

## How effective are trained role model caregivers in prompt presumptive treatment of malaria of under 5 children in Kaduna state, North western Nigeria?

Abubakar AA.<sup>1,2</sup>, Sabitu K.<sup>1</sup>, Jansen A.<sup>3</sup>, Preacely N.<sup>2</sup>, Sufiyan MB.<sup>1</sup>, Idris SH.<sup>1</sup>, Gobir AA.<sup>1</sup>, Ibrahim MS.<sup>1</sup>, Ajayi IO.<sup>4</sup>

### Abstract

**Objective:** Malaria is Africa's leading cause of under 5 mortality, constituting 10% of the overall disease burden. A major strategy for reducing the burden of malaria is prompt access to effective antimalarials. Community Case Management of malaria (CCMm) can be used to achieve the 80% treatment target of uncomplicated malaria within 24 hours of onset of symptoms. CCMm aims to train selected community members to recognize symptoms of malaria and give appropriate early and prompt treatment. We conducted this study to assess CCMm in trained Role Model caregivers (RMCs) of under fives in Kaduna state, Nigeria.

**Methods:** We conducted a descriptive cross sectional survey in Kaduna state. A sample of 308 RMCs were selected by multistage sampling and interviewed using a standardized questionnaire. The questionnaire had questions on sociodemographic characteristics, malaria transmission and treatment.

**Results:** Mean age (SD) of RMCs was 35.34 years ( $\pm 8.67$ ). Females were 294(95.5%) and 285(92.5%) were literate. Out of 308, 294 (95.5%) correctly identified that malaria was transmitted by mosquitoes. Two hundred and sixty three (85.4 %) RMCs had treated a child under five years for presumptive malaria in the two weeks preceding the survey. Out of 267 children, 232 (88.2%) received the correct dose of antimalarials and 220 (84.3%) were treated within 24 hours of onset of symptoms. Level of education was significantly found to affect receiving the correct dose of antimalarials. ( $p < 0.05$ ).

**Conclusion:** Use of RMCs achieved the 80% treatment target of malaria within 24 hours of onset of symptoms. Continuing training and supervision are necessary for correct dosage to be given.

**Keywords:** malaria, under fives, Community Case management of malaria, caregivers

Corresponding author: Dr Aisha AAbubakar. Email: [draishau@yahoo.com](mailto:draishau@yahoo.com)

<sup>1</sup>Department of Community Medicine, Ahmadu Bello University, Zaria, Nigeria.

<sup>2</sup>African Program for Advanced Research Epidemiology Training.

<sup>3</sup>European Center for Disease Prevention and Control Stockholm, Sweden.

<sup>4</sup>University of Ibadan, Ibadan, Nigeria.

## Quelle est l'efficacité sont formés les soignants modèles de rôle dans le traitement présomptif rapide du paludisme de moins de 5 enfants dans l'Etat de Kaduna, au nord ouest du Nigeria?

Abubakar AA.<sup>1,2</sup>, Sabitu K.<sup>1</sup>, Jansen A.<sup>3</sup>, Preacely N.<sup>2</sup>, Sufiyan MB.<sup>1</sup>, Idris SH.<sup>1</sup>, Gobir AA.<sup>1</sup>, Ibrahim MS.<sup>1</sup>, Ajayi IO.<sup>4</sup>

### Résumé

**Objectif:** Le paludisme est la principale cause de l'Afrique de moins de 5 mortalité, constituant 10% de la charge globale de la maladie. Une stratégie importante pour réduire le fardeau du paludisme est l'accès rapide à des antipaludiques efficaces. Prise en charge communautaire du paludisme (GCCp) peut être utilisé pour atteindre la cible de traitement de 80% du paludisme simple dans les 24 heures suivant l'apparition des symptômes. GCCp vise à former des membres de la communauté sélectionnés à reconnaître les symptômes du paludisme et de donner un traitement précoce et rapide appropriée. Nous avons mené cette étude pour évaluer GCCp aides familiaux Rôle modèles formés (PMR) de moins de cinq ans dans l'Etat de Kaduna, au Nigeria.

**Méthodes:** Nous avons mené une enquête transversale descriptive dans l'Etat de Kaduna. Un échantillon de 308 PMR ont été sélectionnés par échantillonnage multiple et interrogé à l'aide d'un questionnaire standardisé. Le questionnaire avait des questions sur les caractéristiques sociodémographiques, la transmission et le traitement du paludisme.

