

Assessment of Use of National Guidelines for Malaria Case Management among Pediatric Resident Doctors Attending an Update Course in Benin City, Nigeria

Damian U. Nwaneri, Ayebo E. Sadoh, Michael O. Ibadin

Institute of Child Health and Department of Child Health, University of Benin and University of Benin Teaching Hospital, Benin City, Edo State, Nigeria

Abstract

Introduction: The National Malaria Guideline is a veritable tool for appropriate case management of malaria. Whether the pediatric residents who are the primary caregivers of children know and make use of this guideline in their routine practice is not yet assessed. **Aim:** The aim of the study is to assess the awareness of the Nigerian pediatric residents of the national guidelines for malaria case management (including antimalarial prescription for uncomplicated and severe malaria). **Settings and Design:** The descriptive study carried out during the 2017 National Postgraduate Medical College of Nigeria, Faculty of Paediatrics Update Course in Benin City. **Subjects and Methods:** Data were obtained using a self-administered questionnaire which was given to all pediatric residents who participated at the update course and who had given written informed consent. **Statistical Analysis Used:** The statistical analysis was done using the Statistical Package for the Social Sciences version 16.0 (Inc., Chicago, Illinois, USA). **Results:** Of the 108 participants whose questionnaires were analyzed, 75.0% were Part 1 candidates and 25.0% Part 2 candidates; mean age 34.0 ± 4.5 years (range 26–51 years) and 42 (39.0%) males while 66 (61.0%) were female. Ninety-four (87.0%) were aware of the current national guidelines for management of malaria and 45 (41.7%) had read the guidelines. Correctness of prescription was obtained from 39 (36.0%) respondents in uncomplicated malaria cases and 44 (40.7%) in severe malaria cases. This finding did not significantly associate with the years of practice, level of practice, practicing institutions, awareness, and reading of the national guideline. **Conclusions:** Most pediatric residents have not read nor use the national guidelines for management of malaria which reflected in poor prescription pattern of antimalarial drugs in routine practice.

Keywords: Antimalarial, malaria, national guidelines, pediatric residents

INTRODUCTION

Malaria is still a major cause of morbidity and mortality in children,¹ with high disease burden in Sub-Saharan Africa.^{1,2} The key initiative in the fight against malaria was the Roll Back Malaria Initiative (RBMI), founded in 1998 by the World Health Organization (WHO), the United Nations Development Programme, the United Nations Children's Fund, and the World Bank, in an effort to provide a coordinated global response to the disease.² The main focus of the RBMI was to forge consensus between key actors in malaria control including health-care providers, harmonized action plan/malaria control strategies, as well as mobilize resources to fight malaria in endemic countries.^{1,3} The RBMI also aimed at strengthening existing strategies of early malaria case detection, making correct/appropriate diagnosis, and instituting

timely treatment of all malaria cases using appropriate antimalaria drugs. The RBMI emphasized on harmonized tools for management and control of malaria at all levels of health care (primary, secondary, and tertiary).⁴ Since the advent of RBMI, there have been series of training and retraining of health-care providers at different levels (primary, secondary, and tertiary health institutions) on the case management of malaria using harmonized materials such as the guidelines for

Address for correspondence: Dr. Damian U. Nwaneri, Institute of Child Health, University of Benin, P.M.B 1154, Benin City, Edo State, Nigeria.
Email: uchechukwu.nwaneri@uniben.edu; damiannwaneri@yahoo.com

