Original Article

ACCEPTANCE OF MALARIA VACCINE BY A RURAL COMMUNITY IN NIGERIA

[1]Ughasoro, Maduka D, [1] Bisi-Onyemaechi, Adaobi I, [1]Okafor, Henrietta U.
[1]Department of Paediatrics, College of Medicine,
University of Nigeria Enugu Campus, Enugu, Nigeria

ABSTRACT

Background: Introduction of malaria vaccine is imminent. This study evaluated the prevalence of malaria among a non-febrile population and their willingness to accept a malaria vaccine.

Methods: This was a cross-sectional, community-based study done in a rural community in south east Nigeria. A total of 156 household heads were interviewed using a structured questionnaire. The questionnaire was pre-tested before commencement of the study to correct ambiguity.

Results: Majority (78.2%) acknowledged that malaria is the commonest illness in the community, while 55.1% believed that presumptive treatment is the best malaria preventive measure. Most (98.7%) of the study participants immunized their children against childhood vaccine preventable diseases, while 91.6% would be willing to accept a malaria vaccine. The prevalence of malaria parasitaemia among non-febrile respondents was 35.4% and the use of mosquito nets was 17.9%.

Conclusion: The high prevalence of malaria among non-febrile populations, the practice of presumptive treatment of unconfirmed fever as malaria preventive measure and the low use of bed nets, points that it is time to introduce malaria vaccine. The high willingness to receive the vaccine is positive to the introduction of the vaccine.

Keywords; Acceptance; Malaria, Vaccine, Nigeria,

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INTRODUCTION

The high malaria- associated morbidity and mortality existing in Nigeria and other sub-Saharan African countries does not reflect the huge investment already made in malaria control and eradication.[1-3] Prominent in the Roll-Back-Malaria strategies are use of appropriate anti-malaria drugs to treat confirmed cases of malaria and use of long-lasting-insecticide-treated bed nets (LLINs).[4,5] Unfortunately, malaria indices have continued to fall short of targets and most countries are still at control or pre-elimination stage.[6]

In an attempt to improve malaria control, introduction of more effective interventions are expected in the near future. The introduction of malaria vaccine is almost at the threshold, considering the reports of successes recorded in the different stages of clinical trials of the vaccine.[7,8]

However, two things are required for the introduction of any new intervention: evaluation of how the existing interventions have fared, and conceptualizing the local social determinants that can either facilitate or militate against the success of the new intervention.[9,10] The latter is particularly important since different localities, have their peculiarities and interventions should be designed considering local scenarios. Although, introduction of new vaccines in Nigeria have not really met acceptance challenges, but it will be an over assumption not to evaluate the acceptance of different

Correspondence to: Ughasoro, Maduka D
Senior Lecturer & Consultant Paediatrician,
Department of Paediatrics, College of Medicine,
University of Nigeria Enugu Campus, Enugu, Nigeria
Email: maduka.ughsoro@unn.edu.ng; kakaatitis@yahoo.co.uk

communities towards malaria vaccine. The acceptance can be improved if the intervention is designed to address local barriers existing in diverse populations and communities. Evaluation of the malaria prevention practices and community acceptance of malaria vaccine are very relevant in the introduction of malaria vaccines. Though studies have reported favourable disposition towards malaria vaccine, there is dearth of such reports in Nigeria.[7,8] This study, therefore, aimed to evaluate the malaria preventive practices and acceptance of malaria vaccine in a rural community. Understanding the community practices, especially rural communities and their disposition towards new malaria vaccines, will be useful in the design of the intervention.

MATERIALS AND METHODS

Study Area

The study was conducted in Mgbogodo, a rural community in Nkanu West Local Government Area in Enugu, south east Nigeria. Majority of the residents are Ibos and Christians with a literacy rate of 65% higher than the national average of 59.6%.Farming and commerce are their main economic activities and there is also a primary health care centre located in the community. The population of Enugu is 3.2 million and average temperature of 26.3 degrees Celsius with annual rainfall of 1730 mm.[11]The vegetation is mainly tropical rain forest and malaria is holoendemic in the region. Residents are mainly farmers and traders. The source of healthcare is mainly patent medicine vendors and primary health care (PHC) facilities.

Study design

This was a descriptive, cross-sectional, quantitative, community-based study. A multi-staged sampling method was employed. The participating community was randomly selected from a sampling frame of other rural communities that have PHC centres. The households in the community were enumerated and those that participated in the study were randomly selected from the list of the households. Members of the selected households were advised to visit the health centre for recruitment into the study.

