

HOME TREATMENT PRACTICES OF MOTHERS OF CHILDREN WITH "MALARIA" IN AN URBAN SETTING IN SOUTH WESTERN NIGERIA

O.M. ALABI¹, M.K. OMOLE², O.O. AYOOLA³ AND A.A. ADEPOJU-BELLO⁴

¹University Health Services, University of Ibadan, Nigeria,

²Department of Clinical Pharmacy, University of Ibadan, Nigeria,

³Department of Paediatrics, University College Hospital, Ibadan, Nigeria,

⁴Department of Pharmaceutical Chemistry, University of Lagos, Nigeria.

Correspondence author

Alabi, Olutosin Monilola; University Health service, University of Ibadan, Nigeria.

E-mail: alabimonitosin@yahoo.com Phone no: 2348023419894

Résumé

Le traitement prompt et efficace des enfants atteints de paludisme forme l'une des pierres angulaires de l'initiative de la santé publique pour contenir le fléau du paludisme. Une bonne connaissance de la gestion thérapeutique correcte des enfants ayant l'infection par les mères et les donneurs de soins est cruciale pour la réalisation de cet objectif et pratiques correctes réduiraient aussi le taux en augmentation de la résistance au palu de plusieurs médicaments. Il y a des informations limitées concernant le traitement à la maison du palu parmi les mères ayant un statut socio-économique moyen ou élevé. En conséquence, une évaluation des pratiques de traitement à la maison du palu par les mères des enfants se présentant au centre de santé d'une communauté de l'université a été effectuée.

Objectif : évaluer les pratiques des traitements à la maison du palu par les mères des enfants se présentant au centre de santé d'une communauté de l'Université.

Méthode : un total de 159 paires mères - enfant s'étaient inscrits. Les données ont été collectées avec des questionnaires structurés administrés aux mères des enfants inscrits. Des enfants âgés de un- 144 mois, avec de la fièvre et le parasite asexuel *P.falciparum* lors de l'examen du film du sang épais pour les parasites de paludisme, ont été étudiés. L'étude a été effectuée entre Août et Septembre 2004.

Résultat : La majorité (145, 91, 2 %) des mères traitait leurs enfants à la maison avant de se présenter à la clinique. La chloroquine était l'antipalu le plus souvent administré (41,5%), suivi du sulphadoxine- pyriméthamine (6,3%), l'amodiaquine (1,9%) le halofantrine et l'artémisinine (0,6% chacun). La plupart des mères ont donné des doses incorrectes des médicaments et la prise conforme du médicament était réduite avec l'augmentation des jours de l'administration des médicaments. Environ 62% des mères ont obtenu des médicaments des pharmacies de la communauté alors que le reste des médicaments achetés antérieurement était utilisé par 15,1%

Conclusion : Il est nécessaire d'éduquer urgemment de manière appropriée les mères sur l'administration des médicaments à la maison.

Mots-clé : Antipalu, Plasmodium, thérapie, donneurs de soin.

Abstract

Prompt and effective treatment of children with malaria forms one of the cornerstones of public health initiative to contain the scourge of malaria. A good knowledge of the correct therapeutic home management of children with the infection by mothers and caregivers is crucial for the realization of this objective and correct practices would also reduce the rising rate of multi-drug resistance to malaria. There is limited data relating to home treatment of malaria among mothers with middle/high socioeconomic status. Therefore, an assessment of home treatment practices of malaria by mothers of children presenting to the health centre of a University community, was carried out.

Objective: To assess the home treatment practices of malaria by mothers of children presenting at the health centre of a University community.

Method: A total of 159 mother-child pair was enrolled. Data was collected with structured questionnaires administered to the mothers of the enrolled children. Children aged 1 - 14, months with fever and *P. falciparum* asexual parasitaemia on examination of thick blood film for malaria parasites were studied. The study was carried out between August and September 2004.

Result: Majority, (145, 91.2%) of the mothers treated their children at home before presenting at the clinic. Chloroquine was the most commonly administered antimalarial (41.5%), followed by sulphadoxine-pyrimethamine (6.3%), amodiaquine (1.9%) halofantrine and artemisinin (0.6% each). Most mothers gave incorrect drug dosages and drug compliance was reduced with increased number of days of administration of the drugs. About 62% of mothers obtained drugs from community pharmacies while left over drugs from previous purchase were used by 15.1%.

Conclusion: There is need for urgent and appropriate education of mothers about correct drug administration for home management of malaria.