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case management of malaria.^{5,6} However, whether health-care providers avail themselves of the availability and use of these tools in their routine practice is not known. The highest level of care for children for all types of illnesses is provided by pediatricians.⁷ The pediatric residents (pediatrician in training); however, form the bulk of primary health-care providers to children in Nigeria.⁷ These health-care providers are still in training and are expected to have been exposed to information and trainings on management of common childhood diseases.⁸ Whether this is so, has not been evaluated in the country. A nation-wide survey conducted in Ghana by Abuaku *et al.* in 2005 showed that only 9.8% antimalarial drug prescription by health care providers were correct.⁹ The drawback of this study is that it was conducted nearly 15 years ago when chloroquine was the drug treatment of choice for uncomplicated malaria. Other available literature across Nigeria and Africa in general mostly assessed the pattern of prescription among health-care providers without assessing the correctness of prescription for malaria treatment.¹⁰⁻¹⁵ Some of the studies were retrospective and only showed types of drugs prescribed.^{5,6,13-15}

This study, therefore, aimed at assessing the awareness of the Nigerian pediatric residents of the national guidelines for malaria case management, including antimalarial prescription practices for management of uncomplicated and severe malaria. The findings from this study could identify gaps in the implementation of RBMI harmonized malaria case management tools as well as give insight on whether there is the need to offer continuous medical education on malaria case management for pediatric residents in Nigeria Health Institutions.

SUBJECTS AND METHODS

This study was carried out during the 2017 National Postgraduate Medical College of Nigeria, Faculty of Paediatrics Update Course. The Update Course usually takes place between February and March every year at the University of Benin Teaching Hospital (UBTH), Benin City, Nigeria. It is usually a 2-week intensive course that covers most common childhood diseases and their management. Appropriate case management of malaria has been part of the course curriculum in the last 5 years.

Respondents or participants were pediatric residents drawn from accredited training health institutions for pediatrics in Nigeria. It involved total sampling of all participants who had given written informed consent. For the 2017 Update Course, a total of 150 (98 Part 1 and 52 Part 2) candidates participated. Of the 150 that participated in the course, 108 gave written informed consent, and all these returned completed questionnaire (giving a response rate of 100.0%).

The study is a descriptive cross-sectional one. Method of data collection was by self-administered questionnaire distributed to the study participants during the course. The questionnaire had been pretested by administering it to medical doctors who practice in primary health-care centers and general hospitals. Key information sought using the questionnaire included malaria

case definition, causes, symptoms and signs, drug management, and preventive/control options according to the national⁵ and WHO guidelines.⁶ Use of guideline was obtained by asking whether the respondents use or do not use the guideline with response as “Yes” or “No.” The respondents were asked to write down the correct prescription for treatment of cases of uncomplicated and severe malaria in children. The responses were reviewed by one of the authors using the national guideline, and they were graded as “correct” or “incorrect.”

Ethical approval

The ethical approval for the study was obtained from the Ethics and Research Committee of UBTH, Benin City, Nigeria.

Data analysis

Information obtained were entered and analyzed using the Statistical Package for the Social Sciences version 16.0 (Inc., Chicago, Illinois, USA). Quantitative variables were summarized using means and standard deviations as appropriate. Postgraduate year period was categorized as old (>10 years postgraduation) and young (≤10 years postgraduation) using the 10-year period cutoff as stipulated by the Medical and Dental Council of Nigeria. The association between correctness of prescriptions and variables such as years of postgraduate experience, period of years in pediatric training, level of training, types of institution of training, formal training on malaria case management, awareness of existence, and reading of the national guideline on malaria case management were evaluated using Chi-square. Binary logistic regression model was to identify factors that would independently predict correctness of malaria treatment prescription by the respondents. Variables were included in the model if the *P* value from the univariate analysis was within the confidence level for statistical significance. The level of significance for the final test was set at *P* < 0.05.

RESULTS

Of the 108 participants whose questionnaires were analyzed, 75.0% were Part 1 candidates and 25.0% Part 2 candidates. The mean age of respondents was 34.0 ± 4.5 years (range 26–51 years). Forty-two (39.0%) were male, while 66 (61.0%) were female. Mean number of years postgraduation from medical school was 8.0 ± 4.0 years (2–28 years). Number of years in residency training was 3.0 ± 2.5 years (range 1–11 years). Table 1 shows the sociodemographic characteristics of the study participants. Two-third of the study participants were in the age range 26–35 years, majority (86.1%) were married, while 93 (86.1%) were young in practice.