**Résultats:** L'âge moyen (SD) des PMR était 35.34 ans ( $\pm 8,67$ ). Les femmes étaient 294 (95,5%) et 285 (92,5%) étaient alphabétisés. Sur 308, 294 (95,5%) a correctement identifié que le paludisme a été transmis par les moustiques. Deux cent soixante-trois (85,4%) avaient traité les PMR d'un enfant de moins de cinq ans pour le paludisme présumé dans les deux semaines précédant l'enquête. Sur 267 enfants, 232 (88,2%) ont reçu la dose correcte de antipaludiques et 220 (84,3%) ont été traités dans les 24 heures suivant l'apparition des symptômes. Le niveau d'éducation a été trouvé de façon significative affecter la réception de la dose correcte de antipaludiques. ( $P < 0,05$ ).

**Conclusion:** L'utilisation de PMR a atteint l'objectif de traitement de 80% du paludisme dans les 24 heures suivant l'apparition des symptômes. La formation continue et la supervision sont nécessaires pour un dosage correct à donner.

**Mots-clés:** paludisme, moins de cinq ans, la gestion de cas communautaire du paludisme, les aidants naturels

Auteur correspondant: Dr Aisha A Abubakar. Email: draishau@yahoo.com

<sup>1</sup>Department of Community Medicine, Ahmadu Bello University, Zaria, Nigeria.

<sup>2</sup>African Program for Advanced Research Epidemiology Training.

<sup>3</sup>European Center for Disease Prevention and Control Stockholm, Sweden.

<sup>4</sup>University of Ibadan, Ibadan, Nigeria.

## INTRODUCTION

Globally there were an estimated 198 million cases of malaria and an estimated 584 000 deaths in 2013 (1). Around 90% of these deaths occur in Africa, mostly in young children. Malaria is Africa's leading cause of under five mortality and it also constitutes 10% of the continents overall disease burden (2). Nigeria is one of the countries in sub Saharan Africa with a high transmission of malaria. Children under five years and pregnant women are amongst the high risk groups for malaria in high transmission areas (3).

There are several strategies for reducing the burden of malaria, prompt access to effective antimalarial treatment is one of the major strategies. Prompt access is having treatment available as near to the home as possible given within 24 hours of onset of symptoms. At the Roll Back Malaria summit at Abuja in 2000, Heads of states of African countries made a commitment to ensure that 60% of malaria episodes are adequately treated within 24 hours of onset of symptoms. This target has been revised to 80% of malaria episodes to be adequately treated within 24 hours of onset of symptoms. The aim of this target is to make diagnosis and treatment of malaria available as peripherally as possible in the health system including near the home (4).

Home based management of malaria (HMM) can be used to help achieve this treatment target of uncomplicated malaria with efficacious antimalarials within 24 hours of onset of symptoms especially in areas with poor access to diagnosis and treatment at health facilities (4). The aim of HMM is to train mothers as their children's primary caregivers to recognize symptoms of malaria and give appropriate early and prompt treatment. In other areas core mothers or mother coordinators were selected for malaria training in collaboration with local leaders, communities and women's groups. After training they passed the information to other community members giving the program community ownership (4,5). Home management of uncomplicated malaria in children has been promoted to enhance accessibility to good, efficacious antimalarial chemotherapy within the shortest possible time after development of fever (6). Most recently a change of name from HMM to Community Case Management of malaria (CCMm) has been proposed. CCMm is the strategy recommended by the WHO to improve access to prompt and effective treatment of malaria episodes through trained community

members living as close as possible to where the patients live. HMM is considered to be an inaccurate description of the implementation due to the misinterpretation of the concept to imply availability of drugs freely in the home without a system for regulating use (7).

Malaria is a major public health problem in Africa. (8). In Nigeria malaria is one of the priority diseases for surveillance under the Integrated Disease Surveillance and Response system.

