



## Achieving the 6<sup>th</sup> MDG: An Evaluation Drug Treatment of Malaria in Selected PHC in Osun State

O. L. Abodunrin<sup>1\*</sup>, A. O. Sabageh<sup>1</sup>, A. O. Adeoye<sup>2</sup>, A. A. Adeomi<sup>2</sup>,  
J. O. Bamidele<sup>3</sup> and F. F. Osundina<sup>4</sup>

<sup>1</sup>Department of Community Medicine, College of Health Sciences, Lautech, Ogbomoso, Nigeria.

<sup>2</sup>Department of Community Medicine, Lautech Teaching Hospital, Ogbomoso, Nigeria.

<sup>3</sup>Department of Community Medicine, College of Health Sciences, Ekiti state University, Ekiti, Nigeria.

<sup>4</sup>Department of Community Medicine, Lautech Teaching Hospital, Osogbo, Nigeria.

### Authors' contributions

This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.

### Article Information

DOI: 10.9734/IJTDH/2015/11932

#### Editor(s):

(1) Ahmed Awad Abdel-HameedAdeel, College of Medicine, King Saud University, Saudi Arabia.

(2) William Ebomoyi, Department of Health Studies College of Health Sciences, Chicago State University, USA.

#### Reviewers:

(1) Anonymous, Divine Word University, Papua New Guinea.

(2) Anonymous, University of Vienna, Austria.

(3) Innocent C. J. Omalu, Federal University of Technology, Minna, Nigeria.

Complete Peer review History: <http://www.sciencedomain.org/review-history.php?iid=711&id=19&aid=6764>

Case Study

Received 10<sup>th</sup> June 2014  
Accepted 19<sup>th</sup> July 2014  
Published 5<sup>th</sup> November 2014

### ABSTRACT

**Introduction:** The burden of malaria in Nigeria and Africa is well documented. The current Nigeria anti-malaria drug policy has recommended artemisinin-based combination therapy (ACT) as the first-line drug treatment for uncomplicated malaria since 2005. It is now 8 years since the adoption of ACT and two years to the set time for the achievement of the MDGs.

**Objective:** To assess the adherence of the PHC to the new policy on drug treatment for uncomplicated malaria.

**Methods:** Using a pro-forma, relevant information about drug prescription of malaria cases between January 2008 and December 2009 was extracted from patients' folders in the 3 comprehensive health centres being used by LAUTECH Teaching Hospital, Osogbo. Additional data were also collected through the use of in-depth interviews. Data were analyzed with Epi-Info software 3.4.2.

\*Corresponding author: Email: [drgbenga10@gmail.com](mailto:drgbenga10@gmail.com);

**Results:** A total of 8881 episodes of malaria were analyzed of which male children (0-5years) constituted the highest number. The commonest prescribed anti-malaria was oral Chloroquine (21.6%) for the 3 CHC combined. However, for each CHC, CQ was the commonest drug prescribed for Ilie and Atelewo CHC (41.6% and 25.5% respectively), while for Akogun CHC alone, it was Artesunate + SP. Akogun CHC was found to have the highest prescribed pre-packaged ACT.

Factors responsible for inappropriate prescription were non-availability and perceived patients' non-affordability and unwillingness to buy drugs.

**Conclusion:** Prescription of CQ and SP as mono-therapy continues to prevail in the CHC. There is urgent need for ensuring compliance to the current and acceptable treatment for malaria. Other means of sustaining availability of anti-malaria drugs should be considered.

*Keywords: Evaluation; prescription anti-malaria; MDG; PHC; drug treatment; ACT.*

## 1. INTRODUCTION

Reports have it that 99% of mortality from Acquired Immune Deficiency Syndrome (AIDS), Malaria and Tuberculosis (TB) live in the developing countries with about 780, 000 deaths each year [1]. Malaria is a disease of enormous economic and social burden and hindrance to human development affecting 3.4 billion people (half) of world population [2]. The disease is documented to be of high prevalence in Osun state according to a community based study (55.9%) and a hospital based study among antenatal clinic attendees (41.2%) [3,4]. Malaria being the second most common cause of infectious disease-related death in the world, after tuberculosis [5]. It is responsible for about 50% of out-patient visits, 40% of hospital admissions and 30% of mortalities more among under-five years of age in Nigeria [6]. In an effort to address the prevailing and overwhelming health and development concern of various countries especially in the developing world, the Millennium Development Goals (MDGs) were officially established following the Millennium Summit of the United Nations in year 2000 with goal 6 focusing on combating HIV/AIDS, Malaria and other diseases [1]. Key interventions to the Malaria control include prompt and effective treatment with Artemisinin-based Combination Therapy (ACT) for which Nigeria adopted as the first line drug treatment of uncomplicated *P. falciparum* malaria in 2005 [7].

