

**Home management of malaria**<sup>1</sup>Oyedeji, O.A, <sup>2</sup>Yussuf,A.O, <sup>2</sup>AbdulWasiu-Idowu K.G, and <sup>3</sup>Oyedeji, G.A

1 Department of Paediatrics, Ladoke Akintola University Teaching Hospital, Osogbo, Nigeria

2 State Specialist Hospital, Asubiaro, Osogbo, Nigeria

3 Department of Paediatrics, Obafemi Awolowo University, Ile - Ife, Nigeria.

Correspondence to : Oyedeji O. A, email: soltomoyedeji@yahoo.com

**Abstract**

**Background:** Malaria continues to be an important cause of morbidity and mortality among Nigerian children. Recent findings show that prompt administration of Artemisin based combination drugs at home can reverse this trend.

**Objective:** To determine the drugs administered at home and in outside (Non LAUTECH Teaching Hospital) health facilities for the treatment of malaria in children.

**Methods:** The parents/surrogates of children consecutively presenting with malaria at the out patient unit of the State Hospital Osogbo, Southwestern Nigeria between July 1<sup>st</sup> and 30<sup>th</sup> of September 2006 were interviewed.

**Results:** Three hundred and one- 159 boys and 142 girls were studied. The age range was 3 months to 13 years and the mean, 2.3 years (S.D. = 0.1). 190 (65.8%) were only treated at home by their parents with left overs of unconsumed stocks of drugs. The patent medicine stores, maternities, government hospitals, pharmacies, medical practitioners, private hospitals and primary health centers were consulted by 70(23.3%), 8(2.7%), 7(2.3%), 6(2.0%), 6(2.0%), 5(1.7%) and 1(0.3%) parents respectively for their children. 40 (13.3%) of the 301 children studied presented with complicated malaria. Only 5(1.7%) used the correct Artemisin combination therapy, while 297(98.3%) did not. The reason given by the patients who did not use the correct anti-malaria combination for not doing so was ignorance. Of the 301 subjects, the two most commonly used drugs were paracetamol in 208(69.1%) and chloroquine in 93(30.9%) children. Four (25%) of the 16 mothers with post secondary school education used the right anti malarial combination compared with 1(0.8%) of the 133 mothers who did not complete secondary school education (P<0.00), None of the 152 children

whose parents did not complete primary school education used the right anti-malaria combination therapy.

**Conclusion:** The use of artemisin based anti-malaria drugs by parents in this study is poor. The health care facilities consulted by the parents of these children had little or no positive influence on their health behavior regarding the home care of children with malaria. There is a need to bridge the unacceptably big gap between treatment policy enunciation and implementation by health care givers in the homes and health service units.

**Introduction**

Malaria is a common and important cause of mortality and morbidity among children in Nigeria.<sup>1</sup> Worldwide it is estimated to cause more than 5 billion infections and approximately 3 million deaths per annum and Africa accounts for 90% of the disease burden.<sup>2</sup> Children living in the tropics are vulnerable to frequent and severe attacks of malaria because of their poorly developed immune defenses against it.

The roll back malaria movement of the World Health organization and the UNICEF movement aims to halve deaths attributable to malaria by 2010 and further halve it again by 2015.<sup>3</sup> One of the strategies adopted by the roll back malaria movement for controlling malaria is the home management of malaria.<sup>4</sup> The strategy at inception was based on the prompt use of chloroquine monotherapy which is now an ineffective drug for the treatment of malaria. Currently the use of artemisin based combination drugs is advocated for the home treatment of malaria and has been proved to be a cost effective tool in the management of malaria.<sup>2,3</sup>

Malaria however continues to be a burden among Nigerian children in spite of the known cost effective tools.<sup>1</sup> Thus, it becomes desirable to evaluate how care givers manage malaria at home, since most of the cases included in the data in studies originate from the home. Furthermore, properly undertaken

care of children by primary care givers, is expected to minimize the proportion of the population reporting for care at our hospitals either as complicated or non-severe cases of malaria.

