

OPTIONS AND PROSPECTS OF MANAGEMENT OF MALARIA WITH RECTAL  
ARTESUNATE IN ABEOKUTA SOUTH-WESTERN NIGERIA

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**ABSTRACT:** Malaria is an important illness in fewer than five years old children in Nigeria which is accompanied with vomiting and severe anaemia that lead to infant and childhood mortality. In view of problems and implications associated with management of malaria at home, rectal artesunate is being introduced as pre-referral drug to reduced multiplication of parasites in children before accessing appropriate treatment. Perceptions of 264 parents of under 5 years children attending two health facilities (Federal Medical Centre, Idi-Aba, Abeokuta (FMC) and State General Hospital Ijaye, (SGH)) in Abeokuta south-western Nigeria through the use of questionnaires and were systematically selected. Analysis of the questionnaires revealed that male (42/78) were more severely infected than female (36/78). The parent revealed common symptoms of malaria include fever and high body temperature vomiting, loss of appetite and cough. Parent who take their children to hospitals were more than those that use herbs during malaria attack. Chloroquine derivatives were observed as common drug of choice and in combination with Sulphadoxine-Pyrimethamine and herbs. Majority of the children with uncomplicated and moderate *falciparum* malaria have fever and in combination with cough, catarrh and abdominal discomfort while children with severe *falciparum* malaria showed symptoms such as vomiting, loss of appetite and convulsion together with fever. The use of rectal artesunate is low among the study group. With more enlightenment in the use of rectal artesunate, the high mortality now experienced in under-five children due to malaria disease would be greatly reduced.

**KEYWORDS:** Perception, Caregiver, Acceptance, Rectal Artesunate, Malaria, Children, Abeokuta, South-western Nigeria.

**INTRODUCTION**

The problem of malaria infection in the under five years children has been widely described ([Kakkilaya, 2009](#), [UNICEF, 2010](#), [Wong et al., 2010](#); [WHO, 2011](#)). It is responsible for up to three million deaths annually throughout the world and causes 850 000 child deaths every year ([WHO/UNICEF, 2003](#); [WHO, 2011](#)). The majority of malaria-related morbidity and mortality are among children in Africa and Asia ([Korenromp, 2005](#); [Murray, 2012](#)), especially Nigeria ([WHO, 2008](#); [Onwuka, 2012](#)). Within Africa, the toll is highest by far in Nigeria and the Democratic Republic of Congo, which have the highest populations ([WHO, 2008](#); [Hay et al., 2010](#)), where the parasite causes an estimated one billion episodes of fever, one in five child deaths are due to malaria and the disease costs

an estimated \$12 billion annually ([Arrow et al., 2004](#)).

Signs and symptoms of malaria vary from person to person ([Nyika et al., 2009](#)). The symptoms of malaria include: fever, chills, headaches, muscles and joint aches, tiredness, nausea, vomiting, lassitude, perspiration, anorexia, fatigue, abdominal discomfort ([Sam-Wobo et al., 2011](#)). Most of the symptoms of malaria are non-specific and are similar to minor systemic viral illness, and residents of endemic area are often familiar with this combination of symptoms, and are frequently self-diagnosed ([WHO, 2006](#)).

Distance to healthcare facilities is a key determinant of high mortality rate ([CDC, 2009](#); [Gomes et al., 2009](#)). Since acute malaria can progress rapidly in young children leading to a high case-fatality rate, especially among those

living far away from hospitals, rapid treatment is important to avert death ([Kazembe \*et al.\*, 2006](#)). High mortality in malaria also results from reluctance of caretakers to take children to hospital for fear of injections ([Foster and Vilendrer, 2009](#)).

Despite vector control measures, malaria is making resurgence and resistance to first-line therapies, an increasing problem ([Arrow \*et al.\*, 2005](#)), and Child mortality from malaria continues to rise in sub-Saharan Africa ([Hastings and D'Alessandro, 2000](#)). The incidence of the disease, and related mortality, in children under the age of five years is even higher. Contributing factors to high child case fatality are the sudden progression from the simple form of the disease to severe malaria and malaria-induced anemia, exacerbated by a lack of timely or inappropriate treatment study had shown that home management of severely ill children in sub-Saharan Africa resulted in death of children before reaching the health facilities for specialized care ([Simoes \*et al.\*, 2005](#)).

