

The Use of Antimalaria Drugs and Insecticide Treated Nets in Ile-Ife, Nigeria

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ABSTRACT

Background: The Roll Back Malaria Initiative (RBMI) is aimed at halving the malaria mortality in the year 2010 using prompt diagnosis and treatment of malaria and the use of Insecticide Treated Nets (ITNs).

Methods: This is a cross sectional study of children aged 1 month to 14 years with confirmed malaria to assess the burden of malaria and to evaluate the home use of anti-malarial drugs and ITNs among children with malaria in Ile-Ife, Nigeria.

Results: Of the total of 1047 children seen, 190 (18.1%) had malaria and were surveyed. Complications were present among 74 (38.9%) children and a significantly higher of the under-fives had complications (p by Fisher's exact test = 0.0018). Chloroquine was administered to 63 (67.0%) children within the first 24 hours of the illness although only 25 (26.6%) children had the correct dosage. One hundred and fifty three (80.5%) were aware of the use of untreated bed nets in preventing malaria while 38(20.0%) and 4(2.1%) were aware of ITNs and used ITNs respectively. The awareness of ITNs increased with increasing maternal education.

Conclusion: Awareness of the parents about ITNs and their use are poor. Health education on appropriate anti-malarial drug use and ITN use should be intensified. ITNs should be made more widely available.

KEY WORDS: Malaria; Drugs; Insecticide treated nets; Children; Nigeria.

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INTRODUCTION

There have been many reports on the socioeconomic burden of malaria in the developing world.¹ Children in the tropics and subtropics are also known to bear the brunt of the malaria scourge with significant morbidities and mortality¹.

The failure of the various malaria control strategies in the recent past makes malaria a topical health and socioeconomic issue in the developing world. In Africa alone, about twelve billion dollars is spent annually on malaria whereas only 10 percent of these is needed in its prevention.² It is against this background that the World Health Organization (WHO) in partnership with

the United Nations Children's Fund (UNICEF), other world development and financial bodies and heads of governments established the Roll Back Malaria Initiative (RBMI) in 1998^{3,4}.

The strong point of the new strategy lies in political and governmental supports, the lack of which has been proposed to be responsible for the failure of the previous control programmes. Therefore, the African Heads of States declared their supports for the Roll Back Malaria Initiative in the year 2000 in Abuja, Nigeria. One of the targets of the RBMI is halving the mortality from malaria by the year 2010⁴. However, in a recent report by the WHO, the death from malaria worldwide was shown to be higher in 2003 than it was in 1998⁵.

Therefore, this study was carried out to determine the burden of malaria in a tertiary health institution and the use of interventions prescribed by the RBMI, particularly prompt and effective home treatment and the use of Insecticide Treated Nets (ITNs) among children with malaria in Ile-Ife, Nigeria.

SUBJECTS AND METHOD

This study was prospectively done at the Children Emergency Room (CHER) of the Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, Osun State, Nigeria over a period of seven weeks (July/August, 2004). The hospital serves the people of Ile-Ife and the neighboring communities in the adjoining Ondo and Ekiti States. The estimated population of Ile-Ife according to the 1991 census is 289,500⁶.

The subjects included consecutive children aged between 1 month and 14 years who presented with features of malaria. Thick blood film was carried out on all patients. This was fixed with heat and then stained for 15 minutes with Giemsa. The demonstration of asexual forms of *Plasmodium falciparum* and or malaria pigment in polymorphonuclear leucocytes on blood film was taken as confirmation for malaria infection. The data collected from the care givers or the patients, using a close ended questionnaire included the age, sex and the socioeconomic status of the parents using the method recommended by Oyediji⁷. The choice and time of commencement of anti-malarial drug use, the adequacy of dose of the drugs, the complications of malaria present as well as the awareness of the

subjects about ITNs were also documented. Dosages of anti-malarial drugs regarded as adequate are: Chloroquine - total dose of 25mg/Kg body weight; Amodiaquine - total dose of 25mg/Kg body weight; Halofantrine - 8mg/Kg per dose 6 hourly X 3doses; Sulfadoxine/pyrimethamine 30mg per Kg body weight/2.5mg per Kg body weight. For the purpose of this study, severe malarial anaemia was taken as malaria infection with Packed Cell Volume (PCV) of less than 18 % while cerebral malaria was defined as the presence of fever, altered level of consciousness with or without convulsion.

The data obtained was analyzed using the Chi-square and Fisher's exact test (FET) as provided by the SPSS version 11⁸ and PEPI⁹ software. P values less than 0.05 in two-tailed tests were accepted as significant.