KEYWORDS: antimalarial, *Plasmodium*, therapy, caregivers.

INTRODUCTION

Malaria is characterized by chills, fever, anaemia, splenomegaly and damage to organs such as the liver and brain. It could be an acute or chronic mosquito-borne disease in man. Malaria is still Africa's leading health problem, though, an ancient disease with a very high annual mortality and morbidity which seriously cripples human productivity¹. Malaria is caused by the presence of a unicellular parasite, a protozoon, belonging to the genus *Plasmodium* in the red blood corpuscles and in liver cells of man. The protozoon is transmitted to man by the bite of infected female mosquitoes of the genus *Anopheles*.

It can also be transmitted congenitally via the placenta of an infected mother, or following blood transfusion from a donor with malaria.

More than 95% of the cases of malaria in the world is caused by various species of plasmodia, with *Plasmodium falciparum*, *P. ovale*, *P. vivax* and *P. malariae* being the most important¹. There are approximately 200 to 500 million new cases of malaria each year in the world and the disease is the direct cause of 1 to 2 million deaths per year globally, primarily in children². It occurs in over 200 countries worldwide but mainly in the tropical and sub tropical regions. According to the World Health Organization (WHO, 2003) report, 56% of the world population live in the malaria endemic regions.³ Over 80% of the world's cases of malaria occur in Africa with the disease being highly stable in West

Africa with peak transmission during the rainy season. Nigeria is holoendemic for malaria with a high stability index⁴.

World Health Organization expert committee recommends that the principal control strategy for malaria in countries with high mortality rates and scarce resources such as Nigeria should be prompt treatment of all patients with drugs. These drugs may be administered at home especially in local communities, which are far from health care centers. The WHO home-based-management (HBM) of uncomplicated malaria recommends that the treatment must be carried out within 24 hours and if within 48 hours there is no clinical improvement, the case should be reported to the Health Care Center⁶. This prompt and effective treatment for children with malaria forms one of the cornerstones of Roll Back Malaria (RBM), which aims to halve malaria mortality by the year 2010. One of the strategies of achieving this is a good knowledge of the correct therapeutic management of children with the disease by those who take care of them.⁷ This strategy is more crucial now with the emergence and spread of strains of *P. falciparum* resistant to chloroquine in Nigeria.⁸

Mothers and caregivers constitute a group whose actions are important in the success of the RBM strategy for malaria reduction. There is paucity of data on the knowledge and treatment practices of mothers especially those that are educated and are of middle / high socioeconomic status. Since self-treatment with drugs purchased from unregistered sources is detrimental⁹, it is therefore important that mothers and other caregivers should have basic knowledge of the proper source and how to administer the correct dosage of antimalarial drugs.

Many African countries have individual national treatment guidelines. To maximize drug efficiency and to slow the relentless spread of resistance, countries are now being urged to consider the use of combination therapy involving concurrent treatment with more than one antimalarial drug. In Nigeria, chloroquine is the first line drug treatment for uncomplicated malaria¹⁰. Chloroquine is fast acting, well tolerated and inexpensive¹¹, although very recently, Policy Makers in Nigeria are considering management of malaria with combination therapy due to high resistance of *P. falciparum* malaria to chloroquine. The second line antimalarial drug is Amodiaquine and in some cases Sulphadoxine-Pyrimethamine. Lack of prompt administration of antimalarials at the correct dose and appropriate dosage regimen may compromise the health of the child and encourage the spread of drug resistance. Correct use of an effective antimalarial drug will not only shorten the duration of illness but also reduce the incidence of complications and the risk of death¹². In addition, irrational use of antimalarial drugs and limited knowledge of the mothers about correct use of antimalarials can lead to sub-optimal dose administration to children which will eventually have a significant influence on the child's body's resistance

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to the drugs^{9,12}. The identification of symptoms and appropriate malaria treatment within the community are the vital first steps in reducing malaria morbidity and mortality¹³. This work was therefore carried out to document prevalence of malaria among children presenting with fever in a middle/high socio-economic community, to document the treatment practices by mothers of these children and to make recommendations to improve home treatment practices of malaria.

METHOD

Study Area

The study was carried out at Jaja Clinic, University of Ibadan, a community that cuts across the various socio-economic groups with reference to their occupational and educational status. The subjects were drawn from those attending the Out Patient Clinic which serves the staff and their dependants and both undergraduate and postgraduate students. General clinics are run daily and there are few beds reserved for patients under observation. The clinic runs for 24 hours daily and an average of 374 children are seen monthly. Cases of complicated malaria and severe illness of any kind are referred to specialist hospitals. The University at the time of study has a population of about 14,000 students, 5,000 staff and about 10,000 children excluding other relations.