The perception of cause of disease is one of the factors that determine seeking for its cure. Correct perception of the cause of malaria determines what the caregiver would do when a child develops malaria. Across Africa caregivers of children have been found to have different understanding of the cause of malaria and how it is transmitted. The further the distance from the village to the health facility the more likely was the caregiver to use home treatment of malaria. Other caregivers living near health facilities were likely to use health facilities as the first point of call (9,10,14,15). It is recommended to have effective treatment within 24 hours of onset of symptoms. Effective treatment within 24 hours of onset of symptoms varied in the different countries from 32.7%-99.7% (10,16,17). Administering the correct dose of antimalarials also varied from 19.5% to 100% (11,15,16). In some areas there was still use of other antimalarials as first line treatment of malaria despite changes in policy recommending Artemisinin-based Combination Therapy (ACTs) as the first line of treatment (14,17,18). In 2005, Nigeria changed policy for antimalarials as first line treatment from chloroquine to ACT. A multi country study in Ghana, Nigeria and Uganda showed 85% of children were correctly treated as regards the dose and duration of treatment while 90% were treated promptly. However, only 77% of children were treated promptly and correctly (19). Effectiveness of ACTs used in 3 study sites in Sub-Saharan Africa showed 94% of children were treated correctly in terms of drug dosage and duration of administration (20). Presumptive treatment of febrile children with prepackaged antimalarials in HMM programs is likely to increase delivery of effective drugs and improve timing, adherence and dosing of treatment (21). In some rural areas communities had not received sufficient information to enable them to understand the rationale of home based management of fever (22). A study in Sudan in rural areas with high

transmission of malaria showed that promoting adequate case management practices at the community level is necessary as more than half of the caregivers gave some sort of care before presenting to the health facility (23). In Southwest Nigeria, it was found that parasitaemia was present in 80.2% of children whose mothers or caregivers presumed they had malaria. This means that mothers or role model caregivers are not likely to miss many cases of malaria (26). This study was conducted to assess the effectiveness of trained role model caregivers in presumptive treatment of malaria within 24 hours onset of symptoms in under fives.

## MATERIALS AND METHODS

A cross sectional descriptive study was conducted in Kaduna state. Kaduna state is located in Northwestern Nigeria. It shares borders with Sokoto, Katsina, Niger, Kano, Bauchi and Plateau states. Based on the 2006 census projections it has a population of 6.63 million. Kaduna state is administratively divided into 23 Local Government Areas. In each LGA there are several districts and wards. The state is divided into three senatorial zones: Northern (Zone 1), Central (Zone 2) and Southern Senatorial (Zone 3) zones. Kaduna state falls under the high transmission areas of malaria in Nigeria. A 2 day training of caregivers/role model mothers in Community Case Management of malaria (CCMm) in Kaduna state was carried out in 2010 by the Association for Reproductive and Family Health (ARFH). The trainees were selected from civil society organizations in their respective communities. The caregivers/role model mothers selected are meant to serve their whole communities and not just their own families. Five hundred caregivers/role model mothers were trained. A sample of 308 role model caregivers were selected by multistage sampling. In the first stage 21 wards were selected, in the 2<sup>nd</sup> stage RMCs were systematically selected from the list of caregivers in the wards. Trained research assistants interviewed caregivers/role model mothers at the different wards in Kaduna state using structured interviewer administered questionnaires. Data was collected on knowledge of cause of malaria, symptoms of malaria, time of onset of treatment with antimalarials and provision of correct treatment with antimalarials. Correct treatment was deemed to be the right dose for age and correct duration of treatment was three days. Data was analyzed using Epi Info version 3.5.1 in consonance with the objectives of

the study. Proportions were calculated. Chi square and Fishers test were appropriate were used to test for association. Ethical approval was obtained from the Kaduna state Health Research Ethical Committee.

## RESULTS

Age range of role model caregivers was 18 to 60 years. The mean age (SD) was 35.34years ( $\pm 8.67$ ). About 46% were in the age group 29 to 38 years and 95.5% were female. Fifty one percent had secondary school education while 5.8% had no formal or informal education. Ninety two percent were literate. Most respondents were housewives (38.1%) and traders (24.4%).

Ninety five percent correctly identified mosquito bites transmit malaria while symptoms of malaria were correctly identified as fever (89%), headache (68.5%) and loss of appetite (50.6%). Two hundred and seventy six (89.6%) out of 308 RMCs had treated a child with fever in the last 2 weeks before the survey. Two hundred and thirty two (88%) out of 276 gave the correct dose of ACT for the right duration of treatment. Eighty four percent of those who gave treatment gave it within 24 hours of onset of symptoms. Range of starting treatment was 1 to 72 hours with a mean duration of 17.81 hours ( $\pm 14.1$ ). There was a statistically significant relationship between educational level and correct dosage (Fisher exact test  $p = 0.0384$ ). There was no statistically significant relationship between correct knowledge of malaria symptoms and correct dose of antimalarials (Fishers exact test  $p = 0.1019$ ) and literacy level and correct dosage (Chi square test  $p = 0.2607$ )

