0.5 x (1-0.5) / 0.05^2 $n^0 = (3.8416 \times 0.5 \times 0.5) / 0.0025$

$n^0 = 0.9604 / 0.0025$, $n^0 = 384.16$, which is approximately 385.

Therefore, Modified Cochran's formula

$$n = \frac{385}{1 + \frac{385 - 1}{600}}$$ n = 234.76, which is approximately 235.

Therefore, the sample size = 235

Sampling Technique

A convenient non-probability sampling technique was used for the study. Participants were self-selected to be part of the study by responding to the online questionnaire. They were continuously encouraged to participate in the survey through constant reminders and pleas on the NMA Benue State branch WhatsApp platform. Permission was obtained from the association's leadership before posting it on the WhatsApp platform.

Research Instrument:

A questionnaire survey was prepared using a Google form, which was shared online with the doctors working in Benue State via the social media platform (WhatsApp) of the major (parent) associations of doctors in Benue State, Nigeria.

Study Procedure

This survey was conducted via an online social media platform among the doctors in Benue State. The questionnaire consisted of an informed consent section and demographic characteristics of the participants. The other parts were adapted from the research questions related to the study's aims and objectives.[11] The questions were grouped into sections: awareness of the malaria vaccine, acceptance of the malaria vaccine, and barriers towards malaria vaccine implementation and administration in Nigeria.

Data Analysis

The collected data were analyzed using the Statistical Package for the Social Science research version 26 (SPSS 26). Descriptive statistics were then conducted to determine the sociodemographic characteristics of the respondents. The level of doctors' awareness and acceptance of malaria vaccine and their willingness to recommend it, including the associated barriers, were assessed using univariate analysis

Ethical Considerations

Permission and approval to conduct the study were sought from the administrators (chairman and secretary) of the Nigerian Medical Association (NMA) Benue State chapter WhatsApp group. The confidentiality and anonymity of the collected data were maintained.

RESULTS

Table 1 below shows the socio-demographic characteristics of the study participants. The largest age group represented is 31-40 years, comprising 32 individuals (47.8%). A majority of the participants were male, 52 (77.6%). Additionally, the most common professional cadre among the participants was junior registrars, with 22 individuals (32.8%). Most participants, 38 (56.4%) held an MBBS degree as their highest qualification. Furthermore, a significant portion of the participants, 38 individuals (59.4%), were practicing in a teaching hospital.

Figure 1 shows the level of awareness of the malaria vaccine among respondents. A larger percentage, 65 (97%), had awareness. Figure 2 below shows the source of information about malaria vaccine among the respondents; the majority, 42 (62.7%), got the information from online sources/social media platforms. Figure 3 below shows the level of acceptance of the malaria vaccine among the

respondents. The majority, 61 (91%), showed readiness for the acceptance of the malaria vaccine. Figure 4 below shows the respondents' perceived concerns about the malaria vaccine. The majority of the respondents, 40 (59.7%), were worried about the safety and side effects of the vaccine.

Figure 5 below shows some perceived barriers to the malaria vaccine among the respondents. A larger proportion, 47 (70.1%), felt the topmost barrier to malaria was limited knowledge among healthcare professionals. Figure 6 below shows the cultural/societal factors that may affect the malaria vaccine in Benue State. Twenty-five (37.3%) of the respondents could not ascertain the type of cultural/societal factors that could affect malaria vaccine acceptance.

Table 1: Socio-demographic characteristics of respondents (N=67)

Variables	Frequency	Percentage (%)
Age groups		
20 – 30 years	9	13.4
31 – 40 years	32	47.8
41 – 50 years	19	28.4
[illegible]	7	10.4
Gender		
Male	52	77.6
Female	15	22.4
Cadre		
House Officer	2	3
Medical Officer	11	16.4
Senior Medical Officer	7	10.4
Junior registrar	22	32.8
Senior registrar	12	17.9
Consultant	12	17.9
Highest medical qualification		
MBBS	38	56.4
Post graduate eg MPH, Msc, PhD	16	23.9
Fellowship/Specialist certification	14	20.9
Others	6	9
Number of years of practicing medicine		
Less than 5 years	11	16.9
5-10 years	34	52.3
11-20 years	13	20
More than 20 years	7	10.8
Primary place of work		
Teaching hospital	38	59.4
General hospital	8	12.5
Private hospital/clinic	4	6.3
Primary health care centre	1	1.6
Non-governmental organization	1	1.6
Others	18	28.1