**Methodology**

This was a prospective study in which consecutive children with proven malaria, seen between 1<sup>st</sup> of July and 30<sup>th</sup> September 2006 were recruited. The

study was conducted at the outpatient unit of the State Hospital, Osogbo, South Western Nigeria and the subjects studied were those whose parents gave consent. Malaria was diagnosed in the patients based on the clinical features of fever and presence of malaria parasites in the blood films.<sup>5</sup>

Patients presenting with a fever and an axillary temperature above 37.5°C in whom other causes of fever apart from malaria had been excluded were studied. Malaria was confirmed in these subjects by detection of malaria parasites in the blood film microscopy examination. Information was obtained from the mothers or their surrogates by means of a questionnaire. Details obtained include the ages, sex, presenting complaints, duration of the complaints and the educational status of the mothers. Information was also obtained concerning the types of drugs administered by mothers or surrogates at home, the details of health care facilities consulted and the drugs administered by them. Full blood count and other investigations were carried out as indicated. The subjects at presentation were classified as having severe malaria if they presented with a life threatening complication such as cerebral malaria, severe anemia, hyperpyrexia, febrile convulsions, hypoglycemia, etc. and in addition to these life threatening complications had positive blood film for *plasmodium falciparum* parasite.<sup>6</sup> Subjects without life threatening complications were classified as having non-severe malaria. The educational attainments of the mothers were grouped into three classes based on Oyedeji *et al's* method.<sup>7</sup> Mothers with post secondary school training such as ordinary diploma, higher national diploma, undergraduates, graduates, postgraduates were classified as group I. The mothers with primary six, uncompleted secondary school training, commercial school certificate and equivalents were grouped as class II. All mothers with no formal education or below primary six completed education were grouped as class III.

The results were analyzed with the Pearson chi-

squared ( $\chi^2$ ) and expressed as descriptive statistics in form of ranges, means, standard deviations, simple percentages and ratios. Yates correction was applied when necessary and P values <0.05 were considered as significant.

**Results****The population studied.**

The 301 children studied consisted of 159 boys and

142 girls giving a male to female ratio of 1.1:1. The ages of the children ranged between 3 months and 13 years and the mean age was 2.3 years (standard deviation = 0.1). Of the 301 children the greater majority 254(84.7%) were aged between 3 months and 5 years and the remaining 46(15.3%) between > 5 years and 13 years. The age and sex distribution of the children is shown in Table 1.

**Table 1: Age and sex distribution of the children**

Age	Sexes		Total Group No. (% of 301)
	Male	Female	
3months-1year	49	39	88 (29.2)
1-2 years	34	31	65 (21.6)
2-3 years	27	25	52 (17.3)
3-4 years	19	10	29 (9.6)
4-5 years	10	11	21 (7.0)
5-6 years	6	11	17 (5.6)
6-7 years	5	6	11 (3.7)
7-8 years	3	3	6 (2.0)
8-9 years	2	4	6 (2.0)
9-10 years	1	0	1 (0.3)
10-11 years	1	1	2 (0.7)
11-12 years	1	1	2 (0.7)
12-13 years	1	0	1 (0.3)
Total	159	142	301 (100)

**Symptoms at presentation**

All the patients presented with fever. Cough, vomiting and frequent stools were the other common complaints. Most patients 272(90.4%) complained of more than one symptom at presentation, while 29(9.6%) complained of fever only. Table 2 shows the symptoms which the children presented with.

**Interval between when fever was noticed and presentation.**

Of the total 301 patients studied 201(66.8%) had been running fever for at least 3 days before presentation. These patients were also receiving some form of treatment at home. Amongst the 21 patients that presented with severe anemia, home treatment was given for at least 3 days in 20(95.2%).

**Table 2: The presenting features in the 301 children.**

Symptoms at Presentation	Number of children in the category	Percentage of total 301
Fever	301	42.9%
Cough	126	18.0%
Vomiting	116	16.5%
Diarrhea	60	8.6%
Poor feeding/ feed refusal	37	5.3%
Chills	18	2.6%
Convulsions	10	1.4%
Headache	9	1.3%
Dark urine	7	1.0%
Abdominal pains	6	0.9%
Weakness	4	0.6%
Irritability	2	0.3%
Loss of consciousness	2	0.3%
Restlessness	1	0.1%
Body aches	1	0.1%
Inability to sleep	1	0.1%
Total	701	100.0%

Amongst the 10 patients that developed febrile convulsion 6 (60.0%) convulsed on the day the fever was noticed while the remaining 4(40.0%) convulsed at least 3 days after the fever was noticed. Concerning the patient with cerebral malaria, fever was noticed 4 days before presentation while the patient with prostration had been noticed to be febrile for 2 days before presentation and the child with hyperpyrexia had been febrile for one day.

