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Community Perceptions and Practices in Management of Malaria in Under-five Children in Rivers State in Nigeria

Abstract

Purpose: To determine baseline information on the perceptions of the causes and treatment of fevers suspected to be malaria in children less than five years in Rivers State, Nigeria in order to inform policy recommendations that will improve malaria control programme in the State.

Methods: A cross-sectional survey was conducted in nine local government areas of the State through a multi-staged sampling, among parents and caregivers. Interviews were carried out using a questionnaire on malaria information adapted from WHO/ Federal Ministry of Health. Data was analyzed using Epi-Info v6.04d software, and descriptive statistics were computed with 95% Confidence Intervals for statistical inferences.

Results: A total of 811 mothers/caregivers participated in the survey. Of these, 76.3% (95% CI=73.3–79.2) were aware that mosquitoes causes malaria fever. Fever was the commonest illness reported among children under five years two weeks preceding the survey (62.9%, 95% CI=59.5–66.2). Majority of the caregivers (94.1%) reported taking actions within 24 hours of a child's febrile illness by giving medications at home with drugs purchased from Patent Medicine Vendors rather than visiting a nearby health centre for treatment (53.3% (95% CI=49.6–57.0) versus 26.8% (95% CI=23.4–30.2). However, the drug mostly used for treatment was chloroquine sulfate (33.6%, 95% CI=30.1–37.2) instead of artemisinin-based combined drugs 18.9%, 95% CI=16.8 – 21.9),

Conclusion: Caregivers knowledge and response time to fever was reassuring that children can be reached promptly with more effective anti-malaria treatment like artemisinin-based drugs, if community-directed management options that utilizes trained community-based volunteers were introduced.

Keywords: Malaria, under-five children, Rivers State, Nigeria

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Introduction

Malaria is the leading cause of morbidity and mortality among children under five years of age in sub-Saharan Africa. The World Health

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Organization (WHO) estimates that every 45 seconds an African child dies of malaria while several others lay ill [1]. In Nigeria, it constitutes the highest disease burden among children and accounts for 30% of all childhood deaths [2]. It is also responsible for high school absenteeism, neuro-disability and impairment of cognitive development in children [3-4].

In order to reduce malaria morbidity and mortality, its effective and timely case management based on the use of artemisinin-based combination therapy (ACT) was proposed by the WHO, and was adopted globally by National Malaria Control Programmes as a key malaria control strategy [1, 5]. WHO also recommended that cases of suspected malaria should be treated with ACTs after confirmation by a parasitological-based diagnostic test, but with exceptions made for resource-poor settings where such tests may not be readily available, especially among children under five years of age and in those with severe malaria [6]. In line with this, the Nigerian National Treatment Policy on Malaria also adopted and recommended the use of ACTs for the management of uncomplicated malaria in preference over long-standing monotherapy regimes with aminoquinolone drugs such as chloroquine and amodiaquine [2]. The paradigm shift in policy was made in recognition of the evidence from drug efficacy studies carried out in many African and Asian countries that demonstrated high levels of resistance of *plasmodium falciparum* to chloroquine [7-8]. Aside from drug resistance, other causes of malaria treatment failures were implicated. They included incorrect dosage, poor patient compliance in respect of either dose or duration of treatment, poor drug quality and drug interactions [9-10]. Some others studies have gone further to show that children with severe or complicated malaria such as cerebral malaria, severe anaemia, hypoglycaemia and persistent fever were more likely to have been treated initially with chloroquine [11-13].

The successful implementation of this current malaria treatment policy has however, remained a daunting challenge in many parts of sub-Saharan Africa, including Nigeria, where most early treatment for fever suspected to be malaria occur

at home through inappropriate self-medication by parents and caregivers [14-15]. The reason for this has been attributed to the poor knowledge of many of these care providers of childhood malaria episodes and correct treatment regimes [14]. For instance, a study carried out in Oyo, south-west of Nigeria, showed that only 13.7% of children and 5.3% of adults received prompt treatment for malaria [16]. Besides the poor knowledge and non-use of artemisinin-based combination drugs, the poor state of other malaria control measures, ranging from low possession and utilization of insecticide-treated bed nets to weak referral arrangements for severe case management, have also been documented [16-19]. In light of these, it is crucial to understand the health-seeking behavior of mothers concerning malaria in children in Rivers State, where very little has been documented prior to the scale-up of malaria interventions by the State Ministry of Health. This study was therefore aimed at obtaining the baseline information on community perceptions of the causes and treatment of fevers suspected to be malaria in children less than five years in Rivers State, in order to inform policy recommendations that will improve the implementation of the World Bank assisted interventions for improved malaria control in the State.

