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Research Article

Malaria Vaccine Introduction in Nigeria; Knowledge, Concerns and Acceptance Among Mothers of Under Five Children in Asaba, Nigeria

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Abstract

Background. Malaria remains endemic in Nigeria with a high burden of morbidity and mortality among children. Due to the high burden of morbidity associated with malaria, it has led to introduction of malaria vaccination. Despite this giant stride, it has faced several challenges. Aim of the study: The study is aimed at assessing the mother's knowledge, concerns and acceptance of malaria vaccine among mothers of under five children in Asaba. Methods. This is a cross sectional study that was carried out among 400 mothers attending immunization unit or antenatal clinic using a simple random method. A structured, pretested, self-administered questionnaire was used to collect the data. SPSS version 24.0 was used for data analysis. Statistical significance was set at p- value less than 0.05. Results. A total of 400 women participated in this study. The study revealed that 58.7% of the mothers have heard of malaria vaccine, with only 44.0% having a fair knowledge of the vaccine. Majority of the mother 44.7% got their information from a health worker. Most of the concerned raised by the mothers were the fear of side effect (44.0%) while only 36.8% of the mothers were willing to vaccinate their children with malaria vaccine. Conclusion. For effective introduction of malaria vaccine as part of the routine immunization program in Nigeria, dedicated effort must be made by all stake holders in ensuring timely dissemination of information on the importance and need for malaria vaccine as this will aid it acceptability by the populace.

Keywords

Malaria, Vaccination, Mothers

1. Introduction

Malaria is a parasitic infection that spread to humans through the bites of infected female Anopheles mosquitoes. Malaria is prevalent in Nigeria and poses a significant public health concern due to the high morbidity and mortality attributed to it [1]. In 2021, 247 million malaria cases and 619,000 estimated malaria deaths were reported worldwide [2]. The African region bears 95% and 96% of the cases and death, respectively, and under-5 children bears 80% of ma-

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laria death in the region [2]. Nigeria (31.3%), the Democratic Republic of Congo (12.6%), the United Republic of Tanzania (4.1%), and Niger (3.9%) bear more than half of the burden of malaria worldwide [2]. According to Nigeria National malaria indicator survey (NMIS), malaria account for 25% of infant mortality and 30% under-5 mortality. Approximately 110 million clinically diagnosed cases of malaria nearly 300,000 malaria related childhood death occurs yearly in Nigeria [3].

Several approaches has been instituted to curd this problem such as: insecticide-treated nets (ITNs), indoor residual spraying (IRS), chemoprevention, environmental modifications and antimalarial drugs, yet the burden of malaria associated death in Africa and Nigeria still remains high hence the need for additional interventions. One of such interventions is malaria vaccination, which has been identified as key in the fight against malaria [4]. The development a malaria vaccine has been challenging, complicated by the inherent complexity of the Plasmodium parasite's life cycle and its diverse antigenic characteristics [5]. Despite all these challenges, there appears to be light at the end of the tunnel.

Currently, two vaccines the RTS,S/AS01 and R21/Matrix-M has undergone large scale clinical trials and have been recommended by the Word Health Organization (WHO) for use in regions with moderate to high p. falciparum transmission. RTS,S is the first recommended vaccine for malaria and acts against *P. falciparum* [2, 6]. Following RTS,S/AS01 trial, report showed that malaria cases dropped by more than half within 12 months and by 40% after four years of follow up [2, 6]. Following administration of more than 1.5 million children at the risk of malaria in 3 African countries (Ghana, Kenya and Malawi) in 2021, finding from the study showed that RTS is safe and effective and significantly reduce the incidence of severe malaria cases and child death due to malaria. On April 2023, the Nigerian Government became the second African country after Ghana to approve the malaria vaccine R21/Matrix-M for possible introduction into the routine national immunization program in 2024. In Nigeria, trust has been poor between government and the populace, hence the critical factor in the success of vaccine implementation is the community acceptance.

To the best knowledge of the authors, no such work has been done in this region of the country. Hence this study is aimed at assessing the awareness and acceptability of malaria vaccine among care givers of under-5 children in Asaba, south-south Nigeria. The information from this study will not only generate timely data before the official introduction of the malaria vaccine into the routine immunization programme but will help in policy making that will aid the smooth and seamless introduction of the vaccine in Nigeria as part of routine immunization schedule for children.

2. Subjects and Method

Study setting

The study was carried out in Asaba specialist hospital, Asaba, Delta state. The hospital is the one of the government owned tertiary center. It provide services to about ten million residence in about three states. The hospital offers free antenatal and free delivery to pregnant women and also offers free immunization and treatment to all children less than five years.