Study Design:

This was a cross-sectional semi experimental study carried out during the rainy season, between August and September, 2004. Mothers who brought children aged 1 month – 144 months with fever for medical consultation at the out patient clinic were enrolled. The study was explained in detail to the mothers and informed consent was obtained before their enrolment into the study. Children aged 1–144 months with fever and *P. falciparum* asexual parasitaemia on examination of thick blood film for malaria parasites were recruited into this study. Children without fever and those whose mothers did not give consent for laboratory test of blood film for malaria parasites and packed cell volume were excluded from the study.

A total of 159 mothers and caregivers were interviewed and 159 children were examined clinically. Interviews were conducted using questionnaires that sought information on demographic characteristics, complaint at presentation, dosages and duration of the drugs (names if known) administered at home before presenting at the clinic. Questions on the home treatment practices of mothers (including compliance) were directed to the child's mother. Mothers were interviewed before their children were seen by the doctor except when the child was very ill. Ethical approval for the study was obtained from the authorities of the University Health Service, University of Ibadan.

All the clinical and laboratory data collected on each subject were entered into a microcomputer using the SPSS version

11 software package. Data analyses were done with the same software package. Baseline demographic data were expressed as mean or percentage.

RESULTS

54% of caregivers were either professionals or skilled workers and most mothers (92.3%) had at least secondary school education. The ages of the children ranged from 1–144 months with a mean of 58.5 months. Male children were over half (54.1%) of all the enrolled children and 60.4% of the children with fever enrolled into the study were between the ages of 1 month – 5 years. 76% of all the children had presence of malaria parasite confirmed in their blood film.

Most mothers (91.2%) administered at least one drug before presenting their children at the clinic (Table 1). The drugs were obtained from various sources (Table 2). Majority, 62.3% of the mothers claimed to have obtained their drugs from a pharmacy. Left over drugs from previous purchases were used by 15.1% of mothers and 5.7% obtained drugs from patent medicine stores.

Table 1: Frequency of mothers involved with home treatment

Response	Frequency	Percentage	Cumulative Percentage
YES	145	91.2	91.2
NO	14	8.8	100.0
Total	159	100	

Table 2: Sources of drugs

Source	Frequency	Percentage	Cumulative Percentage
Hospital	7	4.4	4.4
Health Centre	4	2.5	6.9
Chemist	99	62.3	69.2
Left Over At Home	24	15.1	84.3
Obtained From Neighbourhood	1	0.6	84.9
Others	1	0.6	85.5
Patent Medicine	9	5.7	91.2
Missing System	14	8.8	100.0
Total	159	100.0	

Table 3 shows the different drugs administered to the children at home before presenting at the Clinic. Paracetamol was the most frequently administered drug, given by 75.5% of the mothers. It was either given alone or in combination with an antimalarial drug or antibiotic. About 42% of the mothers administered chloroquine before presentation at the health service. Bonababe® (each 5ml contains Paracetamol BP 120mg, conc. Dill water 0.05ml

and-diphenylhydramine HCl BP 6.25mg) was given by 1.9% of the mothers, while Maxiquine® (each 5ml contains chloroquine phosphate 80mg, promethazine HCl 3mg, paracetamol 100mg) was given by 3.1% of the mothers. Some of the mothers also administered antibiotics. Quinine and mefloquine were not administered to the children before presentation at the clinic.

Table 3: Drugs given for "malaria" treatment by mothers before presenting at the clinic

Drug	No. of mother n = 159	% of all mothers
Paracetamol	120	75.5
Chloroquine	66	41.5
Sulfadoxine-pyramethamine	10	6.3
Co-trimoxazole	10	6.3
Piriton (Chlopheniramine)	6	3.8
Ampicillin/Cloxacillin	4	2.5
Camoquine	3	1.9
Halofanthrine	1	0.6
Artemisinin	1	0.6
Chloramphenicol capsule	1	0.6
Sporidex (Cephalexin)	1	0.6
Amoxicillin	1	0.6
Quinine	-	-
Meflogine	-	-
Arthemeter	-	-
Artesunate	-	-
Bonababe	3	1.9
Maxiquine	5	3.1

The dosage and regimen of the administered drugs were assessed. A high percentage (69.7%) of the mothers who administered chloroquine on the first day of the treatment followed the recommended regimen of once daily dosing of chloroquine but only 15.0% of them administered the correct dosage (Table 4). More than one-third of the mothers (20 out of 66 mothers), administered chloroquine more than the once daily regimen on each of the three day course of chloroquine treatment. The number of mothers that complied with the chloroquine regimen of once daily dosing reduced with increased number of days of treatment. Few mothers administered chloroquine beyond the 3-day course recommended.