Methods

Study Setting and Design

Rivers State's ecological attributes and climatic characteristics favour high malaria transmission all year round. It rains all year round with annual rainfall averaging 1500mm, and relative humidity over 80% [20]. It's expanse of fresh water swamps, dense rain forest and intricate network of creeks and coastal ridges promote malaria vector breeding. Geopolitically, Rivers State is divided into 23 Local Government Areas (LGAs), which are zoned into three senatorial constituencies or districts. The State has a population of 5.6 million people with an annual growth rate of 3% from the result of the National population census conducted in 2006. Over 70% of the inhabitants reside in rural areas and are engaged in subsistence fishing and farming, with

the involvement of some in petty trading. The major ethnic groups include the Kalabaris, Ikwerres, Ogonis, Ekpeyes, Ogbas, Engenes, Ibanis and Okrikas.

The study was part of an integrated survey commissioned by the Rivers State Ministry of Health in November 2008 to establish baseline malaria indices in the State prior to the implementation of a World Bank-assisted scale-up of malaria intervention packages in the State. It was carried out in 15 communities of the State through a household-based cross-sectional design among mothers and caregivers of children less than five years of age. A household was defined as a group of people including husband, wife, children or others living together sharing the same house and eating from the same source.

Sample Size estimation and sampling method

Details of the sampling procedure were described elsewhere [21]. In short, a minimum sample size of 718 for the study was estimated based on a household net ownership prevalence rate of 11.8% in Nigeria [22] at a confidence limit of 95% and sampling error of 3.5%, with adjustments made for a Design Effect (DEFT) of 2 and non-response rate of 10%. Briefly, the selection of households was by multi-staged sampling: at the first stage was the selection of three (LGAs – one each from the three senatorial districts made up of 7-8 LGAs – by simple random sampling; the second stage was selection of five community clusters within each LGA for the purpose of broadening the sample also by simple random sampling; and finally was the selection of 85-100 households within each selected cluster by stratified sampling proportionate to size of the cluster.

The first eligible house and household was determined by the interviewers assuming a central location in each community and spinning a bottle to locate a house. All eligible targets in the house that consented to participate in the study were interviewed by previously trained health care workers in the local languages, where necessary, using a questionnaire adapted from the WHO/ Federal Ministry of Health on malaria baseline information. Consecutive households

were subsequently interviewed until the sample size was reached. All data generated were verified for consistency, and inconsistent responses and incomplete questionnaires were rejected. Data analysis was done using the Epi-Info version 6.04d statistical software package and hypothesis tests were conducted to compare summary statistics at 95% significance level.

Ethical Considerations

Permission to carry out the study was granted by the institutional committee of the Rivers State Ministry of Health. Verbal consent of all participating mothers and caregivers were also obtained after full explanation of the purpose and scope of the study and their right to decline participation or withdraw at any time in course of the interview.

Results

A total of 811 women aged between 15 and 49 years who were mothers or caring for children under 5 years of age were interviewed on their perception of the causes of fever, and on their practices of treatment of fever suspected to be caused by malaria in their children. Table 1 shows the women's socio-demographic characteristics: mean age was 28.15±3.10 years; 74.2% (95% CI=69.1–75.4), were married; only 15% (95% CI=12.5–17.6) had no formal education; the occupation of the majority of them were farming or fishing (40.9%), while 39.6% were engaged in house work. Nearly all (91.1%) of them had more than a single child to care for.