#### Severity of malaria

Two hundred and sixty-one (86.7%) children presented with non-severe malaria while 40(13.3%) presented with severe malaria. Concerning the 40 children who presented with severe malaria; severe anemia, febrile convulsions, persistent vomiting, prostration, cerebral malaria and hyperpyrexia were found in 24(60.0%), 10(25.0%), 2(5.0%), 2(5.0%), 1(2.5%) and 1(2.5%) case respectively.

#### Drugs administered at home

Paracetamol was the drug most commonly administered to the children at home. It was given as a monotherapy in 82 instances and in combination with other drugs in the remaining 126. Chloroquine

was the most common anti-malaria drug administered at home; it was administered as a monotherapy in 12 and with other drugs in 81. Artemisin was administered as a monotherapy in a single patient and rightly as an anti-malaria combination therapy in 5 children and in combination with chloroquine in 2 patients. The

other anti-malarials administered at home are Sulfadoxine-pyrimethamine, Amodiaquine and Sulphametopyrazine-pyrimethamine. Haematinics were given to 55 children in combination with paracetamol or with anti-malarials. Antibiotics were administered to 13 patients, while local herbs were given to 6 children. Table 3 gives the details of the drugs administered at home.

**Table 3: Drugs Administered prior to Admission**

	Monotherapy (on its own)	In combination with other drugs	Total
Paracetamol	82	126	208
Bonababe	1		1
Teething powder	1		1
Nospamin	1		1
Chloroquine	12	81	93
Amodiaquine	2	3	5
Sulphametopyrazine-pyrimethamine	1		1
Artemisin	2	3	5
Sulfadoxine-pyrimethamine	2	3	5
Multivite		43	43
Iron containing Vitamin C		6	6
		2	2
Folic acid		1	1
Flagyl		5	5
Co-trimoxazole		3	3
Amoxicillin		3	3
Ampiclox		2	2
Herbs		6	6
Promethazine		4	4
Piriton		2	2
Cough svrup		6	6
Anti-helminthics		1	1
Total	104	300	404

#### Reasons for not administering the correct Anti-malaria combination drugs

Five (1.7%) of the 301 patients studied received the correct anti-malaria combination therapy before presentation at the health facility. Among the 40 patients who presented with complicated malaria only one was on Artemisin Combined Therapy ACT medication before presentation. This patient presented with febrile convulsion. The mothers of the 296 patients who were not on ACT, said they are not aware of the recommendation to treat malaria with ACT.

#### Laboratory tests carried out prior to presentation

No laboratory investigations had been carried out on any of the subjects prior to the laboratory investigations conducted on all the patients at our health facility.

#### Other health facilities consulted prior to our hospital.

Of the 301 children studied 198 (65.8%) children were treated at home by their parents with left over stocks of drugs. The patent medicine stores were consulted by 70(23.3%) patients, maternities by 8(2.7%), government hospitals by 7(2.3%), pharmacies by 6(2.0%), other medical practitioners by 6(2.0%), private hospitals by 5(1.7%) and a primary health center by 1(0.3%) patient. However, none of the health facilities consulted prescribed the appropriate or the recommended anti-malaria combination for their clients.

**Table 4: Relationship between the mothers' education status and administration of ACT**

Educational Status classification	Number (%) of mothers who administered ACT	Number (%) of mothers who did not administer ACT	Total number of mothers in the class
Class I	4(25.0%)	12(75.0%)	16
Class II	1(0.8%)	132(99.2%)	133
Class III	0(0.0%)	152(100.0%)	152
Total	5	296	301

$$\chi^2=9.77, P=0.04. df=4 \text{ (Williams criterion likely ratio applied).}$$

#### Discussion

The management of malaria had hitherto been centered mainly in health facilities.<sup>8,9</sup> The present study however shows that majority of care givers give some form of treatment at home prior to presentation at the health facility. The potential advantages of managing children with malaria correctly and promptly at home are many. They include the prevention of complications of the disease, reduction of length of morbidity and of service charges of the medical practitioner consulted.<sup>10-12</sup>

