ORIGINAL RESEARCH

A retrospective study of adherence to malaria treatment guidelines for children in rural health facilities Of southwest Nigeria

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Abstract

Background: The World Health Organisation (WHO), in 2006 and in 2010, published malaria treatment guidelines for effective case management of malaria. This study was carried out to assess the adherence of prescribers to these guidelines.

Method: A retrospective pre-intervention study of adherence to malaria treatment guidelines in selected hospitals of Oyo State was carried out. Convenience sampling was used to select the case records of children below five years of age who were treated for uncomplicated malaria at the out- patient departments of selected hospitals between January and June 2010. Specifically, the use of Artemisinin-Combination Therapy (ACT) and diagnostic procedures for malaria were evaluated.

Result: The records of 1445 children were studied. Chloroquine monotherapy was the most frequently used antimalarial treatment (380; 26.3%). ACTs were prescribed in 35.1% cases, artesunate monotherapy for 3.6% and non-recommended antimalarial combinations for 26.1% of cases. Parasitological diagnosis of malaria was carried out in 17.2% children. Thirty six children (2.5%) with negative microscopic results received anti-malarial drugs. Lack of clinical improvement was observed among 0.8% of the children who were prescribed various ACTs.

Conclusion: The study identified non-adherence to WHO malaria treatment guidelines. The prescribers relied more on clinical judgement than parasitological diagnosis of malaria. Adequate and continuous training of health workers on case management of malaria is recommended.

Key words: Adherence, Artemisinin-Combination Therapy, Malaria, Rural health facilities, Treatment guidelines,

Introduction

Malaria remains the most significant public health problem in Nigeria despite the recent gains in curtailing its menace. [1] It accounts for 60% of out-patient visits and 30% of hospitalisations among children under five years of age, with the highest prevalence occurring in the south west of the country. [2] It is postulated that these figures may even be higher in the rural and remote areas of the country where diagnostic and treatment facilities may not be readily available. [3]

Malaria case management entails early diagnosis and effective treatment as a vital component of the malaria control strategies. In Nigeria, and many other African nations, Chloroquine and Sulphadoxine-pyrimethamine which were hitherto, the dominant antimalarial drugs suffered major setbacks from drug resistance and became ineffective in the treatment of malaria. [3-4] Non adherence to protocols on malaria treatment in the form of wrong prescription, inadequate dosage, over diagnosis and poor compliance with treatment by patients were some of the factors that contributed to the development of resistance to these agents. [4-6] The WHO, after assessing the malaria situation in the world in 2001, recommended the adoption of Artemisinin-based

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Combination Therapy (ACT) in malaria endemic areas where the therapeutic efficacy cut-offs had been exceeded. [3] Consequently, Nigeria, which has greater part of her population living in rural areas, formally adopted the ACT as recommended by the WHO in 2005. [4] Studies have since reported the effectiveness and acceptance of ACTs in Africans, particularly among Nigerians. [7, 8]

Subsequently, the WHO, based on available evidence and experts' opinions, published malaria treatment guidelines in 2006 and later updated it in 2010. In the guidelines, emphasis is laid on the use of ACT as the first line treatment for uncomplicated malaria. In addition, the WHO guidelines recommend parasitological confirmation (except where it is not possible) of malaria before ACT prescription is made. [3]

However, many studies published immediately after the release of the guidelines revealed lack of adherence to the guidelines by health workers in many parts of Africa including Nigeria. [9,10] For instance, in an earlier study in South west Nigeria, lack of adherence to ACT prescriptions policy was reported, but the researchers did not provide information on the diagnosis component of the policy. [11] Similar observations were recently made in a Sudanese study where the researchers reported poor adherence of health workers to the malaria treatment guidelines in terms of both ACT prescriptions and parasitological diagnosis of malaria. [5] Although, recent studies in south east Nigeria reported a better adherence to the malaria treatment policy in terms of prescription of ACTs, much gap still existed in the aspect of diagnosis. [12] Several factors including the high cost of ACT as compared with other drugs, lack of public awareness, limited knowledge of practitioners about the guidelines were thought to be responsible for this observation. [13,14]