Table 5 shows treatment practices of mothers with paracetamol. About 44% of them administered it thrice daily to control the body temperature of their children while the others administered it more or less than thrice daily. Fewer mothers gave the drug as the number of days of treatment increased.

All the mothers that administered Sulfadoxine pyrimethamine (S-P) to their children gave the only dose on day one while 20% of them still gave a single dose on day 2 (Table 6). None gave the S-P twice daily. Correct dosage based on the age of the child was administered by most of the mothers on the first day. Home treatment practices of mothers with Maxiquine® are shown in Table 7. Five mothers gave Maxiquine® and most of them gave incorrect dosage. Only 3 mothers gave Amodiaquine, though they all gave it as a stat dose on day 1, none of them gave the correct dose.

Table 4: Dosage regimen and assessment of chloroquine doses given by mothers

Treatment Practices	Day 1 n=66	Day2 n=31	Day3 n=22	Day4 n=3	Day 5 n=2
	*N(%)	N(%)	N(%)	N(%)	N(%)
No of times per day					
o.d.	46(69.7)	17(54.8)	10(45.5)	1(33.3)	1(50.0)
b.d.	16(24.2)	11(35.5)	9(40.9)	1(33.3)	1(50.0)
tid	4(6.1)	3(9.7)	3(13.6)	1(33.3)	-
Total	66	31	22	3	2
Dosages given					
Correct	10(15.0)	4(12.9)	2(9.1)	-	-
Incorrect (Under dose or over dose)	56(85.0)	27(87.1)	20(90.9)	3(100)	2(100)

*N(%) = Number of mothers (percentage)

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Table 5: Dosage regimen of Paracetamol given by mothers

Treatment Practices	Number (n=120)	Percentage (100%)
No. of times/day		
o.d.	44	36.7
b.d.	20	16.7
t.i.d.	53	44.1
q.d.	3	2.5
No of days		
1	60	50.00
2	25	20.83
3	22	18.33
4	6	5.0
5	6	5.0
>5	1	0.83

Table 6: Dosage regimen of Sulfadoxine-Pyrimethamine (S-P) and adequacy of doses given by mothers

S-P Treatment Practices	Day 1 (n=10)	Day 2 (n=2)
	*N(%)	*N(%)
No of times/day		
Stat.	10(100)	2(100)
b.d.	-	-
Dosages given		
Correct	6 (60)	-
Incorrect (Under dose or over dose)	4 (40)	2(100)

*N(%) = Number of mothers (percentage)

Table 7: Dosage regimen and adequacy of Maxiquine® doses given by mothers

Treatment Practices	Day 1 (n=5)	Day 2 (n=5)	Day 3 (n=4)
	*N(%)	N(%)	N(%)
No of times			
Stat.	2(40)	2(40)	2(50)
b.d.	1(20)	1(20)	-
tid	2(40)	2(40)	2(50)
Dosages given			
Correct	1(20)	1(20)	1(25)
Incorrect (Under dose or over dose)	4(80)	4(80)	3(75)

i(%) = Number of mothers (percentage)

DISCUSSION

76% of the febrile children enrolled for this study had detectable malaria parasites in their blood film. This is an indication that home management (HBM) of malaria based on detection of fever by mothers would be correct in most of the cases, especially in holoendemic areas like Nigeria. This confirms fever as a major symptom of malaria in this area, hence mothers need to be taught the rational use of first line antimalarial like chloroquine at the household level. Most mothers (53.9%) were found to be skilled workers or professionals, an indication that majority of the mothers were above average educational status. This may explain why most of the mothers got their drugs from pharmacies, which is the preferred source. Some mothers' financial capability made the more expensive antimalarial drugs like Halofanthrine, which ought not be obtained without prescription¹², affordable. However, it has been discovered that in Africa, unregistered shops like patent medicine shops are the main source of antimalarial drugs^{14,15}. High level of literacy based on their occupational status in this community must have accounted for the majority of the mothers imbibing the WHO initiative of home based management of malaria⁶ as they had all administered drugs to their children before presenting them at the Clinic. Results shown in Tables 3 and 4 indicate that there is adequate awareness of Chloroquine usage as an antimalarial but mothers are not knowledgeable about the correct regimen to use and this is the major cause of treatment failure. This result is in agreement with the findings of several workers on poor compliance with Chloroquine among mothers with low economic status^{9,17,18,19}. This shows that poor compliance with Chloroquine cuts across the various socio-economic status. Since mothers are most of the time the first to identify fever in their children and also to provide presumptive treatment for malaria, mothers should be properly educated on the appropriate antimalarial to use at home. Mothers should also be encouraged to use Chloroquine at home and should be educated on the correct dosage regimen.