As a consequence most malaria related morbidity is treated at home and within the community by informal health providers and networks ([Mayombane \*et al.\*, 2002](#)). Malaria control and treatment requires an integrated approach comprising prevention including vector control and treatment with effective anti-malarial. The affordable and widely available anti-malarial chloroquine that was in the past a main-stay of malaria control is now ineffective in most *falciparum* malaria endemic areas, and resistance to Sulfadoxine-pyrimethamine, Mefloquine and Amodiaquine is increasing rapidly ([Sam-Wobo \*et al.\*, 2008](#); [USAID, 2009](#)). Since malaria is a serious public health problem in under five years children, and is accompanied with vomiting which make it difficult for oral drug administration, New drugs such as rectal artesunate have been developed and used for the emergency management of acute malaria in patients who cannot take drugs by mouth ([Karunajeewa \*et al.\*, 2007](#)). Rectal artesunate is one of the newly developed classes of drug, and this is given rectally, as pre-referral and parenteral treatment ([WHO, 2006](#)). In rural households the responsibility for administration of rectal artesunate may lie with parent, caregivers or those providing health care services at rural community ([Hinton \*et al.\*, 2007](#); [Karunajeewa \*et al.\*, 2007](#)).

With reference to some previous research finding on knowledge, attitude and perception on malaria disease in Africa ([Muller \*et al.\*, 2003](#); [Hinton \*et al.\*, 2007](#)), the perception on symptoms and severity of malaria among parents of

children seeking treatment with rectal artesunate were assessed and introduction of rectal artesunate into the community toward treatment and management childhood malaria.

## MATERIALS AND METHODS

### 2.1. Study Area/ Health Facilities

The study was conducted in Abeokuta, Ogun State, Nigeria, between August, 2008 to March, 2009 in two health facilities namely: Federal Medical Centre, Idi-Aba, Abeokuta (FMC) and State General Hospital Ijaye, (SGH) all located in Abeokuta the capital city of Ogun State. Ogun State, Nigeria. Abeokuta is a tropical rain forest zone and lies approximately between Longitude 2°31" W and 4°31" E, Latitude 6°31" S and 8° N, its bounded in the south partly by the Atlantic ocean, and sharing common boundaries with Oyo and Ondo states.

### 2.2. Ethical Consent

The objectives of the study were discussed, and written consent were sought and obtained from the State Ministry of Health Management and Medical Directors of the health facilities used. Interactive sessions were also held with staff of the health facilities especially the doctors, nurses and the parents of the children explaining the aims/objectives of the study. Approvals to carry out the study were obtained from the ethical committees of each of the health facilities. Consented parents were enrolled for the study.

### 2.3. Research Procedures

Parent perception on management of malaria and acceptance of rectal artesunate suppositories for the management/treatment of malaria in children were determined through the use of structured questionnaires to parents and caregivers. Information obtained from the respondents (mother/father) and caregiver include; name, age, community, frequency of malaria, knowledge on symptoms associated with malaria diseases, preventive measures, and knowledge on use of rectal artesunate drugs. After which the rectal artesunate drugs were administered based on manufacturer prescription.

### 2.4. Data analysis

The obtained results from the questionnaires were entered and analyzed using Epi info (CDC, Atlanta, GA) 10 and SPSS for windows (SPSS, Inc., Chicago, IL) version 16.0. Association between sex, age and all variables were analyzed for the children in both health facilities. All significance are reported at P<0.05.

## RESULTS

### 3.1. Symptoms of Malaria

On the symptoms of malaria among the children in the study areas, analysis of data showed that children with fever (62) were more when compared with other symptoms showed by the children under study, the males were more with fever in both SGH (29) and FMC (20). This is

evidence as majority of the children with malaria have fever and in combination with cough, catarrh and abdominal discomfort while children with severe *falciparum* malaria showed symptoms such as vomiting, loss of appetite and convulsion together with fever (Table 1).