Poor adherence to the treatment guidelines has implications for increased malaria burden in terms of resistance risk and treatment failure. In order to achieve the Millennium Development Goal on malaria eradication in Nigeria, adherence of prescribers to the treatment guidelines is critical. This can be achieved through high quality training, close monitoring and supervision of health workers on adherence to protocol. [12, 14]

To the best of the researchers' knowledge, there is dearth of information about the level of adherence to the treatment guidelines for children in Oyo State, Southwest Nigeria. Therefore, this study aimed to assess adherence to the treatment guidelines for malaria for children below five years of age in rural public secondary health facilities of Oyo State, South-west, Nigeria.

Methods

The study was carried out as part of a pre-intervention study to evaluate antimalarial prescription pattern in Oyo State prior to the commencement of malaria case management training for health workers by a United States Agency for International Development (USAID) funded organisation. The study covered the period between January and June 2010 but the researchers were on the sites to evaluate the records between July 2010 and September 2010. Ethical approval was obtained from the Ethical Review Committee of the Oyo State Ministry of Health. Permission to conduct the study was also granted by the local management of the hospitals.

The research is a descriptive quantitative study involving the retrospective analysis of case notes of children below five years of age. Six rural health facilities were randomly selected based on the geopolitical zones in Oyo State. These hospitals were considered rural based on the State Hospitals Management Board classification. The study sites included the General Hospitals situated at Ilora and Lagun (Oyo Central), Eruwa and Igbo-Ora (Oyo South) as well as Iseyin and Okeho (Oyo North). Each of the selected hospitals had at least two general medical practitioners, one medical laboratory technologist/scientist, a pharmacist/pharmacy technician in addition to functional laboratories. General Hospital Igbo-Ora, in addition, had medical registrars from the paediatric unit of the University College Hospital (UCH), Ibadan. The prescribers in the hospitals had had no focused training on case management of malaria. At the time of this study, the government had free anti-malaria treatment policy for children below the age of five years. Convenience sampling method was used in selection of the case records. The minimum sample size of 600 was calculated from a standard formula, [15] but a total of 1445 case records of children below five years of age treated for uncomplicated malaria within the study period were studied. Children older than five years and those admitted for severe malaria or other ailments were excluded from the study. The study period covered both the dry and wet seasons in the country. A data collection form which was designed on the basis of WHO/INRUD criteria for

drug evaluation in health facilities and which had earlier been pretested at the General Hospital Fiditi, Oyo State was used for the index study. [16]

Data on demographics, clinical features of malaria, diagnostic procedures and drug administration were retrieved from patients' records. The data generated were analysed using the SPSS software version 20. Comparison of means value was done using Student t-test. Chi square was used for inferential statistics. P values less than 0.05 were considered as evidence of statistical association.

Result

A total of 1445 case records of the children were analysed. The cohort comprised 731 (50.6%) males and 714 (49.4%) females. The mean age of the children was 1.9 ± 1.4 years. The distriution of the children according to age is shown in Figure 1.
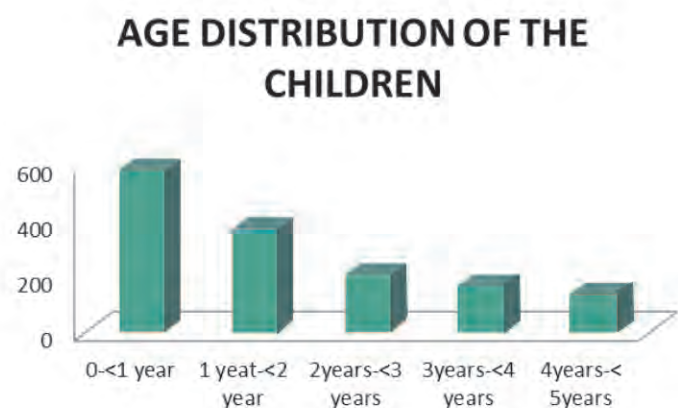

Figure 1: Age distribution of the children treated for malaria

The body weight was recorded in only 26 (1.8%) of cases. The body weight of the children ranged between 6kg and 16kg. Twelve children (0.8%) had weight between 5kg and 9kg, 13 (0.9%) had 10kg 15kg while only 1 (0.1%) weighed above 15kg.