Up to three quarters of the women (76.3%, 95% CI=73.3–79.2) were aware that mosquito-bite 'cause' malaria, while the rest had no idea or attributed it to 'working hard in the sun' or 'consuming much palm oil'. Health facilities were reported as the main source of information on malaria by 63.7% (95% CI=60.3–67.1) of the women,. Most of these women (709 out of 811 or 97.4%) acknowledged the occurrence of an illness in a child under-five years within the two weeks preceding the study (Table 2). Fever was the commonest illness reported in the children by 62.9% (95% CI=59.5–66.2) of the women.

Nearly all (91.8%) the mothers and caregivers claimed that they had taken an action within 24 hours of their child's illness: they had either administered a form of medication at home on the same or next day; or they took the ill child to a health facility (Table 2).

Table 1: Socio-demographic characteristics of mother/caregivers of under-five children in Rivers State

Variable	Frequency (n=811)	Percentage (%)	95% CI
Age Group (years)			
15-19	72	8.9	7.0 – 11.1
20-24	180	22.2	19.4 – 25.2
25-29	257	31.7	28.5 – 35.0
30-34	166	20.4	17.7 – 23.4
35-39	81	10.0	8.1 – 12.5
40-44	37	4.6	3.2 – 6.2
45-49	18	2.2	1.4 – 3.4
Marital Status			
Single	46	5.7	4.2 – 7.5
Married	587	72.4	69.2 – 75.4
Divorced	51	6.3	4.7 – 8.2
Widow	127	15.7	13.2 – 18.4
Educational status			
No formal education	121	15.0	12.5 – 17.6
Primary education	410	50.6	47.1 – 54.1
Secondary education	216	26.6	23.6 – 29.8
Tertiary education	64	7.9	6.1 – 9.9
Occupation			
Skilled artisans	78	9.6	7.7 – 11.8
Civil Servants	35	4.3	3.1 – 5.9
Farmers/fishing	332	40.9	37.5 – 44.4
Students	45	5.5	4.1 – 7.4
Unemployed	321	39.6	36.2 – 43.0
Parity			
Single child	72	8.9	7.0 – 11.1
Two children	167	20.6	17.9 – 23.5
Three children	198	24.4	21.5 – 27.5
Four children	203	25.0	22.1 – 28.2

A description of the places where the mothers/caregivers sought treatment, within or beyond the 24 hours of the suspected malaria showed that patent medicine vendors (PMVs) were the choice of more than half of them (53.3%, 95% CI= 49.6–57.0). Nearby health centres were only half as patronized as the PMVs at 26.8% (95% CI=23.4–30.2), while close to

two-fifth (15.5%, 95% CI=12.9–18.4) stayed home to practice self-medication (Table 2). An examination of the medications that the mothers and caregivers gave to their children showed that chloroquine was the most common drug of choice (33.6%, 95% CI=30.1–37.2) when compared with ACTs (18.9%, 95% CI=16.8–21.9), sulphadoxine-pyrimethamine (19.5%, 95% CI=16.6–22.6) or herbal medicine (14.2%, 95% CI=11.8–17.0).

Discussion

Correct local knowledge of malaria, coupled with timely and proper case management practices are essential for reducing the burden of malaria in the community. Our study showed that a high proportion of mothers and caregivers were aware that mosquitoes are the vectors responsible for transmitting the organisms causing malaria fever. The primary level education of most of them may have contributed to this, corroborating the findings of previous studies where knowledge about malaria reportedly increased with education [23-25]. Other studies have also reported high levels of knowledge of malaria in some other malaria endemic areas in Nigeria, Uganda and Sudan [16,17,26]. However, our respondents' malaria treatment practices were in sharp contrast to the level of awareness observed. Most of the women reported that they sought treatment at informal/alternative health care providers, largely PMVs, where most were offered incorrect medications for their children. For instance, up to one-third (33.6%) offered chloroquine as against the 18.9% who had the WHO-recommended ACTs that had also been stipulated in the National Malaria Treatment Guidelines as the best available treatment option, particularly for uncomplicated malaria [1-2,7-8]. This suggests a poor level of knowledge of the recommended malaria treatment regimes by these cadre of health providers and mothers/caregivers alike [14,18,19]. The implications of this inappropriate practice on malaria morbidity and mortality in the communities are grave because treatment with chloroquine has been linked with drug resistance, treatment failures and emergence of complications such as severe anemia and cerebral malaria, most of which result in fatal outcomes because of the existing weak health

infrastructure and referral arrangements in many community settings [7,8,11-13]. For the few

