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Prescribers' Adherence to Treatment Guidelines for Uncomplicated Malaria in Primary Health Centres in Bayelsa State, Nigeria

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A – research concept and design; B – collection and/or assembly of data; C – data analysis and interpretation; D – writing the article; E – critical revision of the article; F – final approval of article.

Abstract

Background: Malaria, though preventable and treatable, remains a disease with unacceptably high mortality in Nigeria. Effective and prompt treatment of uncomplicated cases reduces progression to severe disease, development of drug resistance, and cuts the costs of the disease.

Objective: To assess adherence by prescribers to recommended treatment (based on National Treatment Guideline) for uncomplicated malaria in primary health centres (PHCs) in the eight Local Government Areas (LGAs) of Bayelsa State, Nigeria.

Methods: A retrospective review of case notes and prescription sheets for suspected malaria cases treated at 28 PHCs within a year of data collection was done. Relevant data about the prescribers, the patients, and the antimalarial drugs prescribed were collected and analyzed as appropriate.

Results: A total of 2,303 case notes of patients attending PHCs were examined over the study period. A high proportion of malaria (1422, 61.7%) was observed among the 2,303 cases. The median age (years) of adults was 28.0 (IQR = 14), and for children of 0-5, 2.0 (IQR = 2.17). Majority of those treated were females (792, 55.7%) and children (967, 68.0%). Artemisinin-based combination therapies (ACTs) were the most prescribed antimalarials (961, 67.6%), followed by artemisinin monotherapies in 23.8% of cases. Proportion of treated cases of malaria that could be considered rational across the LGAs was 67.6%.

Conclusion: Adherence of prescribers to National Treatment Guidelines of uncomplicated malaria in PHCs in Bayelsa State was below the required standard, with continued usage of obsolete agents, such as artemisinin monotherapies. Training on case management for prescribers at this level of care is urgently needed.

Keywords: Antimalarial drugs, Malaria, Primary Health Centres, Community Health Workers, Bayelsa State.

INTRODUCTION

Malaria, though preventable, treatable and curable, remains a major communicable disease of public health importance in Africa, particularly in the sub-Saharan region. World Health Organization (WHO) in its 2017 World Malaria Report posits that Africa accounts for 90% of the 216 million cases of malaria which occurred globally in 2016, with Nigeria accounting for 27% of such reported cases (WHO, 2017). Asides the economic burden, which is caused by man-hour loss due to malaria infection, its associated complications, and cost of treatment and other control measures, mortality from untreated and poorly treated cases have been established to be very high (Ezennia *et al*., 2017).

Presumptive treatment of malaria based on symptoms and signs was a common and recommended practice in many endemic regions some years ago (WHO, 2010), but, due to the progressive decline in the incidence of the disease which is attributable to control efforts, it became necessary to "count malaria out" as eliminating the disease became a global agenda (WHO, 2015a). World Health Organization therefore introduced the "3T" initiative, which recommends that appropriate parasite-based diagnostic procedure with either microscopy or malarial rapid diagnostic test (mRDT) be conducted before initiating appropriate treatment for confirmed cases of malaria, in contrast to presumptive treatment, which is based only on clinical diagnosis (WHO, 2012; WHO, 2015b). Given the foregoing, Nigeria has also adopted the policy of testing before treatment for all suspected cases of malaria at all levels of healthcare delivery in the country (National Malaria Elimination Programme, 2015). Moreover, in line with WHO recommendation, artemisinin-based combination therapy (ACT) was adopted as the treatment of choice for uncomplicated malaria in the country since 2005, with the combination of artemether and lumefantrine (AL) as first-line and artesunate and amodiaquine (AA) as an alternative. Both drugs are to be administered over three days.