The peak of malaria cases occurred in the months of May (306; 21.2%) and June (308; 21.3%). This observation was the same in all the sites. The monthly distribution pattern of malaria cases is shown in Table I.

Table I: Monthly distribution of malaria cases managed at the health facilities

Month	Frequency	Percentage
January	206	14.3
February	183	12.7
March	210	14.5
April	232	16.0
May	306	21.2
June	308	21.3
TOTAL	1445	100

The General Hospital, Ilora had the highest number of cases (329; 22.8%) followed by Iseyin (300; 20.8%). Eruwa, Igbo-Ora, Lagun, and Okeho had 189 (13.1%) 210 (14.5%), 181 (12.5%), 236 (16.3%) cases respectively.

Of all the antimalarial prescriptions, recommended ACTs constituted 35.1% (507/1445). Monotherapy constituted 37.4% (541/1445) with artesunate monotherapy prescribed in 52 (3.6%) of cases. Non-recommended antimalarial combinations were precribed for 377 (26.1%) children while the specific antimalarial drug prescribed was not indicated in 20 (1.4%) cases. The pattern of antimalaria prescription in the facilities is as shown in Table II.

Table II: Pattern and frequencies of antimalarial drug prescriptions

Drug Class	Identity	Frequency	Percentage
Recommended ACTs	Artemether-Lumifantrine	339	23.5
	Artesunate + Amodiaquine	145	10.0
	Dihydroartemisinin + piperaquine	13	0.9
	Artesunate + mefloquine	1	0.1
	Artesunate + sulphadoxine/ pyrimethamine	9	0.6
Monotherapy			
	Chloroquine	380	26.3
	Amodiaquine	103	7.1
	Artesunate	52	3.6
	Sulphadoxine/ Pyrimethamine	6	0.4
Non-recommended Combinations			
	Chloroquine + ACTs	210	14.5
	Chloroquine + other monotherapies	139	9.6
	Other combinations	28	3.3
	Antimalaria drugs not indicated	20	1.4
Total		1445	100.0

Complete doses of chloroquine were prescribed for 210 (14.5%) children along with full dose of ACTs, while a single dose of chloroquine was prescribed for 37 patients (2.5%) in combination with artesunate. Artesunate injection was prescribed as a stat dose for four patients before being switched to oral ACTs. The three-day complete doses of recommended ACT were prescribed in all the cases which had the ACTs. There was no indication that any supplementary dose was given in any of the cases during the study period.

Dosage determination was largely done according to age in 99.7% cases while weight was used in 0.3% cases. Follow-up care of the children was generally poor. Only 16 children (1.1%) reported back to the facilities, the time of reporting ranged between 2 days and 6 weeks. Thirteen children reported back

before 8 days and the major complaint on reporting were fever and cough. Eleven of these 16 children had earlier received ACTs; nine had artemether+lumefantrine while the remaining two had artesunate + amodiaquine. The other five children received chloroquine.

Parasitological confirmation of malaria was carried out in only 248 (17.2%) children and microscopy was the only diagnostic method used. However, out of the 248 patients investigated, 212 (85.5%) were confirmed to have malaria while the remaining 36 (14.5%) children did not have confirmed parasitaemia but still received antimalaria drugs. The level of adherence of each facility to WHO recommendations on ACT prescription and diagnosis requirements is as shown in Tables III and IV respectively.