The monotherapy antimalaria such as Chloroquine (CQ), Sulphadoxin-Pyrimethamin (SP), Amodiaquine (AMQ) and artesunate (AT) have been shown to be ineffective. The recommended ACTs for Nigeria are Artemether + Lumefantrine and Artemisin + Amodiaquine [7]. How has this policy been adhere to in Primary Health Care (PHC) 5 years after the adoption? It is therefore important to evaluate the anti-malaria

prescription habits in PHC especially those attached to a teaching hospital that should serve as a prototype for other PHCs due to the expertise there. A study in a teaching hospital in Nigeria in 2006 showed anti-malaria prescription of Artemesinin based combination drugs constituted 26.2% of all the antimalarials prescribed followed by Sulphadoxine+Pyrimethamine 564 (20.0%) [8]. The 2010 Nigeria Malaria Indicator survey reported that only 6% of under five received ACT while 40% took other anti-malarials [9]. A previous facility-based study in the South-East Nigeria 88.8% of public hospital and 34.2% of private hospital use ACT as first-line treatment of uncomplicated Malaria [10]. The correct use of anti-malarial drugs is the key not only to therapeutic success but also to deterring the spread of drug resistance malaria. The attainment of the MDG goal with regard to Malaria burden depend largely on adherence to the anti-malaria policy of ACT for uncomplicated malaria. This study therefore sought to assess the pattern of anti-malaria prescription in the health facilities as well as identify factors affecting the choice of prescriptions in the respective Comprehensive Health centres (CHCs).

## 2. METHODOLOGY

### 2.1 Study Area

This Study was carried out in Osun state in the South-western Nigeria. The three health facilities being used by the Community Medicine department of Ladoke Akintola University of Technology (LAUTECH) were used for the purpose of this study. Two of the health facilities are in Osogbo (Osogbo local government) and are the urban Comprehensive Health Centres (CHC) while one is in Ilie (Olorunda local government) is the rural health centre. The facilities were chosen because they are the CHC

for the community Medicine department of LTH, Osogbo. Patients are usually attended to by residents and consultants in posting at the various centres but nursing staff and Community Health Extension Workers (CHEWs) both from the LTH (LAUTECH Teaching Hospital) and from the owner local government also attend to patients as occasions demand.

## 2.2 Study Population

Cases of Malaria treated between January 2008 and December 2009 in the three CHC in the study area. All the cases seen during the period were used except cases of Malaria in pregnancy-which are usually recorded in separate folders and therefore excluded.

## 2.3 Study Design

Descriptive retrospective study through a review of patients' folders.

## 2.4 Data Collecting Instrument and Management

Data were collected between July and September 2010.

## 2.5 Quantitative Data

A self-developed proforma was used to retrieve/extract data on age, sex and drug treatment. Information collected included biodata and the drugs prescribed for them.

## 2.6 Qualitative Data

Key informant interview and current drug availability were used to obtain additional information.

## 2.7 Data Collection Technique

Medical students helped to retrieve information from the folders while one of the researchers got the qualitative data.

## 2.8 Data Analysis

Data Analysis was done by Epi Info software version 3.4.1. Data were presented in form of tables. Appropriate prescription for malaria is the ACT as laid than by the national guideline, all others including monotherapy Artesunate or its combination with SP and AMQ were termed as

inappropriate. Univariate and bivariate analysis were done with level of significance set at p value of 0.05.

## 2.9 Limitation of the Study

Parasitological diagnosis (microscopy or rapid diagnostic test) was not made in many of the cases, so malaria diagnosis was based on clinical features as made by the attending health personnel. The statuses of the prescribers (whether doctors, nurses or CHEWs) were not considered as this may actually determine the drug prescription. This is because it could not be easily identified in the folders; while some prescribers write their names, other put signatures only. Also, the study did not assess the knowledge of prescribers concerning correctness of prescription and so the practice discovered herein does not necessarily equate to their knowledge or the policy of the hospital.