Paracetamol was used by most mothers (75.5%) as an antipyretic. This is useful as a supportive therapy to other physical measures such as tepid sponging, in bringing down the body temperature of the children. A report by Fawole *et al*⁸ has also confirmed the use of paracetamol by 81.8% of mothers studied. Majority of the mothers administered Paracetamol correctly. This is probably because of numerous adverts on the mass media by pharmaceutical companies, which create awareness about the use of the drug⁸. Most mothers did not follow the regimen for Chloroquine administration and incorrect dosage was common. The complete dosage regimen of chloroquine is 10 mg/kg on day one and day two and 5 mg/kg on day three^{22,23,24}. The non-compliance with dosage regimen for chloroquine and its discontinuation after the first day by more than half of the mothers (Table 4) may be due to the fact that their children were symptomatically relieved.

Mothers did not commonly use Sulphadoxine-

Primingethamine as the first line drug in home treatment of 'malaria' as compared to chloroquine. This may be due to the fact that chloroquine exhibits a faster fever abatement and faster antimalarial action than Sulphadoxine-Pyrimethamine¹². In Nigeria, Sulphadoxine-Pyrimethamine is registered as a second line drug in the treatment of uncomplicated falciparum malaria and is advised to be taken as a stat dose⁹. Warhust²¹ however suggested that it could be used as an alternative first line drug in patients with uncomplicated falciparum malaria except when prompt antimalarial action is needed because it is slower in action than chloroquine. Amodiaquine was also not commonly administered by mothers at home. The doses and the regimen of the administered amodiaquine were incorrect, probably because of inadequate knowledge of the correct dose and regimen, or because it is not as popular and as cheap as chloroquine or due to the fatigue associated with the use of the drug. The correct regimen is a daily dose for three days.

The use of Maxiquine[®] by the mothers of children studied reflected an inadequate knowledge of the components of this drug. According to the manufacturer, each 5.0ml of Maxiquine[®] syrup contains chloroquine phosphate 80.0mg, paracetamol 100.0mg and Promethazine HCl 3.0mg, and the dosage regimen for paracetamol is 60.0–120.0mg for 3 months to 1 year old, 120.0–250.0mg for 1–5 year old and 250.0–500.0mg for 6–12 year old up to a maximum of 4 doses in 24 hours¹¹. Despite the manufacturer's warning that it should not be given to children under-two, one of the mothers administered an overdose of it to a 6-month old child, giving it thrice a day. Maxiquine[®] is recommended as a single daily dose for 3 days by the manufacturer. It was also observed that some of the mothers took paracetamol syrup simultaneously with Maxiquine[®] despite the presence of paracetamol in the Maxiquine[®] formulation. Thus, it is clear that a multi-component antimalarial drug like Maxiquine[®] may encourage over dosage of all or some of its components and its unadvised use should be discouraged.

Mothers and caregivers should also be advised that Halofanthrine and Artemisinin should be used mainly in situations involving drug-resistant strains of plasmodium and should therefore not be used except on prescription¹². The results showed that there is a high occurrence of malaria (60.4%) in children less than 5 years of age. This may be because their immunity to malaria is at the developing stage and this makes them more prone to malaria infection.

Mothers should be counseled against indiscriminate and improper use of antimalarial drugs at home and educated on the implication of incorrect dosing especially the administration of sub-therapeutic doses and incomplete course of therapy. Mothers should also be educated on the appropriate source to procure their drugs to prevent the use of fake drugs and subsequent emergence of resistant strains of *P. falciparum*. There is the urgent need for

education programmes for mothers and caregivers in the community on rational use of first line antimalarial drug such as Chloroquine and amodiaquine at household level. This would prevent therapeutic failure with antimalarial drug especially chloroquine and reduce the emergence and spread of resistant strains of *P. falciparum* among children in the community.

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