Table III: Adherence of health facilities to WHO recommendations on antimalarial drug prescription

Facility	Non-artemisinin based anti-malaria	Artesunate Monotherapy	Recommended ACTs	Antimalaria not specified	Total
Eruwa	93 (6.4)	14 (1.0)	82 (5.7)	0 (0.0)	189 (13.1)
Igboora	58 (4.0)	8 (0.6)	142 (9.8)	2 (0.1)	210 (14.5)
Ilora	137 (9.5)	46 (3.2)	140 (9.7)	6 (0.4)	329 (22.8)
Iseyin	166 (11.5)	12 (0.8)	121 (8.4)	1 (0.1)	300 (20.8)
Lagun	30 (2.1)	13 (0.9)	137 (9.5)	1 (0.1)	181 (12.5)
Okeho	95 (6.6)	27 (1.9)	104 (7.2)	10 (0.7)	236 (16.3)
Total	579 (40.1)	120 (8.3)	726 (50.2)	20 (1.4)	1445 (100.0)

Figures in parentheses are percentages

Table IV: Adherence to WHO recommendation on malaria diagnosis across the facilities

Facility	Frequency of laboratory diagnosis	Positive Parasitaemia	Negative Parasitaemia	Diagnosis not done	Total
Eruwa	38 (20.1)	36 (19.0)	2 (1.1)	151 (79.9)	189
Igboora	64 (30.5)	59 (28.1)	5 (2.4)	146 (69.5)	210
Ilora	6 (1.8)	4 (1.2)	2 (0.6)	323 (98.2)	329
Iseyin	79 (26.3)	71 (23.6)	8 (2.7)	221 (73.7)	300
Lagun	1 (0.6)	1 (0.6)	0 (0.0)	180 (99.4)	181
Okeho	24 (10.2)	5 (2.1)	19 (8.1)	212 (89.8)	236
Total	212 (14.7)	176 (12.2)	36 (2.5)	1233 (85.3)	1445

Figures in parentheses are percentages

Discussion

The findings in the present study showed that more children were treated for malaria at General Hospital, Ilora than the other facilities despite the fact that the town has the lowest population among the study cities. [17] However, this could be as a result of the relatively larger rural catchment area of the hospital compared with the other health facilities. Malaria is known to be more prevalent in rural communities than in the urban. [3] This observation could also be due to over diagnosis of malaria in the facility since the prescribers in Ilora relied mostly on clinical diagnosis of malaria rather than parasitological diagnosis.

Although, seasonal variation in malaria prevalence has been a contentious issue among researchers, there appears to be a consensus that the highest frequency of malaria parasitaemia occurs during the rainy season. [18, 19] The findings from this study seem to concur with this observation. Males were also more affected (50.6%) than females (49.4%) in this study. Although no correlation between gender and malaria exists in literature, studies have reported similar findings of higher incidence in males. [20, 21] Children below one year of age constituted the highest percentage in this study (40.1%), while those aged between four and five years constituted the lowest. The observed inverse relationship between age and prevalence of malaria supports the finding that children living in malaria endemic region develop immunity with increasing age. [3] The implication of this finding is the need to re-evaluate the high prevalence rate of malaria often quoted for many malaria endemic regions. This could have been as a result of over-diagnosis of this disease in the regions as observed by Charles et al in Mtowa Mbu. [22]

The findings in this study showed that chloroquine was still the most prescribed antimalarial drug in the health facilities despite the WHO guidelines which emphasised ACTs. This observation is similar to the result of a pre-intervention study conducted in Southern Nigeria in 2008 but contrasted with the recent report by Builders et al in Northern Nigeria where chloroquine prescription was not found. [11, 20] Our observation could however, be due to wider availability, affordability and the belief of some physicians in the efficacy of chloroquine at the time of the study.

The rate of ACT prescription in this study was 35.1%. This is higher than 26.2% earlier reported by Oshikoya in south west Nigeria in 2006. [9] Recent studies have, however, reported a better usage of ACTs in Nigeria. [12, 20] This suggests increased utilisation of artemisinin-based therapies for the management of malaria in Nigeria. However, the implication of our findings is that the cost of drug may not be the only factor affecting adoption of new treatment policy and prescribing practice. This is because ACTs were provided free for children below the age of five years of age in Oyo State at the time of the study. Therefore, factors relating to the prescribers' knowledge and attitude need to be put into consideration for effectiveness of the policy. Our study also revealed a high prescription frequency (26.1%) of non-recommended antimalarial drug combinations in the facilities. The prescription rate of non-recommended antimalarial drugs obtained in this study was higher than 24.3% reported by Meremikwu et al in 2003 from south east Nigeria but differs substantially from a recent study, where no prescription contained such combinations. [13, 23] The use of non-recommended antimalarial drug combinations for the treatment of uncomplicated malaria especially in children may increase the risk of recrudescence thereby predisposing them to complications of malaria and possibly, death. [24]