Ninety-four (87.0%) of the 108 respondents were aware of the existence of the current national guidelines for management of malaria, but only 45 (41.7%) had read the guidelines. Reading of the guidelines was done within 1 year preceding the study by few residents; (4/45 [9.0%]), 6 (13.3%) read the guideline 2 years, and 35 (77.7%) read it ≥3 years preceding the dates of this study. Majority of the respondents (94 [88.7%]) were from teaching hospitals, 10 (8.5%) from Federal Medical Centers and

Table 1: Socio-demographic characteristics of the study participants

Socio-demographic characteristics	n (%)
Gender	
Male	42 (39.0)
Female	66 (61.0)
Age (years)	
26-35	72 (66.7)
36-45	33 (30.6)
46-55	3 (2.7)
Marital status	
Single	14 (13.0)
Married	93 (86.0)
Separated	1 (1.0)
Level of training	
Part one	81 (75.0)
Part two	27 (25.0)
Years of experience	
Young	93 (86.0)
Old	15 (14.0)
Duration of stay in residency training	
1-6 years	96 (89.0)
More than 6 year	12 (11.0)

other hospitals such as Mission and Corporate Private Hospitals; 2 (2.8%). Two residents did not indicate their centers.

The proportion of respondents who had received formal training on malaria case management using the national guidelines was 63 (58.0%), while 45 (42.0%) had not received any formal training. Of the 63 that had received formal training, 50 (79.0%) did so within their residency training while 21.0% was during the undergraduate medical school years. The Update Course was the most common formal training on malaria received, by 16/63 (25.0%). Of the 63 that had received formal training on malaria case management using the national guidelines; 9 (14.3%) received the training a year preceding the study; 6 (9.4%) 2 years, 9 (14.3%) 3 years, and the other 39 (62.0%), 4 or more years preceding this study.

All respondents stated correctly the antimalarial treatment of choice for treatment of malaria which is artemisinin-based combination therapy (ACT) for uncomplicated malaria and intravenous artesunate for severe malaria as recommended in the national guidelines. All respondents also stated that ACTs are the drugs of choice for treatment of uncomplicated malaria and severe malaria (intravenous artesunate) in their respective health institutions. Concerning the correct prescription for treatment of malaria, 40 (37.0%) wrote down correctly the prescription for ACT needed to treat uncomplicated malaria, while 44 (40.7%) wrote down correctly the prescription for intravenous artesunate for treatment of severe malaria.

Table 2a and b show the association between prescription for malaria treatment (uncomplicated and severe malaria) and some factors such as level of training, duration of stay in the residency programme, and receipt of training on malaria case

management using the National Guidelines. However, logistic regression model analysis showed that obtaining training on malaria case management independently predicted correctness of prescription of antimalarial drugs for both uncomplicated and severe malaria (odds ratio = 2.4, 95% confidence interval = 1.12, 5.64, $P = 0.046$) [Table 3].

Ninety-eight (91.0%) stated that the course on case management of malaria should be included in the yearly update course.

DISCUSSION

The study showed that majority of the pediatric residents are aware of the current national guidelines for case management of malaria, but a substantial proportion was observed not to have read the guidelines. This finding is in keeping with those of other authors in Nigeria and elsewhere in Africa.⁹⁻¹⁵ However, while these previous studies were conducted across health facilities (private and public), this present one was conducted among health-care providers who are in training and who were expected to have access to information either from training curriculum or personal study.

The guideline for treatment of common childhood diseases including malaria is a national document and is meant to streamline and harmonize case management with attendant improvement in outcome.⁵ The said document is available in most health facilities as well as online and is easily accessible. Only 9.0% of the Nigerian pediatric residents had read the document in the 1 year preceding the study. Most of the respondents probably did not see the need to do so, perhaps due to the fact that they believed that malaria is a simple and common disease that can be readily managed. It could be postulated that that malaria issues have been over flogged and do not necessarily require any serious or further studies to influence correct management. It is expected that medical practitioners, especially pediatricians whose primary function is the treatment of common childhood diseases would have read and studied the document for effective management of malaria in children in Nigeria.