## 3. RESULTS

### 3.1 Quantitative Results

A total of 8881 Malaria cases were attended to in all the 3 CHC during the period that met the inclusion criteria and is presented as in Table 1. Table 2 showed age and sex distribution of the malaria cases seen in the review period. There were 6650 (74.9%) children less than 5 years while the others were older children and adults. The male: female ratio was 0.93, while 1906 (21.5%) were from Ilie CHC, 3980 (44.8%) were from Akogun CHC and 2995 (33.7%) were from Atelewo CHC.

**Table 1. Distribution of malaria cases in three comprehensive health centres in Osun state**

Health facility	No of malaria cases	%
ILIE CHC	1906	21.46
AKOGUN CHC	3980	44.82
ATELEWO CHC	2995	33.72
<b>Total</b>	<b>8881</b>	<b>100.00</b>

Table 2 showed the pattern of anti-malaria prescription in the different CHCs. Chloroquine (CQ) remained the most prescribed 1918/8881 (21.6%) for all the 3 CHC combined together. While CQ was the most prescribed for Ilie and Atelewo CHCs [793/1906 (41.6%) and 763/2995 (25.5%) respectively], Sulfadoxin-Pyrimethamine (SP) and Athemeter (AT) was the most prescribed for Akogun CHC. Also, Akogun CHC was the facility with the highest percentage of

prescribed ACT totaling 2347/3980 (58.9%) followed by Atelewo CHC 701/2995 (23.4%) and lastly Ilie CHC 337/1906 (17.6). The pattern of prescription was statistically significant with respect to the facilities as presented in Tables 3 and 4. In both tables, the Akogun CHC had 18.4% appropriate prescription (which was the ACT for malaria) when compared with 9.9% and 12.0% in Ilie and Atelewo CHC with  $p < 0.0001$ .

**Table 2. Distribution of ages of malaria cases by sex and three comprehensive health centres in Osun state**

		<5 years	>5 years	Total
<b>Sex</b>	Male	3330	958	4288
	Female	3320	1273	4593
<b>CHC</b>	ILIE	1417	489	1906
	AKOGUN	2999	981	3980
	ATELEWO	2234	761	2995
<b>Total</b>		6650	2231	8881

### 3.2 Qualitative Results

The most senior nursing officer-in-charge of each facility was interviewed. It was gathered in all the CHC that there is awareness of the current policy for malaria treatment although it was also said that there was no copy of the malaria national guideline in any of the facilities. Usual challenges are those of non-availability of the ACT supply from the local government. This is however less in Akogun CHC which was pointed out that it was due to the drug revolving scheme being run. In Ilie and Atelewo CHC, drug procurement is from the local government which is irregular; most of the drugs being supplied are CQ, SP. Sometimes however, AMQ, AT are also supplied and less frequent is preformed ACT. In Akogun CHC, drug procurement is by Drug Revolving Scheme which made appropriate drugs achievable and realistic. On why drug revolving scheme is not operative in Ilie and Atelewo CHC; it was reported that it was strictly government policy to supply free drugs. In Ilie, it was said that most of the patients would not purchase drugs that were not supplied in the clinic being in the rural area; however, in Atelewo and Akogun CHC, even when ACT were not available at the facility, it could be prescribed for the patients to buy. The staff in Ilie claimed ACT was not even available in the patent medicine store in the village which could make its prescription even more difficult.

On inspection of anti-malaria available in the health facilities; in Ilie CHC; CQ, SP, and few

AMQ were available but AT and ACT were not available at the time of study. In Atelewo CHC; CQ, SP, AMQ, AT were available. In Akogun CHC: SP, AMQ, AT and ACT were available. Table 5 showed the relative quantity available as at the time of data collection.