Primary healthcare facilities are supposed to be the first formal contact point for persons with suspected cases of malaria, according to the three-tier health service delivery system, which is in operation in Nigeria (National Malaria Elimination Programme, 2015). The most recent Malaria Indicator Survey (MIS) of 2015 shows that public facilities were the source of treatment for 30.4% of children with fever for whom treatment was sought and that government health centres were responsible for about half (15.6%) of all the children treated in the public sector (National Malaria Elimination Program (Nigeria), and ICF International, 2016). This underscores the importance of PHCs in the treatment of malaria and if patients report promptly, uncomplicated cases can be effectively treated at this level without progressing to severe malaria that will need management at a higher level of care.

Studies have however shown poor management of malaria at the PHC level (Mangham et al., 2011; Agbo*et al*., 2012; Suleiman *et al*., 2015; Arute *et al*., 2016; Akinyode *et al*., 2018) and irrational prescribing has been identified as one of the factors responsible for this (Agbo *et al*., 2012; Arute *et al*., 2016; Akinyode *et al*., 2018). Irrational prescribing has been noted to be a cause of antimalarial drug resistance, which is a major drug-related problem militating against successful control of the disease in endemic regions. Other factors driving drug resistance include poor adherence to treatment by patients, questionable quality of drugs, and uninformed self-medication (Yousif and Adeel, 2000; Bloland, 2001; Hanboonkunupakarn and White, 2016).

With a prevalence of 35.9%, above the national average of 32.9%, Bayelsa State carries a heavy burden of malaria as reported in the 2015 Malaria Indicator Survey (National Malaria Elimination Program (Nigeria), and ICF International, 2016). It is imperative that effective case management takes place at the level closest to the community in order to reduce the associated burden of the disease and to strive towards the attainment of the target of the national strategic plan of 100% treatment with effective antimalarial (ACT) from 2019 onward (National Malaria Elimination Programme, 2014). The objective of this study was to assess drug prescribing for the treatment of uncomplicated malaria by health workers at PHCs in Bayelsa State of Nigeria with a view to identifying gaps and making recommendations that will improve malaria management at this level.

METHODOLOGY

Study setting

Bayelsa State is one of the 36 States in Nigeria, and it is located in the Niger Delta region of the country. It is largely riverine in nature, and comprises eight LGAs (districts), which are further divided into 105 geopolitical wards. There are 330 health facilities in the state, consisting of 233 Primary Health Centers (PHC), 40 public secondary facilities, two tertiary hospitals and 55 private hospitals (Ministry of Health Bayelsa State, 2018). The PHCs are at varying levels of functionality; some are reasonably equipped and staffed and are well patronized while others are

dilapidated and barely active, attending to patients occasionally (Bayelsa State Primary Health Care Board, 2019).

Study Design and Sampling technique

The study is retrospective and evaluated the 2,303 case note of patients diagnosed with uncomplicated malaria within one year of data collection. Study PHCs were selected through simple random sampling technique by balloting from the list of public PHCs in each LGA. Five PHCs were intended to be sampled per LGA except for Yenagoa, where eight PHCs were proposed, being the most populous LGA (available PHC facilities ranges from 10 to 30 across the various LGAs). However, due to poor accessibility of some facilities in the riverine areas, and for security concerns, some of the selected facilities could not be visited. All the eight LGAs were however represented in the study.

Data collection

A structured data abstraction form was developed and pretested in two PHCs other than those included in the study. The prescriptions within the patients' case notes were retrospectively examined for drug usage patterns. The evaluation was done for one year preceding the study. A total of 34 PHCs were visited across the eight LGAs.

As recommended by WHO, 100 case notes were systematically sampled from most facilities (WHO, 1993), and their respective prescriptions were reviewed from April 2016 to March 2017. In the sampling, the total number of case notes within the one year under review was divided by 100 to determine the sampling interval. For example, one in two sampling for 200 case notes. In each case note, the prescriptions that fell within the previous one year were considered. Universal sampling was employed where the prescriptions within the previous one year were fewer than 100. The previous one year was chosen to ensure collection of information on current practice on which evidence-based intervention could be designed (WHO, 1993). Duplication of sampling was avoided since the prescription within the selected case notes were examined.