Study design, Study population and Sample size Determination

It is a cross sectional descriptive study that was conducted between May and June 2024. Inclusion criteria were mothers with children less than five years who gave their consent while mother who did not give their consent were excluded.

A simple random sampling method was used to recruit the participants. The study population were women who came for routine antenatal visit, route immunization visit or those who brought their children for under five children clinic.

Using the formula for calculating sample size in a cross sectional study, a minimum sample size of 323 participants were calculated for the study at 95% confidence interval and a 30% projected uptake of malaria vaccine. Four hundred (400) questionnaires were subsequently administered by trained research assistant to respondents for this study.

Statistical Analysis

Data was entered analyzed using Statistical Package for Social Science (SPSS) version 23. The results were presented in form of frequency tables, bar charts and cross tables. Statistical inference were performed using chi-square test. Statistical significance was defined as p-value < 0.005.

Ethical consideration

Ethical approval was sought and obtained from the Ethics Committee of Asaba Specialist Hospital and approval was granted in April 2024. Informed consent was obtained from every mother participating in the study before administration of the questionnaire. Privacy and confidentiality were also maintained throughout the process of data collection.

Study instrument

A pretested semi-structured, interviewer-administered questionnaire was used tom elicit information from the respondents. The questioner was divided into two sections, namely.

(1) respondents' socio-demographic characteristics, including age, occupation, and marital status;

(2) respondent's awareness, concerns and acceptability of malaria vaccine. Confidentiality was maintained throughout the study.

3. Results

Table 1 show the socio-demographic characteristics of the subjects. A total of 400 mothers were studied, majority of the women (55.3%) were aged 20-29 years, 94.3% were married, 75.8% are self-employed, 62.0% had tertiary level of education, 71.8% are of low income status, 62.0% reside in urban area while 94.6% are of Christian faith.

Table 1. The socio-demographic characteristics of the subject.

Age (years)	Frequency (N)	Percentage (%)
20-29	220	55.0
30-39	159	39.7
40-49	8	2.0
>50	13	3.3
Marriage		
Married	377	94.3
Single	9	2.2
Separated	2	0.5
Widowed	12	3.0
Occupation		
Government employed	64	16.0
Self employed	304	76.0
Unemployed	18	4.5
Student	5	1.2
House wife	9	2.3
Education		
Primary school	17	4.3
Secondary school	135	33.7
Tertiary school	248	62.0
Income		
Low	295	71.8
Middle	100	24.3
High	5	1.2
Residence		
Urban	255	63.7
Semi-urban	83	20.7
Rural	62	15.6
Religion		
Christian	389	97.3
Islam	10	2.5
Traditionalist	1	0.2
No of children		
0-2	185	46.2
3-4	116	29.0
5-6	68	12.0
7-8	31	7.8

Table 2 shows the mothers knowledge of malaria vaccination and source of the information. The table showed that only 58.7% of the responder have heard of malaria vaccine of which only 31.8% had good knowledge of malaria vaccine. Most of the responders (44.7%) heard about the malaria vaccine through health workers.

Table 2. Knowledge and source of malaria vaccination.

Have heard of malaria vaccination	Frequency (n)	Percentage (%)
Yes	235	58.7
No	165	41.2
Source of information		
Television/ Radio	80	20.0
Social media	98	24.0
Health workers	179	44.7
Other	43	10.7
Rate your knowledge about malaria vaccination		
Excellent	35	8.7
Good	127	31.8
Fair	176	44.0
Very poor	62	15.5

Table 3 shows that the fear of side effects 44.0% was the major concerns for most mothers followed by the safety profile (20.5) of the vaccine. Only 36.8% of the mothers were willing to vaccinate their children with malaria vaccine while 52.3% were not willing to vaccinate their children with malaria vaccine.

Table 3. Concerns and willingness of mothers to vaccinate their children.

Concerns of mothers regarding malaria vaccine	Frequency	Percentage
Side effects	176	44.0

Concerns of mothers regarding malaria vaccine	Frequency	Percentage
Safety	82	20.5
Cost	58	14.5
Effectiveness	34	8.5
Accessibility	30	7.5
Lack of information	22	5.5
Willingness to vaccinate		
Yes	147	36.8
No	209	52.3
Undecided	44	11.0

Table 4. The relationship between the socio-demographic variable and the willingness to vaccinate their children.