### 4. DISCUSSION

The age distribution is similar to report of the Nigeria Malaria fact sheet where 86% of Malaria burden were in children under five [9,11,12] but different from that of Noland who reported largest burden of Malaria among 5 – 9 years of age although the test was confirmed by microscopy [10]. The prescription of CQ, AMQ, SP and monotherapy AT found in this study both negate the national guideline and WHO recommendation for the treatment and control of Malaria especially in view of the MDG actualization [6,7,13,14]. This wrong prescription is about 7 out of 10 in Ilie CHC, 6.5 out of 10 in Atelewo and 2.5 out of 10 in Akogun CHC. Monotherapy including that of AT has been suggested to likely result in resistance quickly and that its parasitaemia clearance is low [15]. Similarly the CQ/SP combination is not recommended for treatment of Malaria by the current policy since it is not AT based but this represents about 9%, 15% and 6.5% in Ilie, Atelewo and Akogun CHC respectively. Similarly, AT combination with CQ or SP is not recommended which is also high especially in Akogun CHC. A study in the GOPD of ABUTH [16] showed high prescription of CQ and monotherapy artemisinin although the study period was in 2006 only one year post-adoption of the ACT policy compare to five year post-adoption in our study. The hitherto (at the time of this study) prescription of these CQ and other monotherapies in these CHCs which are mainly by resident doctors would have been worrisome since it was expected that they should know the standard regulation but the free healthcare in Atelewo and Ilie CHC with irregular ACT supply made some prescriptions inevitable. It was observed that a patient receiving treatment for Malaria in Akogun CHC was likely to receive an Artesunate and SP combination while that in Ilie and Atelewo CHC was more likely to receive CQ. It was more likely to receive ACT treatment in Akogun CHC than in Ilie and Atelewo CHC. It is however in contrast to the study in Enugu state where 88.8% of the public hospitals studied have ACT present at the time of study and almost all the drugs were supplied by the government.

**Table 3. Types of anti-malaria prescription in three comprehensive health centres in Osun state**

Health facility	Antimalaria prescription n (%)								Total
	CQ	SP	AT	CQ+SP	CQ+AT	AMQ+AT	SP+AT	ACT	
ILIE CHC	793(41.6)	344(18.1)	206(10.8)	183(9.6)	43(2.7)	71 (3.7)	79(4.1)	187(9.9)	1906
AKOGUN CHC	362(9.1)	214 (5.4)	233 (5.9)	257 (6.5)	567(14.2)	661 (16.6)	952 (23.9)	734(18.4)	3980
ATELEWO CHC	763(25.5)	52 (17.6)	346(11.6)	455(15.2)	202 (6.7)	180(6.0)	162 (5.4)	359(12.0)	2995
<b>Total</b>	1918(21.6)	1086(12.2)	785 (8.8)	895(10.1)	812 (9.1)	912 (10.3)	1193(13.4)	1280(14.4)	8881(100)

$\chi^2 = 2.33; df = 14; p < 0.0001$

**Table 4. Appropriateness of prescription for malaria in three comprehensive health centres in Osun state**

CHC	Inappropriate treatment n (%)	Appropriate treatment n (%)	Total
ILIE CHC	1719 (90.1)	187 (9.9)	1906
AKOGUN CHC	3246 (81.6)	734 (18.4)	3980
ATELEWO CHC	2636 (88.0)	359 (12.0)	2995
<b>Total</b>	760 (85.6)	1280 (14.4)	8881

$\chi^2 = 99.4; df = 2; p < 0.0001$

**Table 5. Estimate of anti-malaria stock available in three comprehensive health centres in Osun state at time of study**

	CQ	SP	AMQ	AT	ACT
ILIE CHC	√√√	√√	√√	X	X
AKOGUN CHC	√	√√	√√√	√√√	√√
ATELEWO CHC	√√√	√√√	√√	√	X

X out of stock; √ very few; √√ fairly many; √√√ large quantity relatively

The practice of Drug Revolving Scheme in Akogun CHC seems to have assisted in the correct adherence to ACT prescription by making appropriate drugs available all the time which has also been reported elsewhere [17,18]. The prescription pattern observed in this study can be corroborated by the anti-malaria in stock in the respective CHC. It is not surprising therefore that Akogun CHC has the highest prescription rate of ACT. Where DRF is not practice in the public hospitals, correct prescriptions should then be made for purchase outside the facility although patients generally tend to resist this practice.

## 5. CONCLUSION

The drug prescription pattern in these health facilities being managed or supported by staff in a teaching hospital is unacceptable. The prescription of CQ, AMQ, SP including monotherapy AT will undermine the attainment of the MDG goal.