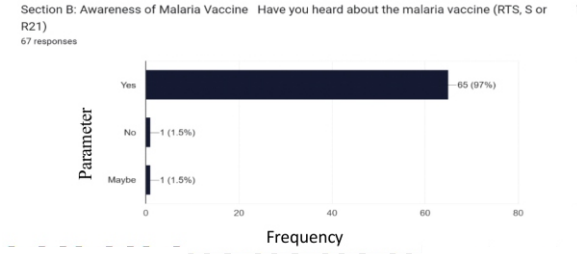

Figure 1: Levels of awareness of malaria vaccine among participants

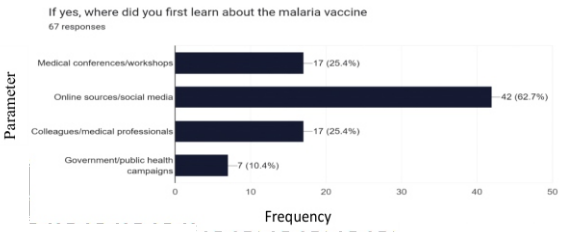

Figure 2: Participants' sources of information about the malaria vaccine

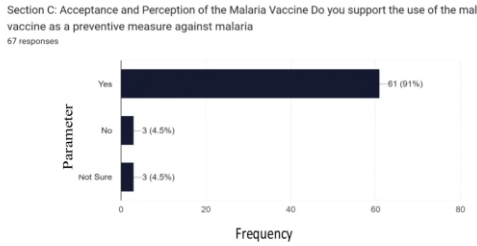

Figure 3: Level of acceptance of the malaria vaccine among the respondents

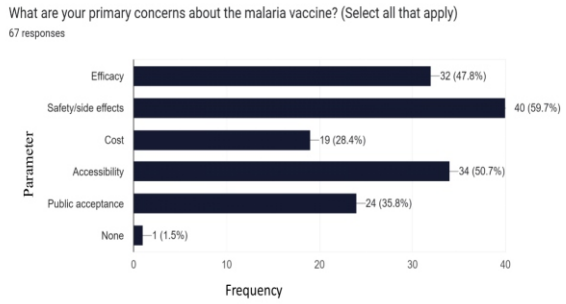

Figure 4: Respondents' perceived concerns about the malaria vaccine

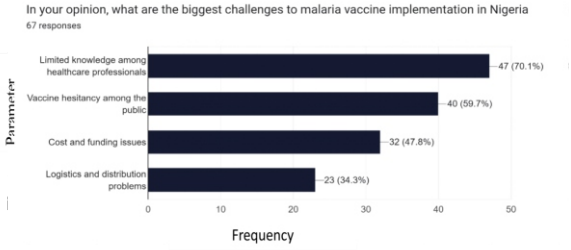

Figure 5: Perceived barriers to the malaria vaccine among the respondents

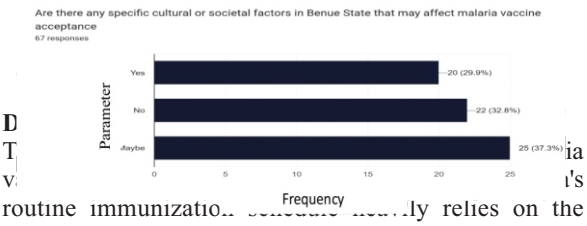

Figure 6: Cultural/societal factors that may affect malaria vaccine acceptance in Benue State

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routine immunization schedule heavily relies on the enforcement and advocacy of healthcare professionals.

This study aimed to assess the awareness, acceptance, and perceived barriers regarding the malaria vaccine among medical doctors in Benue State, Nigeria. The findings reveal a highly aware and accepting physician population, though significant concerns regarding vaccine safety, cost, and comprehensive clinical knowledge remain prevalent.