RESULTS

Age, sex, socioeconomic distribution and complications

During the period of study, a total of 1047 children presented at the CHER out of which 190 (18.1%) had malaria and were recruited for the study. The age ranged from 6 weeks to 168 months with the median (SD) of 24.0 (28.2) months. One hundred and sixty (84.2 %) of these children were under-fives. There were 110 males and 80 females giving a male: female ratio of 1.37:1 Ten (5.3 %), 57 (30 %), 93 (48.9 %), 24 (12.6 %) and 6 (3.2 %) children belonged to the socioeconomic classes I, II, III, IV and V respectively. Complications were diagnosed among 74 (38.9 %) children. The complications included febrile convulsion (16.3 %), severe anaemia (15.8 %), and severe anaemia with febrile convulsion (3.2 %), cerebral malaria (2.1 %) and persistent vomiting (1.6 %). Seventy (94.6 %) of these children with complications were under-fives. There was a significant relationship between the age of the child and the occurrence of complications (p by FET = 0.0018).

Home treatment of malaria

One hundred and fifty-eight (83.2 %) children had home treatment in form of anti-malarial drugs (94; 59.5 %), paracetamol alone (43; 27.2 %), haematinics (16; 10.1 %), antibiotics particularly septrin and ampiclox (11; 7 %), an unbranded product containing paracetamol and diphenhydramine (4; 2.5 %) and local concoctions (3; 1.9 %)

Chloroquine was administered on 86 (45.3 %) children prior to presentation in the hospital. Out of these, only 25 (26.6 %) children had the correct dosage. Others had amodiaquine (8; 4.2%), Paludrine (2; 1.05%),

Halofantrine (1; 0.5%), Quinine (1; 0.5%) and a brand of Sulphadoxine/Pyrimethamine (1; 0.5%). Some children took these drugs in combinations. Anti-malarial drugs were commenced at the onset of the fever, within the first 24 hours and after 24 hours of the onset of illness among 27 (28.7%), 36 (38.3%) and 31 (33.0 %) children respectively. Thirty-eight (40.4%) of these children who had anti-malarial drugs had complications while the remaining 56 (59.6%) did not Table I. Of the 38 children who had anti-malarial drugs and complications, the treatment was commenced at the onset of fever, within 24 hours and after 24 hours of the illness among 12 (31.6%), 14 (36.8%) and 12 (31.6%) children respectively. Anti-malarial treatment was also commenced at the onset of fever, within 24 hours and after 24 hours of the illness among 15 (26.8%), 22 (39.3%) and 19 (33.9%) out of the 56 children who had anti-malarial drugs but did not have complications. There was no statistically significant relationship between the time of commencement of anti malarial drugs and the occurrence of complications of malaria ($\chi^2 = 0.25, p = 0.881$).

Awareness and use of bed nets and ITNs

One hundred and forty-eight (77.9 %) children lived in houses with window nets. While 153 (80.5 %) parents were aware of use of bed nets in the prevention of malaria, only 38 (20 %) were aware of the use of ITNs. Twenty-four (12.6 %) children used bed nets while only 4(2.1 %) used Insecticide Treated bed nets. None of the 4 children who used ITNs had complicated malaria although this difference was not statistically significant (p by FET = 0.2997). Table II shows that the awareness about ITNs was directly proportional to the level of education of the parents with statistical significance.

However, the level of awareness does not match the use of ITNs as shown in Figure 1. Among the parents who were aware of, but not using ITNs, non-availability, high cost and inconvenience during sleep were the reasons given among 14(41.2 %), 4(11.8%) and 6(17.6%) parents respectively. Nine (26.5 %) parents gave no particular reasons.

Table I. Relationship between Time of Commencement of Anti-malarial Drugs and Occurrence of Severe Malaria

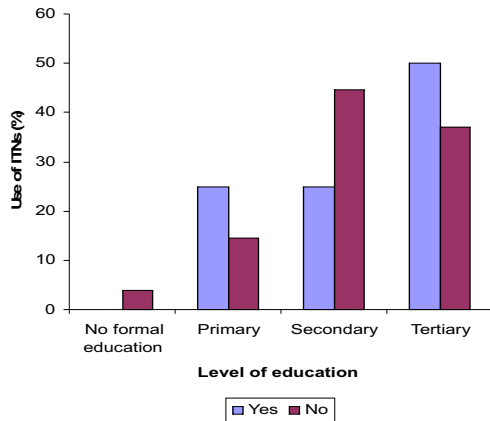
Time of Commencement of Anti-malarial drugs	Uncomplicated malaria	
	Uncomplicated malaria	Complicated malaria
At the onset of fever	15 (26.8)	12 (31.6)
Within 24 hours	22 (39.3)	14 (36.8)
After 24 hours	19 (33.9)	12 (31.6)
Total	56 (100.0)	38 (100.0)