Monotherapy with artemisinin accounted for 3.6% of the total antimalarial drug prescriptions in these facilities. This compares with 7% recently reported by Ezenduka et al but lower than the 18.2% reported in earlier study in southwest Nigeria. [11] This suggests a downward trend in the use of artemisinin monotherapy within southwest Nigeria. However, the available data may be insufficient to make this conclusion. The observation is also an indication that artesunate monotherapy is still available in Nigerian drug markets. Artesunate monotherapy promotes resistance and therapeutic failure hence, its use should be discouraged. The findings in the present study also revealed that chloroquine was used in combination with both ACTs and artemisinin. With the level of resistance to chloroquine and the possibility of cross resistance to mefloquine and lumefantrine, the use of chloroquine in any malaria treatment should not be encouraged. [25]

The doses of ACTs prescribed in all the cases were found to be adequate and complied with the three-day duration as recommended in the guidelines. The packaging of the available brands of ACTs in

Chloroquine was the most prescribed drug for malaria treatment in rural health facilities of Oyo State at the time of the study. Training of health care workers on current malaria case management is advocated. Adequate monitoring and supervision is also needed to ensure adherence to the guidelines. A future study to investigate the reason for non-adherence to guidelines by prescribers should be considered.

Authors' contributions

SSA designed the study, collected the data, analysed the data and prepared the manuscript. FOT participated in the study design and drafting of the manuscript.

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Discussion

".........The doses of ACTs prescribed in all the cases were found to be adequate and complied with the three-day duration as recommended in the guidelines. The packaging of the available brands of ACTs in the facilities could have actually contributed to this observation. However, there was no indication of provision of supplemental doses in case of vomiting (which is a common feature of malaria in this group) or damage. This may lead to suboptimal dosing which could result in therapeutic failure and subsequently aid the development of resistance to ACT. [6] This observation could have accounted for the lack of clinical improvement observed in some patients in the study facilities.

Many studies on adherence to malaria treatment guidelines failed to highlight adherence to diagnostic requirement which is a key component of the protocol. [9,11,26] This study however, revealed that despite the availability of medical laboratory technician/scientists and light microscopes in these hospitals only 17.2% children had malaria confirmatory test. Some children were treated for malaria despite having negative microscopic results. Similar trend has been reported in some parts of Africa. [5,13,22] Although some recent studies reported better adherence in this regards but it is not yet satisfactory. [12,20] In addition, it was noted that the Rapid Diagnostic Test (RDT) was not used at the health facilities studied, probably due to non-availability in the hospitals at the time of the study.

Although, the follow-up care was generally poor, some children reported back to the hospitals with complaints suggestive of malaria within 28 days. This observation may be an indication of lack of clinical improvement but the data were not sufficient to make this conclusion. Comparing the use of WHO treatment guidelines at the six health facilities, the physicians at General Hospital, Igbo-Ora appeared to adhere to the guidelines better than any of their colleagues in other health facilities. This was expected as some of the prescribers in the hospital were deployed from the paediatric unit of a tertiary health facility – UCH Ibadan. These physicians in specialty training are better trained and are more likely to have latest drug prescription information compared with the medical officers in other health facilities. This affirms the role of training in the adherence to policies and guidelines. The strength of this study is limited by the fact that we could not assess factors militating against adherence to guidelines by the prescribers.

Conclusion

This study identified non adherence of WHO malaria treatment guidelines at the study sites. Chloroquine was the most prescribed drug for malaria treatment in rural health facilities of Oyo State at the time of the study. Training of health care workers on current malaria case management is advocated. Adequate monitoring and supervision is also needed to ensure adherence to the guidelines. A future study to investigate the reason for non-adherence to guidelines by prescribers should be considered."