Pertinent data were collected about the prescribers and patients, and the antimalarial drugs prescribed were noted. Children were defined as those aged, 0 - 12 years and adults as those older than 12 years (Food and Drug Administration, 2014). Rational antimalarial drugs were considered as those which meet the recommendations of the current national antimalarial treatment guidelines. A combination of artemether and lumefantrine (AL) as first-line and artesunate and amodiaquine (AA) as an alternative over three days is considered appropriate (National Malaria Elimination Programme, 2015).

Data Analysis

Completed data collection forms were retrieved and entered into the computer using Statistical Package for Social Sciences version 21 (SPSS Inc., Chicago Illinois, USA) to generate the frequencies and cross tabulation. Descriptive statistics was employed, and results are presented in frequencies and percentages.

Ethical consideration

Ethical approval for the study was obtained from the Bayelsa State Ministry of Health dated 20th April, 2016. The permission of the officers in charge of the PHCs was sought and obtained and the objectives of the study were explained to them.

RESULTS AND DISCUSSION

Of the 34 PHCs visited, data collection actually took place in only 28. Two facilities could not be accessed due to the difficulty posed by the riverine nature, while the remaining four were due to security concerns.

Characteristics of prescribers

The characteristics of the 73 prescribers that were present at the 28 PHCs from which data were collected are as shown in Table 1. They were mostly females (50, 68.5%), Community Health Extension Workers (37, 50.7%), aged 31-40years (40, 54.8%), and have been working for 11-20 years (40, 54.8%).

Review of prescriptions

A total of 2,303 prescriptions within the patients' case notes were retrospectively examined for drug usage patterns, representing 2,303 patients managed for various disease conditions within the study period in the 28 health centres across the eight LGAs in the State. Out of the number, 1,422 (61.7%) were presumably treated for malaria.

Socio-demographics of cases

The proportion of patients treated for presumed malaria varies widely from LGA to LGA. Brass had the lowest (38.5%), while Ekeremor had the highest (73.9%). The majority of those treated were females (792, 55.7%) and children (967, 68.0%) with variations across the LGAs.

The median age of adult was 28.0 years (IQR = 14); for the age range of 0-5 years, it was 2.0 years (IQR =

2.17); and for 6-12 years it was 8.0 (IQR = 4). The details are as shown in Table 2.

Antimalarials used for treatment

A variety of antimalarial drugs (AMDs) were used, including mixtures containing more than one AMD. The ACTs were the most (67.6%) prescribed of all, ranging from 57.0% in Kolokuma/Opokuma LGA to 89.6% in Southern Ijaw LGA. They were followed by artemisinin monotherapies (AM) in 339 (23.8%) cases. Other AMDs used are shown in Table 3.

Table 1: Characteristics of Prescribers at Primary Health Care Facilities in Bayelsa State

Variables	Male, N (%)	Female, N (%)	Total, N (%)
Age Group			
21-30	1 (1.4)	2 (2.7)	3 (4.1)
31-40	10 (14.0)	30 (41.1)	40 (54.8)
41-50	9 (12.3)	13 (17.8)	22 (30.1)
51-60	3 (4.1)	5 (6.8)	8 (11.0)
Total	23 (31.5)	50 (68.5)	73 (100.0)
Designation			
JCHEW	3 (4.1)	16 (21.9)	19 (26.0)
SCHEW	5 (6.8)	13 (17.8)	18 (24.7)
CHO	7 (9.6)	11(15.1)	18 (24.7)
Medical Doctor	7 (9.6)	9 (12.3)	16 (21.9)
Others	1 (1.4)	1 (1.4)	2 (2.7)
Total	23 (31.5)	50 (68.5)	73 (100.0)
Years of Experience			
1-10	1 (1.4)	3 (4.1)	4 (5.5)
11-20	14	26	40 (54.8)
21-30	7 (9.6)	19 (26.0)	26 (35.6)
>30	0	1 (1.4)	1(1.4)
No response	1 (1.4)	1 (1.4)	2 (2.7)
Total	23 (31.5)	50 (68.5)	73 (100.0)