The study also showed that most of the pediatric residents had not had any formal training on malaria treatment strategy in the preceding 1 year. Only 14.0% received training in the preceding 1 year, while two-third did so over 3 years preceding this study. Although the residency training is without the true structure of didactic lecture, resident doctors are expected to attend conferences and update courses for continuing medical education which are acknowledged means of updating one's knowledge on contemporary issues.

Although all respondents stated the correct drug treatment for both uncomplicated and severe malaria according to the national guidelines, awareness and knowledge of the drug of choice in the guidelines did not translate to improved practices, as only one-third were able to write down the correct prescription (s) for treatment of uncomplicated malaria. Similar finding had been observed among other health-care providers

Table 2a: Association between prescription for uncomplicated malaria and some factors (level of training, duration of stay in residency program, and receipt of training on malaria case management using the national guideline)

	Prescription for uncomplicated malaria				
	Correct	Incorrect	χ^2	OR	P
Years of post-graduation experience					
Young graduate (<i>n</i> =93)	32 (34.4)	61 (65.6)	1.98	0.5	0.16
Old graduate (<i>n</i> =15)	08 (53.3)	07 (46.7)			
Level of training					
Part one (<i>n</i> =81)	26 (32.1)	55 (67.9)	3.39	0.44	0.07
Part two (<i>n</i> =27)	14 (61.9)	13 (48.1)			
Period of years in paediatric training					
1-6 years (<i>n</i> =96)	33 (34.4)	63 (65.6)	2.63	0.4	0.11
>6 years (<i>n</i> =12)	07 (58.3)	05 (51.7)			
Type of training institution					
Teaching Hospitals (<i>n</i> =94)	33 (35.1)	61 (64.9)	0.61	0.5	0.44
Others – FMC, State Specialist Hospitals	07 (50.0)	07 (50.0)			
Had training on malaria case management					
Yes (<i>n</i> =63)	29 (46.0)	34 (54.0)	5.25	2.6	0.02
No (<i>n</i> =45)	11 (24.4)	34 (75.6)			
Awareness of existence of national guideline					
Yes (<i>n</i> =94)	36 (38.3)	58 (61.7)	0.49	1.6	0.48
No (<i>n</i> =14)	04 (28.6)	10 (71.4)			
Reading of national guidelines					
Yes (<i>n</i> =45)	20 (44.4)	25 (55.6)	1.31	1.7	0.25
No (<i>n</i> =63)	20 (31.7)	43 (68.3)			

Table 2b: Association between prescription for severe malaria and some factors (level of training, duration of stay in residency program, and receipt of training on malaria case management using the national guideline)

	Prescription for severe malaria				
	Correct	Incorrect	χ^2	OR	P
Years of post-graduation experience					
Young graduate (<i>n</i> =93)	37 (39.8)	56 (60.2)	0.25	0.75	0.62
Old graduate (<i>n</i> =15)	07 (46.7)	08 (53.3)			
Level of training					
Part one (<i>n</i> =81)	31 (38.3)	50 (61.7)	0.82	0.70	0.37
Part two (<i>n</i> =27)	13 (48.1)	14 (51.9)			
Period of years in paediatric training					
1-6 years (<i>n</i> =96)	38 (39.6)	58 (60.4)	0.48	0.70	0.49
>6 years (<i>n</i> =12)	06 (50.0)	06 (50.0)			
Type of training institution					
Teaching Hospitals (<i>n</i> =94)	38 (40.4)	56 (59.6)	0.03	1.0	0.86
Others – FMC, State Specialist Hospitals (<i>n</i> =14)	06 (42.9)	08 (57.1)			
Had training on malaria case management					
Yes (<i>n</i> =63)	22 (34.9)	41 (65.1)	2.12	0.6	0.15
No (<i>n</i> =45)	22 (48.9)	23 (51.1)			
Awareness of existence of national guideline					
Yes (<i>n</i> =94)	36 (38.3)	58 (61.7)	1.79	0.5	0.18
No (<i>n</i> =14)	08 (57.1)	06 (62.9)			
Reading of national guidelines					
Yes (<i>n</i> =45)	17 (36.2)	30 (63.8)	0.42	0.71	0.42
No (<i>n</i> =63)	27 (44.3)	34 (55.7)			