## 6. RECOMMENDATIONS

The possibility of having a drug revolving scheme in the other centres should be further evaluated. Further research is needed about prescribers' knowledge and hindrances as well as community perception to purchasing drugs when not available in the health facility.

## ETHICAL APPROVAL

Authors hereby declare that informed consent was obtained and that no harm was caused in the cause of the research as it involved only descriptive survey.

## ACKNOWLEDGEMENTS

The authors appreciate the efforts of the medical students who devoted time to extracts the data from the folders. We also thank the nursing staff and the CHEWs for their cooperation during the data collection.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

## REFERENCES

1. World Bank. Available: [www.worldbank.org/mdg/diseases.html](http://www.worldbank.org/mdg/diseases.html).
2. World Health organization. Available: [www.who.int/features/factfiles/malaria/en](http://www.who.int/features/factfiles/malaria/en).
3. Bolaji OS, Adeyeba OA, Adefioye AO, et al. Prevalence of Malaria among the nomadic Fulani in Osun state, South west Nigeria. International Journal of Natural and Applied Sciences. 2010;6(2):223–227.
4. Ojiezeh TI, Ibeh NI, Opedun DO, et al. Malaria endemicity among pregnant women in urban and semi-urban areas in southwest Nigeria. Am-Euras. J. Sci Res. 2010;5(3):207–211.
5. Centre for Disease Control and Prevention. Malaria facts. Available: <http://www.cdc.gov/malaria/facts.htm>.
6. Roll Back Malaria. Available:<http://www.rollbackmalaria.org/countryactionnigeria.html>.
7. Federal Ministry of Health (FMOH). National Antimalaria Treatment Policy. FMOH, National Malaria and vector control Division. Abuja Nigeria; 2005.
8. Oshikoya KA. Antimalaria prescription for children preventing with uncomplicated malaria to a Teaching hospital in Nigeria after the challenge of national guidelines for malaria treatment. World journal of medical sciences. 2007;2(1):49-53
9. Malaria Indicator Survey (MIS) 2010. Final Report; 2012
10. Martin Meremikwu, Uduak Okomo, Chukwuemeka Nwachukwu et al. Antimalaria drug prescribing practice in private and public health facilities in south east Nigeria: A descriptive study. Malaria Journal. 2007;6:55. DOI:10.1186/1475-2875-6-55.
11. Noland GS, Graves PM, Sallau A, et al. Malaria prevalence, anemia and baseline intervention coverage prior to mass net distributions in Abia and Plateau States, Nigeria. BMC Infectious Diseases. 2014;14:168. Available: <http://www.biomedcentral.com/1471-2334/14/168>.
12. Sachs J, Malaney P. The economic and social burden of malaria. Nature. 2002;415:680–685. DOI: 10.1038/415680a.
13. World Health organization. Roll Back Malaria. Developmental Guideline for treatment of Malaria (WHO/HTML/2006.1108). Geneva. World Health Organization; 2006.

14. WHO. MDG 6: Combat HIV/AIDS, Malaria and other diseases.
15. Julien Zwang, Grant Dorsey, Andreas Mårtensson. *Plasmodium falciparum* clearance in clinical studies of artesunate-amodiaquine and comparator treatments in sub-Saharan Africa, 1999–2009. *Malar J.* 2014;13:114.
16. Olurische TO, Maiha BB, Olurische CO. Short-term pre-intervention evaluation of Artemisinin combination therapy usage in a tertiary health facility in northern Nigeria. *Nig Journ Pharm Sci.* 2007;6(2):93-98
17. Uzochukwu BSC, Onwujekwe OE, Akpala CO. Effect of the Bamako-Initiative drug revolving fund on availability and rational use of essential drugs in primary health care facilities in south-east Nigeria. *Health Policy and Planning.* 2002;17(4):378–383
18. Ogunbekun I, Adeyi O, Wouters A, Morrow RH. Costs and financing of improvements in the quality of maternal health services through the Bamako initiative in Nigeria. *Health Policy and Planning.* 1996;11:369–84.

---

© 2015 Abodunrin et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

*Peer-review history:*

*The peer review history for this paper can be accessed here:*  
<http://www.sciencedomain.org/review-history.php?iid=711&id=19&aid=6764>