The roll back malaria initiative stipulates that individuals with malaria should be diagnosed and treated promptly. Presumptive treatment of malaria at home without prior investigations was the norm in this study. *Malik et al*<sup>10</sup> and *Oyedeji et al*<sup>13</sup> also documented similar practice at Sudan and Nigeria. The laboratory investigation of blood film microscopy is however the gold standard for the confirmation of malaria diagnosis.<sup>5</sup> Other laboratory tests have the disadvantage of longer processing, increased cost and not being quantitative or specific.<sup>14</sup> A blood film microscopy however costs between 2-4 dollars. Given at that, this may be too

#### Educational status of care giver

The mother was the primary care giver in all cases at home. Sixteen (5.3%) mothers were in social class I, 133(44.2%) in class II and 152(50.5%) in class III. The differences between the 4(25.0%) of the 16 mothers in class I who used the correct anti-malaria combination therapy for their children compared with the 1 (0.8%), of the 133 mothers in class II who also used the correct anti-malaria combination for their children are statistically significant ( $P<0.000$ ). None of the 152 without formal education or below primary six completed education used the appropriate anti-malaria combination therapy for their children.

expensive for some of our clients and be responsible for their preferring presumptive treatment. Administration of the antipyretic paracetamol was the most common home treatment in this study with the administration of antimalarials, especially chloroquine being the next common. Unfortunately, recent studies conducted by the Nigerian Federal ministry of health on malaria, have shown that the level of resistance to chloroquine is high.<sup>15</sup> The discovery of this fact led to the change in the malaria treatment policy and the recommendation of the use of artemisin based combination drugs as the malaria treatment policy. However, our findings on the persistent use of the anti-malarial, Chloroquine in this study are similar to those obtained in other studies<sup>8,15-16</sup> and support the statement that old customs die hard. Chloroquine is also very cheap. The administration of anti-pyretic monotherapy which was the case in this study may lead to the development of complicated malaria. Anti-pyretics may mask fever and pains there by giving an erroneous feeling to the caregiver that the ill child is being managed well. Other drug groups used in the present study are haematinics and antibiotics. Administration of haematinics may be easier for the



care giver because they are less expensive, more palatable, fancifully packaged and easier to administer to children compared with anti-malarials. All the patients that developed cerebral malaria, prostration, hyperpyrexia and the majority of those presenting with severe anemia had been noticed to be febrile for at least two days. Timely administration of ACTs could have prevented many of the complications because the artemisin as a monotherapy or combination drug has been shown to be efficacious with parasite and fever clearance time of less than 48 hours.<sup>17,18</sup>

Less than 2% of the subjects studied used the effective artemisin based combination, thus suggesting that the policy change of the Nigerian Federal ministry of health is still far from getting through to the populace. Thus ignorance on the part of the care givers concerning use of ACTs was the main reason given for not using these drugs. It is also possible that the government policy change regarding the use of ACT for malaria therapy has not got through to the majority of health service providers. This would seem to be the implication of the lack of positive impact of the health service facilities consulted by the mothers of the children studied on the drugs prescribed for or taken for malaria by the children. This then is most likely to be responsible for the finding in previous studies that the knowledge and practice of health workers regarding the management of malaria in accordance with current guidelines, are poor.<sup>19,20</sup>

In order to improve the quality of home care among children with malaria in this and similar communities, the mothers and the general public should be educated concerning the secondary place of antipyretics vis-à-vis the early commencement of ACT or alternative appropriate combinations. Also, because of the loss of efficacy of chloroquine to parasite resistance, the government should consider substantially subsidizing the cost of other more effective anti-malarials side by side with making chloroquine unavailable over the counter except on prescription. The latter recommendation is necessitated by the need to curb the habitual choice of chloroquine for malaria treatment. Furthermore the appropriate government agencies should train and retrain health workers on the current management modalities of malaria. Finally, the appropriate drugs should be made easily accessible and affordable in order to ensure their use.