**Table 1: Sex-Symptoms of malaria among the study groups**

Parameters	Health Facilities					Total (264)(%)
	SGH (136)		FMC (128)			
	Male (75)	Female (61)	Male (70)	Female (58)		
FV	29	20	8	5	62(23.10)	
FV+CG	8	8	4	8	28(10.57)	
FV+BT	6	7	21	16	50(19.24)	
FV+VM	5	10	7	7	29(10.99)	
FV+MJ	4	2	2	0	8(2.99)	
FV+CV	1	0	0	0	1(0.37)	
FV+LA	3	3	3	1	10(3.71)	
FV+AD	2	2	1	1	6(2.25)	
FV+CC	2	3	1	1	8(3.01)	
FV+CT	2	3	1	1	9(3.45)	
VM+LA	4	3	10	6	23(8.83)	
FV+VM+BT	8	3	10	9	30(11.46)	

FV-Fever, VM-Vomiting, BT-Body temperature, CG-Cough, MJ-Muscles and Joint aches, CV-Convulsion, LA-Loss of appetite, AD-Abdominal discomfort, CC-Chill/Cold, CT-Catarrh.

### 3.2. Treatment Seeking Behaviours

Analysis of data on preventive measures adopted by the parent of the children under study revealed that more children visit hospital for malaria treatment, also the use of herbs and visiting hospital is also common among the study group (Table 2). Chi-square ( $\chi^2$ ) at  $P < 0.05$  showed that there was no significant difference between sex and preventive measure (SHA,

$P = 0.097$  and FMC,  $P = 0.12$ ). On age-preventive measures, result showed that children under 1 year visited hospital more than other age group (SGH, 23 and FMC, 43) (Table 2). Chi-square ( $\chi^2$ ) at  $P < 0.05$  showed that there was no significant difference between age and preventive measures to be adopted (SHA,  $P = 0.83$  and FMC,  $P = 0.30$ ).

**Table 2: Treatment Seeking Behaviours (Preventive measures) of Parents of the Children in the Study Areas**

Parameters	Health Facilities											
	SGH					FMC						
	Age (years)					Age (years)						
	<1 (39)	1.1-2 (31)	2.1-3 (23)	3.1-4 (19)	4.0-5 (24)	Total (136)	<1 (58)	1.1-2 (23)	2.1-3 (24)	3.1-4 (14)	4.0-5 (9)	Total (128)
Preventive measures												
HB	3	2	0	0	1	7	2	1	1	1	0	5
HB+HP	8	7	4	1	1	21	6	8	2	4	2	32
HB+HP+TH	0	0	0	0	0	0	0	0	1	1	2	4
HB+TH	0	0	0	0	1	1	0	0	0	0	0	0
HB+HP+SF	0	0	0	0	0	0	1	0	0	1	0	2
HB+SF	0	1	0	0	1	2	0	1	0	0	0	1
HP	23	15	15	16	17	86	46	12	9	7	4	80
HP+SF	2	3	2	1	1	9	1	1	0	0	1	3
TH	0	0	0	0	0	0	0	0	1	0	0	1
SF	3	3	2	0	2	10	0	0	0	0	0	0

HB- Herbs, TH- Traditional Home, HP- Hospital, SF- Self Medication

Result on anti-malaria used for preventing malaria diseases, result showed that the use of Chloroquine is predominant among the study group as well as the use of Sulpadoxine-Pyrimethamine derivatives which is low, with

very low usage of artesunate derivatives especially the rectal formulations (Table 3). Chi-square ( $\chi^2$ ) at  $P < 0.05$  showed that there was no significant difference between sex and anti-

malarial drugs used (SGH,  $P=0.699$  and FMC,  $P=0.482$ ).