Data collection

The bio-demographic data was collected using a pre-tested, structured, interviewer-administered questionnaire. The questionnaire was developed by the researchers and tested to remove any ambiguity and ensure that the set objectives would be achieved. Information on the age of the respondents, education, occupation, and household size, were collected. Also information on history of previous illnesses and health-seeking behaviour, their malaria prevention practices and their acceptability of and willingness to pay for malaria vaccine and the amount they were willing to pay was documented.

Blood samples were taken under aseptic conditions: the skin of the left 4th finger was cleaned with a cotton ball soaked in 1% alcohol solution. The phlebotomist gloved with sterile latex gloves, pricked and wiped the first drop of blood with dry sterile cotton. Blood was taken using a pippette and transferred to the well, for malaria rapid diagnostic test kit. The results were subsequently documented in the questionnaire.

Data analysis

The frequencies of the discrete variables like educational status, occupation, religion and their responses to questions were computed and the mean and standard deviation of quantitative variables (age of mothers, and amount they were willing to pay for the malaria vaccine) was generated. The frequencies and percentages were calculated. The Nigerian currency (naira) was the unit used for all the estimation, but was later converted to United States of America

Dollars (USD) at the 2016 official exchange rate of 310 naira for one dollar.

Ethical consideration

The University of Nigeria Teaching Hospital, Ituku-Ozalla, Health Research and Ethics Committee gave the approval for the study. Written Informed consent was obtained from the respondents before being recruited in the study. A venepuncture was performed by a phlebotomist and a microliter of blood was collected with a pipette and drop place on malaria rapid diagnostic kit. Children who were found to have positive malaria parasitaemia were given appropriate antimalarial drug.

Consent for publication: All the authors reviewed and gave consent for the article to be submitted for publication.

Availability of data and materials: The data that generated the results which are presented in this article can be made available once the need arises.

Competing interests: There is no conflict of interest declared by any of the authors.

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RESULTS

The mean (SD) age of the respondents was 43.44 (19.25) years and majority 106 (67.9%) were female (see Table 1). Half, 78 (50.0%) of the mothers had no formal education and most 85 (55.5%) of them participate in health related decision taking. Most, 122 (78.2%) of the respondents believed that malaria was the commonest illness in their community (see Table 2). Majority 86 (55.1%) treat for malaria once they are ill.

Similarly most 153 (98.7%) believed that vaccines are effective and 154 (99.3%) were willing to vaccinate themselves and their children if there is malaria vaccine (see Table 3). Only 10 (6.6%) expressed concern about any new malaria vaccine. Those who were willing to pay for the vaccine were 76 (91.6%).

The prevalence of positive malaria parasiteamia among non-febrile respondents was 218 (35.4%) (See Table 4). %). Few 110 (17.9%) slept under insecticide treated mosquito net the previous night.

Table 1: Socio-demographic characteristics of respondents

Variables	Frequency n=156	%
Age in years		
Mean (SD)	43.44 (19.25)	
Gender		
Female		
Male	106	67.9
Household Size	50	32.1
Mean (SD)		
Educational Status	5.78 (2.37)	
Mother		
No Formal Education	78	
Primary	31	50.0
Secondary	41	19.9
Tertiary	6	26.3
Father		3.8
No Formal Education	55	
Primary	38	35.3
Secondary	56	24.3
Tertiary	7	35.9
Occupation		4.5
Wife (n=130)		
Business	62	
Farming	31	47.7
Unemployed	12	23.8
Civil servant	15	9.2
Others	10	11.6
Husband (n=125)		7.7
Farmer	41	
Business	33	32.8
Wine Tapper	18	26.4
Driver	15	14.4
Civil servant	11	12.0
Driver/Security Man/ Carpenter/Mason	7	8.8
Religion (n=120)		5.6
Christian	99	
Traditional	20	82.5
Islam	1	19.7
Are you the Decision marker on Health related issues? (*n=148*)		0.8
Yes I am (wives)	51	
No it is my spouse (husbands)	63	34.5
Both of us take the decision (husband and Wife)	34	42.5
		23.0