Awareness and Sources of Information

This study demonstrated an exceptionally high level of awareness of the malaria vaccine among the respondents, with 97% acknowledging its existence. This high awareness level is commendable and expected, given that the respondents are medical practitioners who are predominantly working in teaching hospitals (59.4%) and are generally expected to stay abreast of global health advancements. However, a critical finding is the primary source of this information. The majority of the doctors (62.7%) obtained their information via online and social media platforms, while only a mere 10.4% cited government or public health campaigns as their source. This highlights a significant gap in the formal dissemination of public health information by the Ministry of Health and primary healthcare boards. As noted by Nwokolo et al., while social media is a rapid tool for information sharing, it is prone to misinformation.[9] For a major public health intervention like the malaria vaccine, it is imperative that the government takes the lead in structured, evidence-based dissemination of information to healthcare providers.

Acceptance and Willingness to Prescribe

Despite relying on informal information sources, the acceptance rate of the malaria vaccine among the surveyed doctors was notably high at 91%. The majority expressed willingness to prescribe and recommend the vaccine to their patients. This serves as a positive sign for the upcoming rollout of the vaccine in Benue State and aligns with broader expectations for malaria-endemic areas.[7] Since doctors are primary influencers of health-seeking behaviour, their high acceptance rate is likely to lead to greater uptake among the general public. The trust patients have in their doctors can effectively reduce community hesitancy, which has historically been a challenge for new immunisation programmes in Nigeria.

Concerns and Perceived Barriers

Despite the high acceptance rate, the study identified substantial concerns that could impede successful implementation. More than half of the respondents (59.7%) expressed concern about the vaccine's safety and potential side effects. Furthermore, 70.1% identified "limited knowledge among healthcare professionals" as the primary barrier to implementation. This presents a fascinating paradox: while 97% of doctors are aware of the vaccine, they feel they lack the comprehensive clinical knowledge (such as efficacy rates, specific contraindications, and detailed side-effect profiles) needed to confidently administer it. This corroborates findings by Nnaji et al, who emphasized that superficial awareness does not equate to clinical competence regarding new vaccines.[11]

Additionally, 28.4% of the respondents raised concerns about the cost of the vaccine. In a resource-constrained setting like Benue State, out-of-pocket healthcare expenditure is a significant determinant of healthcare access.[12] If the vaccine is not heavily subsidized or provided free of charge through the National Programme on Immunization (NPI), cost will inevitably become a barrier not just for the patients, but for the doctors attempting to prescribe it.

CONCLUSION

Medical practitioners in Benue State demonstrate high awareness and acceptability of the malaria vaccine, establishing a strong foundation for its future roll-out. However, the reliance on social media for information, coupled with significant concerns about vaccine safety and a self-reported lack of in-depth clinical knowledge, underscores the need for immediate action. The government and relevant health ministries must transition from passive communication to active, structured educational campaigns tailored specifically for healthcare workers. Equipping doctors with comprehensive, evidence-based training will empower them to confidently advocate for the vaccine, address patient concerns, and ultimately reduce the devastating burden of malaria in Benue State.[13,14]

RECOMMENDATIONS

There is a need for further research work on malaria vaccine efficacy and its safety/side effects. Also, there should be more public health campaigns, conferences and workshops on malaria vaccines amongst health professionals. The malaria vaccine should be incorporated into the National Programme of Immunization (NPI), and hence made more affordable and accessible for the citizens, especially the vulnerable groups.

Furthermore, cultural/societal factors that can hinder the public acceptance of Malaria vaccines, as well as factors that can potentially infringe on effective malaria vaccine implementation in Nigeria, should be effectively addressed.

LIMITATIONS OF THE STUDY

The findings of this study should be interpreted in light of certain limitations. While the calculated sample size for the study was 235, the actual number of respondents was only 67. This low response rate, utilizing a non-probability convenience sampling technique via WhatsApp, introduces selection bias. The sample is heavily skewed towards younger, male practitioners (77.6%) with 5–10 years of experience, primarily located in teaching hospitals. Therefore, the views expressed may not adequately represent the perspectives of older practitioners, female doctors, or those practising in rural primary healthcare centres where the malaria burden is often most severe.

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CONTRIBUTION TO KNOWLEDGE

This study has contributed to the existing knowledge on

Malaria vaccines by demonstrating their awareness and acceptance amongst Benue doctors, identifying some of the primary concerns doctors have about the vaccines and some of the hindrances to Malaria vaccine implementation in Nigeria.

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Conflict of Interest

The authors declare that they have no competing interests.