**Table 3:** Treatment Seeking Behaviours (Anti-malarial drugs used) of Parents of the Children in the Study Areas

Parameters	Health Facilities											
	SGH					Total (136)	FMC					Total (128)
	Age (years)						Age (years)					
<1 (39)	1.1-2 (31)	2.1-3 (23)	3.1-4 (19)	4.0-5 (24)	<1 (58)	1.1-2 (23)	2.1-3 (24)	3.1-4 (14)	4.0-5 (9)			
Anti-malaria used												
CQ	20	17	16	8	15	76	24	2	3	2	3	34
CQ+ SP	10	3	1	5	3	22	17	7	9	3	1	37
CQ+SP+ ART	1	1	0	0	0	2	2	3	3	0	3	11
CQ+SP+ART+ HB	0	1	0	0	0	1	3	1	2	1	0	7
CQ+SP+ HB	0	0	0	0	0	0	5	3	2	1	0	11
CQ+ART	0	1	1	0	1	3	0	1	2	2	1	6
CQ+ART+ HB	1	0	0	0	0	1	0	0	0	1	0	1
CQ+ HB	1	1	1	0	1	4	2	3	2	3	1	11
SP	4	3	3	4	2	16	1	1	1	1	0	4
SP+ ART	1	1	1	2	1	6	1	2	0	0	0	3
SP+HB	0	1	0	0	0	1	1	0	0	0	0	1
ART	0	1	0	0	0	1	1	0	0	0	0	1
HB	1	1	0	0	1	3	1	0	0	0	0	1

HB- Herbs, CQ- Chloroquine, SP- Sulfadoxine-Pyrimethamine, ART- Artesunate

On age-anti-malaria used, analysis of data showed that chloroquine was mainly used as anti-malarial drug in under 1 year than other age groups (Table 3). Chi-square ( $\chi^2$ ) at  $P<0.05$  showed that there was no significant difference between age and anti-malarial drugs used (SGH,  $P=0.25$  and FMC,  $P=0.00$ ).

### DISCUSSION

High percentage obtained on symptoms of malaria, fever and chill and cold are common symptoms of uncomplicated and moderate *falciparum* malaria, and fever, vomiting, loss of appetite and cough are symptoms of severe *falciparum* malaria, an indication of severity of malaria infection among the children under study. This result is consistent with previous result obtained by [Akogun, \(2008\)](#).

On preventive measures adopted by parent for their children, most of the parent with their children visit hospital (62.55%) as well as use of herbs and visiting hospital (20.40%), which is the common method of preventing malaria in rural communities of Nigeria. This result is in line with result obtained by [Idowu, \(2008\)](#) on herbal remedy in the treatment of malaria: cross sectional survey of residents of Lagos State, and [Sam-Wobo et al., \(2008\)](#) on knowledge and practice of people in Abeokuta, Ogun State on malaria diseases.

The result on antimalarial drugs used in preventing malaria infection which showed that chloroquine was the most commonly used antimalarial drugs. This observation confirms earlier findings by [Sam-Wobo et al., \(2008\)](#) on evaluation of HIV and malaria diseases,

perception among anti-natal women in Ogun State ([World Malaria Report, 2005](#)).

However, resistance to the antimalarial drug has been reported ([USAID, 2009](#)) with current finding of resistance of *falciparum* malaria to chloroquine and sulphadoxine-pyrimethamine in Africa, low percent is obtained with the use of artesunate drug (both oral, intramuscular, intravenous and rectal) (0.76%), this infers that the use of artesunate drug especially rectal formulation that is presently use in combating *falciparum* malaria is low among African. This result is in line with result obtained by [Bar-Zeev and White \(2006\)](#); [Krishna et al., \(2006\)](#); [Hinton et al., \(2007\)](#), [Karunajeewa et al., \(2007\)](#); [Warsame et al., \(2007\)](#); [Idowu et al., \(2008\)](#); [TDR \(2008\)](#); [CDC \(2009\)](#); [Gomes et al., \(2009\)](#).

### CONCLUSION

The low usage of rectal artesunate is remarkable and showed that good knowledge and awareness will increase its usage. Therefore, health education should be intensified by government health institutions and development partners for the general public to be aware of the easily usable antimalarial drug for managing childhood malaria and reducing mortality.

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