such as medical officers in a study in Ghana where correct prescription for treatment of uncomplicated malaria was noted to be very low.⁹

The fact that this finding is independent of years of experience of the medical practitioner and duration of residency training is disturbing. Years of experience as a doctor and period of

Table 3: Binary logistic regression model showing the relationship between correctness of prescription for treatment of uncomplicated malaria and level of training on malaria case management using the guideline

Characteristics	Correctness of prescription					
	Yes	No	β	OR	95% CL	P
Level of training						
Part one (n=81)	26 (32.1)	55 (67.9)	0.67	2.0	0.79, 4.88	0.15
Part two (n=27)	14 (31.9)	13 (48.1)				
Had training on malaria case management						
Yes (n=63)	29 (46.0)	34 (54.0)	0.87	2.4	1.12, 5.64	0.046
No (n=45)	11 (24.4)	34 (75.6)				

stay in residency did not significantly influence participants' performances regarding generation of correct prescriptions for the treatment of simple and complicated malaria. Years of experience affect cognition and should impact positively on enhanced performances, but this was not the case in this study. Reasons for the current observations are not readily apparent, but it could be that there are other overarching factors influencing performances other than just experience.

It is expected that those in senior residency should be more knowledgeable and perform better. This indeed was the case in this study with more senior residents compared to junior providing appropriate prescriptions. The difference, however, did not reach statistical significance.

More residents in hospitals other than teaching hospitals generated appropriate prescriptions for the management of uncomplicated malaria. This could be viewed as aberration as tertiary compared to secondary-level hospitals, are endowed with more facilities, personnel and structured programs are expected to offer better opportunities for training with attendant enhanced performances. It could also be viewed that these facilities have more of post-Part I candidates and those staying longer than the stipulated study duration in the absence of well-established residency policies. Other possibility could be that the resident doctors from these other hospitals see more of uncomplicated malaria and hence will generate appropriate prescriptions in that regard as against resident doctors from teaching hospitals which are expected to see and actually do manage most cases of severe malaria.

Performances in the generation of correct prescription were significantly influenced by receipt of formal training on appropriate case management based on the said guidelines. Receipt of such formalized training does influence performance through reinforcement of desired norms. Such explains the routine advocacy for training and retraining of staff as commonly recommended as means of improving performances in establishments.

Awareness of the existence of the national guidelines for malaria case management and accessing the document did not significantly improve performance regarding correct generation of prescriptions for either uncomplicated or severe malaria implying perhaps that more training and retraining is

required to influence conduct as seen with receipt of formal training.

CONCLUSIONS

Knowledge and practices regarding morbidities, including common ones like malaria, are dynamic. It demands that care providers update their knowledge and practices to keep abreast with modern trend. Making information on new policies available manually or electronically is not sufficient to effect the desired changes in practice at least for now. Therefore, more formalized trainings are required even for the Nigerian resident in training. This can come by ways of seminars, conferences, and workshops.

Pediatric resident doctors are hereby encouraged to utilize such opportunities to equip themselves with current information on the management of common childhood diseases as malaria. All residents knew the correct antimalarial drug for treatment of uncomplicated and severe malaria, however, the major observation in their prescription is in writing down the correct dosages of the recommended drugs. Perhaps, other job aids such as a handy National Drug Formulary made available to the hospitals may be of help.

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Conflicts of interest

There are no conflicts of interest.

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