Demographic	Willingness to vaccinate				
	Yes (%)	No (%)	Undecided (%)	χ^2	p-value
Age (years)					
18-29	79 (35.9)	123 (55.9)	18 (8.2)	92.39	< 0.000*
30-39	65 (40.4)	82 (50.9)	14 (8.7)		
40-49	3 (50.0)	3 (50.0)	0 (0.0)		
>50	0 (0.0)	1 (7.7)	12 (92.3)		
Marriage					
Married	131 (34.7)	202 (53.6)	44 (11.7)	20.07	0.003*
Single	5 (55.6)	4 (44.4)	0 (0.0)		
Separated	0 (0.0)	2 (100)	0		
Widowed	11 (91.7)	1 (8.3)	0		
Education					
Primary	7 (41.2)	10 (58.8)	0	5.09	0.53
Secondary	47 (34.1)	74 (53.6)	17 (12.3)		
Tertiary	93	125	27		
Income					
Low	115 (38.9)	141 (47.6)	40 (13.5)	14.56	0.006
Middle	30 (30.3)	66 (66.7)	3 (3.0)		
High	2 (40.0)	2 (40.0)	1 (20.0)		

*significance P < 0.005

4. Discussion

Malaria still remain one of the major causes of morbidity and mortality among children in Africa and in Nigeria. Several interventions has been introduced to reduce the burden of this problem among which is the recently introduced malaria vaccination. Since the recent introduction of malaria vaccine

into Nigeria, this has generated lots on concerns and apprehension among mothers and even health care workers.

This study showed that 58.75% of the subjects have heard of malaria vaccination. This finding shows an improvement in earlier studied on the mother's knowledge of malaria vaccination in Nigeria. Alagbe et al in North central [7], Nigeria reported the awareness of malaria vaccination among mothers to be 23.7%. Ajayi and Emeto [8] reported 40.3% while Musa-Booth et al [9] documented 30% among mothers in Abuja, Nigeria. This finding indicate that over the years the information on malaria vaccination has continue to spread and reaching the mothers. However, the level of awareness of the malaria vaccination is still low and raises a lot of concerns considering that the Nigerian government has recently introduced this as part of the routine immunization program for all children. This finding highlight the need for continuous sensitization on malaria vaccination as most of the responders reported that they only have a fair knowledge of malaria vaccine.

The main source of information about malaria vaccine in this study were health workers (44.7%) followed by social media (24.0%) and Television/ Radio (20.0%). This finding highlight the importance the health care workers play in timely and accurate disseminations of health related information. The above finding is similar to what was reported by Olowokure et al [10] in which the critical role of health care workers in dissemination of health related information was noted. In addition, this study highlight the powerful role social-media plays in this age and time in information dissemination. This is worthy of note as most of the younger mother have access to social media and communicate with a larger number of people. Social-medial could be a veritable tool that could be used to reach out to larger number of mothers of the importance of malaria vaccination.

The study showed that the mothers are more likely to accept malaria vaccine if they are recommended by the doctors. This shows the critical role of doctors and other health workers in promoting vaccine acceptance. This finding is similar to what has been reported by Dube at al [11] in Kenya who showed that parents are more likely to accept vaccination when recommended by health care worker. Trust is always build by patient. Doctors and other health care workers play a vital role in promoting vaccine awareness, increasing uptake and sustained public trust.

The study showed that only 36.8% of the responders were willing to vaccinate their children with malaria vaccine. This low willingness to accept malaria vaccine has also been reported by Asmare et al [12] in south west Ethiopia. This finding could be attributed to previous experiences with vaccination. In addition only 44% of the women had a fair knowledge of malaria vaccine. This low knowledge of malaria vaccine could be responsible to the vaccine hesitancy experienced by the mother. This finding is in contrast to studies by Ajayi and Emeto [8], Chinwa et al [13] and Alagbe et al [7] who reported a high acceptance rates of 91.9%, 92.9% and 97.7% respectively. The observed difference could be attributed to socio-demographics of the subjects and recent disinformation on malaria vaccination.

The major concerns for most of the mothers were the fear of side effects. Similar concerns were observed in a study by Alegbe et al [7] and onyejekwe et al [14] where the fear of adverse effect was the major reason for rejecting malaria vaccination. Health education through the health workers, social media and television/Radio station on the malaria vaccine will go a long way in removing the fear from the populace. It has been shown by Goldstein et al that tailored educational interventions help to effectively reduce vaccine hesitancy.

The study showed that younger mothers, mothers who are employed, and mothers with tertiary level of education are more likely to accept malaria vaccination. This finding shows the impact of education and economic power plays in health decision making of the mothers. This observation has also been reported by Adedini et la [15] and Musa et al [16]. When mothers are educated and financially empowered they are more likely to accept new innovations such as malaria vaccination.

5. Conclusion

There is low awareness of malaria vaccine among the mothers. There is low wiliness of the mothers to accept malaria vaccine while the major concerns of the mothers was the fear of side effects.