JCHEW- Junior Community Extension Worker
SCHEW- Senior Community Extension Worker
CHO- Community Health Officer

N, number of observations; n, sample size

Table 2: Age and Sex Distribution of Patients Treated for Malaria in Selected PHCs in Bayelsa State

LGA	Total No of Patients	No of Patients treated for Malaria, N (%)	Sex, N (%)		Age, N (%)	
			Male with malaria	Female with malaria	Adults with malaria	Children with malaria
Kolokum-Opokuma	257	172 (66.9)	87 (50.6)	85 (49.4)	29 (16.9)	143 (83.1)
Sagbama	298	202 (67.8)	83 (41.1)	119 (58.9)	54 (26.7)	148 (73.3)
Southern Ijaw	298	193 (65.0)	82(42.4)	111 (57.6)	138 (71.0)	55(29.0)
Ogbia	365	260 (71.2)	114 (43.8)	146 (56.2)	82 (31.5)	178 (68.5)
Nembe	201	130 (64.7)	64 (49.2)	66 (50.8)	27 (20.8)	103 (79.2)
Brass	78	30 (38.5)	20 (66.7)	10 (33.3)	11 (36.7)	19 (63.3)
Ekeremor	92	68 (73.9)	30 (44.1)	38 (55.9)	21 (30.9)	47 (69.1)
Yenagoa	714	367 (51.4)	150 (40.9)	217 (59.1)	93 (25.3)	274 (74.7)
Total	2303	1422 (61.7)	630 (44.3)	792 (55.7)	455 (32.0)	967 (68.0)

Table 3: Antimalarial Drugs Prescribed at the PHCs Studied

LGA	No of patients with malaria	ACT, N (%)	AM, N (%)	QUN, N (%)	CHQ, N (%)	SP, N (%)	`ART+ QUN, N (%)	QUN+SP, N (%)
Koloku-Opokuma	172	98 (57.0)	60 (34.9)	0 (0.0)	3 (1.7)	5 (2.9)	2 (1.2)	4 (2.3)
Sagbama	202	146 (72.3)	46 (22.8)	1 (0.5)	3 (1.5)	5 (2.5)	0	
Southern Ijaw	193	173 (89.6)	9 (4.7)	4 (2.1)	1(0.5)	6 (3.1)	0	0
Ogbia	260	163 (62.7)	83 (31.9)	6 (2.3)	6 (2.3)	2 (0.8)	0	0
Nembe	130	99 (76.2)	13 (10.0)	1 (0.8)	17 (13.1)	0 (0.0)	0	0
Brass	30	20 (66.7)	6 (20.0)	1 (3.3)	3 (10.0)	0 (0.0)	0	0
Ekeremor	68	46 (67.6)	10 (14.7)	12 (17.6)	0 (0.0)	0 (0.0)	0	0
Yenagoa	367	216 (58.9)	112 (30.5)	16 (4.4)	7 (1.9)	3 (0.8)	3 (0.8)	10 (2.7)
Total	1422	961 (67.6)	339 (23.8)	41 (2.9)	40 (2.8)	21 (1.5)	5 (0.4)	15 (1.1)

ACT = Artemisinin-based combination therapy, AM = Artemisinin-monotherapy, CHQ = Chloroquine, QUN= Quinine, SP = Suphadoxine-Pyrimethamine, ART = Artesunate

DISCUSSION

This study assessed treatment of uncomplicated malaria among outpatients at the PHC centres, the ideal first level of contact with the formal health system in Nigeria. Cases of suspected malaria accounted for about 62.0% of all the cases treated at this level within the review period. This agrees with the figure of 60% that has been estimated as the proportion of cases seen in Nigerian health facilities attributable to malaria (National Malaria Elimination Programme, 2015) and underscores the continued significance of malaria as a disease of public health importance. Children were also disproportionately affected, a finding in consonance with the known epidemiology of the disease being commoner amongst children (National Malaria Elimination Programme, 2015).