Table II. Awareness of ITNs in Relation to the Level of Education of Mothers

Level of education of mothers	Awareness about ITNs	
	Yes	No
No formal education	0(0.0)	7(4.6)
Primary	4(10.5)	24(15.8)
Secondary	9(23.7)	75(49.3)
Tertiary	25(65.8)	46(30.3)
Total	38(100.0)	152(100.0)

P by FET = 0. 0009

Key: Figures in parenthesis are percentages of the total in the respective row.



DISCUSSION

In Nigeria, malaria is responsible for 41 percent of morbidities and 30 percent of mortalities among the under-fives¹⁰. The high incidence of 18.1 percent recorded in this study is instructive for a study carried out in a tertiary health centre which is supposed to manage complicated malaria. A larger number of the children had their malaria diagnosed and various forms of home treatment commenced before presentation in the hospital. This is in keeping with the earlier studies that people have a high knowledge about transmission of malaria and its main clinical features^{11,12}.

The pattern of anti-malarial use in this study was also similar to an earlier report from Kenya where 47 percent of the children received anti-malaria treatment at home¹³. The inadequate dosage of Chloroquine administered on most of the children prior to presentation in the hospital is a major therapeutic problem that deserves closer attention. No doubt, much emphasis still needs to be placed in the area of public enlightenment to further educate the people on the proper use of common anti-malarial drugs. This would guide against breeding strains of the malaria parasite that would be resistant to Chloroquine, Sulfadoxine/pyrimethamine and other anti-malarial drugs.

In Nigeria, the problem of chloroquine resistance is increasing and studies are advocating the use of alternative medication^{14,15}. A recent study quoted the

clinical failure rate for chloroquine to be 38.7 %¹⁴. This is corroborated by this study where 26.6 % of the children had correct dosage of chloroquine yet they still presented to the hospital with malaria.

The ability of the ITNs to reduce the degree of malarial parasitaemia as well as the incidence of malaria infection has been documented hence, its inclusion as one of the key constituents of the RBMI¹⁶. It is expected that at least 60 percent of pregnant women and children who are at risk of malaria should be using ITNs by the year 2005. However, with just 6 years to the target of halving the mortality associated with malaria, the abysmally low level of awareness and use of ITNs in this study is disturbing. The level of awareness about ITNs in this study, though low, is better than 7 percent reported by a south eastern Nigeria survey¹⁷. The ITNs use rate in this study is lower than the 20.5 percent reported from Malawi¹⁸ as well as the 5.7 % obtained from a national survey in Nigeria¹⁹. The low rate of ITNs use seems borne out of the low awareness among the respondents when compared with the untreated bed nets. The reasons of non-availability and high cost given for the poor use of ITNs in this study are similar to the finding in Burkina Faso where the rural people demonstrated a desire to use bed net but could not afford to buy²⁰.

Expectedly, the awareness about bed nets varied in direct proportion to the level of education and socioeconomic class of parents. However, the use of untreated bed nets in Nigeria previously put at 12 percent²¹ was obviously lower than 86 percent and 75 percent reported from Gambia and Guatemala respectively^{22,23}. This suggests a generally poor culture of bed net use in Nigeria and not merely a function of the literacy rate in the countries under comparison. Nigeria has a higher literacy rate than Gambia and about the same rate with Guatemala²⁴. It is not surprising then that more than a quarter of the respondents in this study did not have any particular reason for not using ITNs.

Since the use of window nets among the respondents in this study was almost universal, impregnating the window nets with insecticides to improve their effectiveness may be an appropriate technology. However, this does not stop the reinforcement of the campaign for the use of ITNs.

In conclusion, this study has shown that malaria still constitutes a significant health problem in Nigeria and that the current control strategies have not yielded the desired results. Specifically, there is the need for increased awareness about the proper use, in terms of dosage, frequency of doses and total duration of use, of the common anti malarial drugs. It is important that

increasing the level of awareness as well as encouraging the people to use the ITNs should be the focus of intensive mass media campaigns on malaria control efforts. There should be political will and commitment on the part of the government to subsidize and make ITNs available, in terms of cost and quantity, to its citizens.

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