6. Recommendation

Effective educational campaigns involving the health workers with active use of social medial as a tool.

Abbreviations

NMIS	Nigeria National Malaria Indicator Survey
ITN	Insecticide-treated Nets
IRS	Indoor Residual Spraying

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Author Contributions

Obinna Chinedu Ajaegbu: Conceptualization, Formal analysis, Supervision, Visualization, Writing – original draft, Writing – review & editing.

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Nkemjika Emmanuel Mbagwu: Methodology, Validation, Investigation.

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Conflicts of Interest

The authors declare no conflicts of interest.

References

[1] World Health Organization. World malaria report: 20 years of global progress and challenges. 2020. https://www.who.int/publications/i/item/9789240015791

[2] WHO. World malaria report 2022. Geneva: World Health Organization; 2022.

[3] National Malaria Elimination Programme (NMEP), National Population Commission (NPopC), National Bureau of Statistics (NBS), and ICF International. Nigeria Malaria Indicator Survey 2015. Abuja, Nigeria, and Rockville, Maryland, USA: NMEP, NPopC, and ICF International. 2016 [Cited 2020 July 17]. Available from: https://dhsprogram.com/pubs/pdf/MIS20/MIS20.pdf

[4] Kanoi BN, Maina M, Likhovole C, Kobia FM, Gitaka J. Malaria vaccine approaches leveraging technologies optimized in the COVID-19 era. Front Trop Dis. 2022. https://doi.org/10.3389/fitd.2022.98866

[5] Etefia E, Etoh PI. Malaria vaccine development: challenges and prospects. Med Pharm J. 2023; 2023: 28-42 https://doi.org/10.55940/medphar20225

[6] WHO. First malaria vaccine in Africa: a potential new tool for child health and improved malaria control. Geneva, World Health Organization, 2018. https://www.who.int/malaria/publications/atoz/first-malaria-vaccine/en Accessed August 13 2022.

[7] Alagbe OO, Iliya Rs, Rotimi B, Solomon A. awereness, perceptions and willingness to accept malaria vaccine for children under age 5 among mothers in Nortcentral Nigeria: a cross sectional study. BMJ Open 2025; e091739.

[8] Ajayi and Emeto Malaria Journal (2023) 22: 329. https://doi.org/10.1186/s12936-023-04768-z

[9] Musa-Booth T, Enobun B, Agbomola A, Shiff C. Knowledge, attitude and willingness to accept the RTS, S malaria vaccine among mothers in Abuja. Nigeria Ann Afr Med Res. 2021; 4: 1. https://doi.org/10.4081/aamr.2021.128

[10] Olowokure B, Erinoso SO, Ajayi O. Parental perceptions and willingness to vaccinate children against malaria in Ibadan, Nigeria. Vaccine (Auckl) 2019; 37: 7036-43.

[11] Dubé E, Gagnon D, MacDonald NE, et al. Strategies intended to address vaccine hesitancy: Review of published reviews. Vaccine (Auckl) 2015; 33: 4191-203. https://dx.doi.org/10.1016/j.vaccine.2015.04.041

[12] Asmare G. Willingness to accept malaria vaccine among caregivers of under-5 children in Southwest Ethiopia: a community based cross-sectional study. Malar J 2022; 21: 146. https://doi.org/10.1186/s12936-022-04164-z

[13] Chinawa AT, Ossai EN, Onukwuli VO, Nduagubam OC, Uwaezuoke NA, Okafor CN, Chinawa JM. Willingness to accept malaria vaccines amongst women presenting at outpatient and immunization clinics in Enugu state, Southeast Nigeria. Malar J. 2024 Apr 25; 23(1): 117. https://doi.org/10.1186/s12936-024-04914-1

[14] Onyejekwe O, Afolabi AA, Eze G. Factors influencing the uptake of childhood immunization in Enugu, Nigeria. J Public Health Epidemiol 2016; 8: 193-203. 14. https://doi.org10.1136bmjopen-2024-091739

[15] Adedini SA, Odimegwu C, Bamiwuye O, Fadeyibi O, De Wet N. Barriers to accessing health care in Nigeria: implications for child survival. Glob Health Action. 2014 Mar 14; 7: 23499. https://doi.org/10.3402/gha.v7.23499

[16] Musa S, Umar Makarfi H, Abayomi Olorukooba A, et al. Awareness, perception and acceptance of malaria vaccine among women of the reproductive age group in a rural community in Soba, Kaduna State, North-west Nigeria. KJMS 2022; 16: 32-42. https://doi.org/10.36020/kjms.2022.1601.004