In 2005, Nigeria adopted ACT as the drug of choice for treating uncomplicated malaria in line with WHO recommendation (National Malaria Elimination Programme, 2015; WHO, 2015b). There has been a progressive increase in the use of ACTs for treatment at all treatment outlets nationwide (National Population Commission, National Malaria Control Programme and ICF International 2014a; National Population Commission, National Malaria Control Programme and ICF International, 2014b; National Malaria Elimination Program (Nigeria), and ICF International, 2016; National Population Commission

and ICF, 2019). This study however reveals that PHCs in Bayelsa State fell short of the target of at least 90% effective treatment of malaria, i.e. ACT treatment for 2017 according to the strategic plan (National Malaria Elimination Programme, 2014). The prescription of older antimalarial drugs that are no longer recommended because of proven loss of efficacy/resistance is disturbing, and particularly worrisome is the continued use of artemisinin monotherapy (AM). Due to reported resistance to AM in some parts of the world, notably in the Greater Mekong sub-region, and the fear of spread of the resistance, WHO has strongly advised countries to phase out the use of AM (WHO, 2011; WHO, 2013) and Nigeria supposedly has banned the importation of AM (Society for Family Health, 2017). The availability of AM for use in public facilities, which ideally should receive their drugs through government procurement and supply chain system, is worrisome and deserves urgent intervention.

Effective treatment consists of the right choice of AMD, such as ACTs, given at the right dose and for the right duration (WHO, 2002). However, an appreciable proportion of the medication prescribed was obsolete, which included artemisinin monotherapies, chloroquine, quinine and suphadoxine-pyrimethamine across the LGAs. This poor prescription by the attending workers has dire implications for treatment such as progression of uncomplicated to severe disease, increased cost of management, and fatality. Other studies have reported poor treatment of malaria by prescribers at PHC facilities (Mangham et al., 2011; Agbo *et al*., 2012; Suleiman *et al*., 2015; Arute *et al*., 2016; Akinyode *et al*., 2018). Primary health centres across the country are staffed by different categories of healthcare workers. Very few have physicians in charge, while others have lower cadres of health professionals attending to patients (National HIV/AIDS Division Federal Ministry of Health (FMoH) [Nigeria] and MEASURE Evaluation, 2014). Our study reveals a mix of HCWs treating patients and prescribing AMDs at the PHCs studied. This apparent variation in the level of expertise and possible variation in exposure to training on management of malaria may be partly responsible for prescriptions at the PHC level departing from the national recommendation. This calls for further study to determine the factors that may explain this variation.

The study is limited in some ways. First, the cases treated and analysed as malaria were suspected cases. The review did not ascertain the proportion of cases that were tested and confirmed before treatment. As a result, over diagnosis and consequent over-treatment for malaria were inevitable. A previous study in a similar PHC setting supported this assumption (Oladosu and Oyibo, 2013). Second, not all randomly selected facilities were visited for reasons stated *vide supra* thereby reducing the sample size of facilities. This limits the generalization of our findings. Meanwhile, all the eight LGAs in the State were involved in the study and this gives a reasonable representation of the situation in the state.

CONCLUSION

The study shows that malaria is still an important disease for which prescription was given at the primary health centres and children accounted for a greater proportion of those treated for the disease. Artemisinin-based combination therapy was the most prescribed antimalarial drug but its use fell short of the national target for the period of review. There was inappropriate use of antimalarial agents that have been delisted from the national guidelines; this has potential for disease progression and drug resistance.

We recommend a larger study that will involve secondary, tertiary and also private facilities to determine prescription for malarial treatment at the different levels of care in the state. There is a need to investigate the continued use in the PHCs of artemisinin monotherapy and other antimalarials that are no longer recommended. The State Malaria Elimination Programme should organize a training workshop on case management of malaria for personnel who treat patients at PHCs in Bayelsa State in order to maximize their potentials for effective management of the disease.

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