Table 2: Illnesses and interventions taken by mothers/caregivers of under-five children

Variable	Frequency (n)	Percentage (%)	95% CIs
Reported illnesses occurring in under-five children within previous two weeks (n=811)			
Fever	510	62.9	59.5 – 66.2
Cough/catarrh	145	17.9	15.3 – 20.7
Vomiting	54	6.7	5.0 – 8.6
None	102	12.6	10.4 – 15.1
Actions taken within 24 hrs by mothers for fever in under-five children (n=709)			
Gave or got medicine for child on same/next day	461	65.0	61.4 – 68.5
Took child to health centre	190	26.8	23.6 – 30.2
Did nothing same/next day	42	5.9	4.3 – 7.9
Others	16	2.3	1.3 – 3.6
Places where treatment was sought for fever in under-five children (n=709)			
Private Medicine Vendor	378	53.3	49.6 – 57.0
Health Centre	190	26.8	23.6 – 30.2
Home (self-medication)	110	15.5	12.9 – 18.4
Herbalist	17	2.4	1.4 – 3.8
Church	8	1.1	0.5 – 2.2
Traditional Birth Attendant	6	0.8	0.3 – 1.8
Medications given for fever in under-five children (n=709)			
Chloroquine	238	33.6	30.1 – 37.2
Sulphadoxine/pyrimethamine	138	19.5	16.6 – 22.6
Artemisinin-based combination therapy	134	18.9	16.8 – 21.9
Herbal medicine	101	14.2	11.8 – 17.0
Amodiaquine	63	8.9	6.9 – 11.2
Nothing	35	4.9	3.5 – 6.7

mothers/caregivers and PMVs that gave or prescribed ACTs, it was not known if the appropriate doses and the recommended duration were indeed complied with. Sub-therapeutic levels of ACTs and substandard and counterfeit drugs which are more prevalent in the rural communities are some of the factors that constitute a potential threat to the emergence of artemisinin resistance. In this respect, the WHO had expressed its concern over the increasing number of child deaths from malaria as a result of failing medicines and medicines of poor quality [27].

Pertinent issues were highlighted in this study that should be considered for the development of community-directed strategies for the management of malaria, especially in children. Mothers and caregivers generally possess some level of formal education that would enhance transfer of correct basic information and skills for health actions. To a great extent, their response time to illness was reassuring that children can be

reached with interventions that are prompt, and this was regardless of the nature of the illness, that is febrile or non-febrile. These findings portend enormous prospects for a well thought out, integrated community-based or home-based management of malaria. Home-based management of malaria involves the prompt treatment of all febrile children at home with pre-packaged anti-malarial drugs obtained from trained community volunteers, including PMVs [28-29] and this has been successfully implemented and evaluated in some African countries, with caregivers reporting up to 96.3% adherence rate [30-32]. It is expected to guarantee timely access to effective and high quality anti-malaria drugs and promote rational drug use that will delay or prevent the development of anti-malaria drug resistance. Community-directed Management of Malaria as a strategy has also been supported by Nigeria's National Malaria Control Programme; and a pilot scheme has been tried with commendable outcomes in two States in Nigeria. Its adaptation in Rivers State with a modification

to incorporate the use of Rapid Diagnostic Tests (RDTs) for malaria is strongly recommended to avoid indiscriminate use of ACTs in order to prevent the emergence of artemisinin resistance.

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Conflict of Interest

No conflicting interests associated with this work.

Contribution of Authors

We declare that this work was done by the author(s) named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors. Charles I. Tobin-West was responsible for the study concept, design, interpretation of data and drafting of article. Seye Babatunde participated in data analysis, statistical analysis, manuscript editing and manuscript review.

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No Information