Table 2: Malaria prevention practices by the respondents

Variables	Frequency n=156	%
Which illness is most common in your locality?		
Malaria	122	78.2
Typhoid Fever	21	13.5
Catarrh	8	5.1
Fever	4	2.6
Diarrhoea	1	0.6
Which measures do you take to prevent Malaria?		
Take medication once ill	86	55.1
Sleeping under mosquito net	36	23.1
Keeping Environment clean	32	20.3
Immunization	1	0.5
How often do you have unconfirmed Malaria illnesses in a year? (n=77)		
2 times	28	36.4
3 times	35	45.5
4 times	4	5.1
5 or more times	10	13.0

Table 3: Perception of vaccines and their willingness to accept malaria vaccine

Variable	Frequency n=155	%
Were your children immunized? (n=155)		
Yes	153	98.7
No	2	1.3
Are Vaccines effective in preventing targeted diseases? (n=155)		
Yes	151	97.4
No	1	0.6
Don't know	3	2.0
If there is vaccine for malaria prevention would you receive it?		
Yes	154	99.3
No	1	0.7
Will you be discouraged, if the vaccine is injectable?		
Yes	2	1.3
No	153	98.7
Do you have any fear for the new Vaccine? (n=152)		
Yes	10	6.6
No	142	93.4
Will you be willing to pay to receive the vaccine? (n=83)		
Yes	76	91.6
No	7	8.4
The mean (SD) amount willing to pay for the vaccine?	448 (221)	

Table 4: Malaria rapid diagnostic test results

Malaria Test Result	Frequency n=616	%
RDT Positive	218	35.4
RDT Negative	398	64.6
Febrile state of those tested with mRDT		
Febrile	20	3.2
Non-Febrile	596	96.8
Did you Sleep under Mosquito net last night? (n = 616)		
Yes	110	17.9
No	506	82.1

DISCUSSION

Most rural community populations practice presumptive treatment of most febrile illnesses as malaria and this is similar to what has been reported.[12-14] These treatments are often inappropriate or substandard. This practice is facilitated by frequent stock-out at the health facilities, prolonged waiting time before consultation at the hospitals, cost of illness and lack of proximity of the health facilities to the their homes.

Many do not sleep under treated mosquito nets and this also is not uncommon.[15,16] The ultimate outcome of LLINs intervention is to improve the number of people that sleep under mosquito net. Unfortunately increasing the coverage of mosquito net usage of households does not necessarily translate to the protection of household members especially children.[15] Despite emerging evidence that LLINs and Indoor-residual spray (IRS) are cost-effective malaria vector control tools and combining the two interventions can be both synergistic and antagonistic, depending on combination strategy being deployed in the locality.[17-19] Thus the need to deploy malaria vaccine which has been shown to be efficacious and safe. Furthermore, if the World Health Organization (WHO) eventually introduces the vaccine for widespread use, there is still uncertainty on what the uptake would be. The issue of uptake is very important, since the malaria vaccine would be ineffective against malaria if the children did not receive four doses spread out over 18 months. [20] This highlights the importance of evaluating the willingness of the population to receive the vaccine. Fortunately, this study revealed that majority were willing to take the malaria vaccine when introduced. A similar finding was reported by Ojakaa *et al* on malaria vaccine, and Ughasoro *et al* in the introduction of other vaccines.[21-22] This acceptance to vaccinate was supported with relative high proportion of the respondents that were willing to pay for the malaria vaccine, similar to what Ughasoro *et al* and Tagbo *et al* had reported.[10,22] The impressive willingness to pay for the vaccine is a good indicator of the sustainability of the intervention should the vaccine not be publicly funded or the funding withdrawn in future. Since the vaccine has not been deployed yet and the market price not yet known, it is not possible to relate the mean amount the respondents are willingly to pay to the market price.

Emphasis in the tropics has always been on prevalence of malaria parasiteamia among febrile patients.[23,24] This is due to relatively high endemicty of malaria, thus making testing of non-febrile populations for malaria cost-ineffective and not routinely done. This study revealed a relatively large proportion of non-febrile populations that are positive to malaria parasiteamia. This gives insight to the huge population of carriers that will continue to sustain the malaria transmission. A malaria vaccine will help to reduce this population and facilitate elimination in the region.

CONCLUSION

In conclusion, the high prevalence of malaria among non-febrile populations, the practice of presumptive treatment of unconfirmed fever as malaria preventive measure and the low use of bed-nets, underscores that it is time to introduce malaria vaccine. The resultant high willingness to receive the vaccine is positive to the introduction of the vaccine.

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