## References

1. Orimadegun AE, Fawole O, Okereke JO, Akinbami FO, Sodeinde O. Increasing burden of childhood severe malaria in a Nigerian tertiary hospital: Implications for control. *J Trop Pediatr*. 2007;53: 185-9.
2. Breman JG, Alilio MS, Mills A. Conquering the intolerable burden of malaria; Whats new, whats needed: a summary. *Am J Trop Med Hyg* 2004;71:1-15.
3. Narasimhan V, Attaran A. Roll back malaria? The scarcity of international aid for malaria control. *Malaria Journal* 2003;2:8
4. Ajayi IO, Browne EN, Garshong B, Bateganya F, Yusuf B, Agyei-Baffour P, Doamekpor L, Munquti K, Cousens S, Pagnoni F. Feasibility and acceptability of artemisin-based combination therapy for the home management of malaria in four African sites. *Malar J* 2008; 7:6
5. Pasvol G. Malaria. *Africa Health* 2006; 28:15-20
6. Singhal T. Management of severe malaria. *The Indian journal of Pediatrics* 2004; 71:81-8
7. Oyedeki GA, Olamijulo SK, Osinaike AI, Esimai VC, Odunusi EO, Aladekomo TA. Secular trends in the growth of children aged 0-6 years in a rural Nigerian community. *Annals of Tropical Paediatrics* 1996;16:11-17.
8. Ogunlesi TA, Okeniyi JAO, Oyedeki GA, Oyedeki OA. The influence of maternal socioeconomic status on the management of malaria in their children: implication for the roll back malaria initiative. *Nigerian Journal of Paediatrics* 2005; 35:40-46.
9. Runsewe-Abiodun TI, Olanrewaju DM. Management of malaria in Nigerian children-Recent advances. *Nigerian Hospital Practice* 2007;1:89-95
10. Malik EM, Hanafi K, Ali SH, Ahmed ES, Mohamed KA. Treatment-seeking behaviour for malaria in children under five years of age: Implication for home management in rural areas with high seasonal transmission in Sudan. *Malar J* 2006;5:60
11. Sirima SB, Konate A, Tiono AB, Convelbo N, Cousens S, Pagnoni F. Early treatment of childhood fever with pre-packaged anti-malarial drugs in the homes reduces severe malaria morbidity in Burkina Faso. *Trop Med Int Health*. 2003;8 :133-9
12. Larson BA, Amin AA, Noor AM, Zurovac D, Snow RW. The cost of uncomplicated childhood fevers to Kenyan households: implications for reaching international access targets. *BMC Public Health*. 2006; 6:314
13. Oyedeki OA, Aremu AA, Adebami OJ, Oningbide MO, Oyedeki GA. Complex febrile convulsion in an African child. *The Internet Journal of Neurology* 2006;5:2
14. Almeida A, Mehta A. Malaria and anaemia. *Postgraduate Doctor Africa* 2001,23: 61-63
15. National anti-malaria treatment guideline 2004. Federal Ministry of Health. Malaria and vector control division, Abuja Nigeria.
16. Isah EC, Ofili AN, Ogbebor CE, Obahiagbon I, Isah AO. Knowledge of malaria and the practices towards its control among urban dwellers in Benin city *Nig Postgrad Med J* 2007;14:125-8
17. Hassan MA, Ashton M, Kihamia CM, Mtey GJB, Bjorkman A. Clinical efficacy and pharmacokinetics of artemisin monotherapy and in combination with mefloquine in patients with falciparum malaria. *Br J Clin Pharmacol* 1996;41:587-92
18. Tjitra E, Suprianto S, Currie BJ, Morris PS, Saunders JR, Anstey NM. Therapy of uncomplicated malaria: a randomized trial comparing artesunate versus sulfadoxine-pyremethamine alone in Irian Jaya, Indonesia. *Am J Trop Med Hyg* 2001; 65:309-17
19. Ogungbamigbe TO, Ogunro PS, Elemile PO, Egbewale BE, Olowu O.A, Abiodun OO. Prescription patterns of antimalarial drugs among medical practitioners in Osogbo metropolis South-West Nigeria. *Tropical Medicine and Health* 2005;33:201-205.
20. Ariba AJ, Osiberu B, Iyaniwura CA, Dada OA. Hospitals workers' practice of malaria prevention and treatment in Sagamu: Implications for malarial control in the community. *Nigerian Medical Practitioner* 2006;49:164-168