## DISCUSSION

Good knowledge of malaria determines action to administer antimalarials when needed in this study 95% of RMCs correctly identified mosquitos transmit malaria, in other studies knowledge amongst caregivers that malaria is actually transmitted by mosquitoes ranged from 92% in Northwestern Tanzania (9) to 70-85% in Ethiopia, Madagascar and Eritrea (10,11,12). In West Africa, a study in Ghana showed that 76.4% of caregivers in a rural area were aware that mosquitoes transmitted malaria (13). In South East Nigeria, 88.3% believed that malaria is a disease or illness (14). Other studies in the South West of Nigeria showed in some areas 65% of caregivers were aware that mosquitoes transmitted malaria (15) while in another area



only 3.9% of caregivers in a rural area were aware mosquitoes transmitted malaria (16). The high proportion of correct knowledge of transmission of malaria in this study may be due to the high level of formal education in respondents of this study. To reduce recall bias, respondents who had treated any child less than five years in the 2 weeks preceding the survey were included among this group, 88% of the respondents gave the correct dose of ACT for the right duration of treatment. Eighty four percent of those who gave treatment gave it within 24 hours of onset of symptoms, this is important as treatment seeking behavior improves with training as well as the use of effective antimalarials. Another study showed there was a significant increase in the administration of antimalarials within 24 hours of onset of symptoms as well as adequacy of Artemether-Lumefantrine doses obtained and consumed (24). One of the Abuja targets to Roll Back Malaria is the greater than 80% administration of first line antimalarials within 24 hours onset of symptoms. This study has shown it is feasible to achieve this target using community members. In addition, community effectiveness of malaria treatment has been shown to improve after community interventions with treatment within 24 hours increasing from 80% to 97%. Prompt and effective treatment increased from 32-63%(25). Use of RMCs achieved the 80% treatment target of malaria within 24 hours of onset of symptoms. However this group achieved the treatment target after receiving training therefore continuing training and supervision of the role model caregivers is necessary for correct dosage to be given. The limitations of the study include inability to get a baseline assessment of the knowledge of RMCs before the training they received from the NGO as the change in knowledge may be significant post training compared to pre training levels. In addition there may be misdiagnosis as fever was used to make a diagnosis of presumptive malaria.

**Conflict of Interests:** We declare no conflicts of interest.

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Table 1. Socio demographic profile of Role Model Caregivers in Kaduna state

Variables	Frequency	Percentage
Age		
18-28	65	21.1
29-38	142	46.1
39-48	79	25.7
49-58	16	5.2
>58	6	1.9
Sex		
Female	294	95.5
Male	14	4.5
Highest Educational level		
None	18	5.8
Informal	12	3.9
Primary	75	24.4
Secondary	158	51.3
Tertiary	45	14.6
Occupation		
Housewife	117	38.0
Trader	75	24.3
Farmer	47	15.3
Teachers	25	8.1
Artisan	19	6.2
Others	25	8.1

Table 2. Knowledge about malaria, symptoms and treatment of children less than five years in the two weeks before the survey

Variables	Frequency	Percentage
Knowledge about malaria transmission (n=308)		
Mosquito bites	294	95.5
Working or playing in the sun	7	2.3
Working or playing in the rain	27	8.8
Stagnant water	152	49.5
Dirty environment	154	50.0
Symptoms and signs of malaria (n=308)		
Fever	274	89.0
Headache	211	68.5
Loss of appetite	156	50.6
Vomiting	133	43.2
Chills and rigors	74	24.0
Others	4	0.01
Respondents who treated a child for presumptive malaria in the two weeks before the survey	276	89.6

Table 3. Role Model caregivers who gave the correct dose and correct duration of treatment of malaria (n=276)

Treatment measure	Frequency	Percentage
Correct dose for treatment	244	84.4
Correct duration of treatment	275	99.6
Correct dose and duration of treatment	244	84.4

Table 4. Bivariate analysis for selected demographic factors and correct treatment of malaria

Variables	Frequency (%)	p value( Fishers exact test)
Educational level		
No education/Informal	17	
Formal Education	215	0.0384*
Correct knowledge of malaria symptoms		
Correct knowledge		
Incorrect knowledge	203	
	29	0.1019
Literacy levels		
Literate	222	
Illiterate	10	0.2607

\*p value statistically significant