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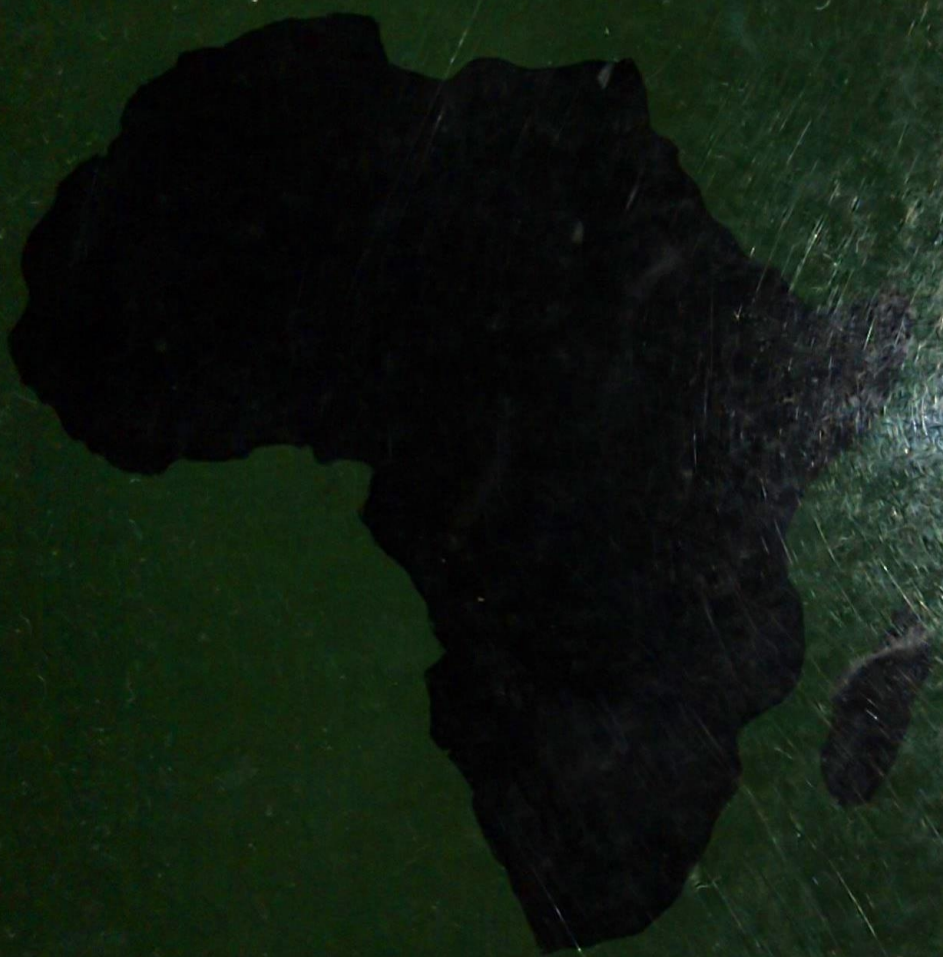

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How well equipped are healthcare facilities to manage childhood malaria? the situation in selected Local Government Areas in South Western Nigeria

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Summary

Using a structured questionnaire, surveys were conducted in 55 of 123 primary and secondary healthcare facilities in 4 selected local government areas in Southwestern Nigeria. Heads of healthcare facilities (HCFs) surveyed include nurses (41.8%), medical officers (21.8%) and community extension workers (21.8%). Twenty five (45.5%) HCFs run special clinics for children. About one fifth (20.3%) of staff had received continuing education on management of malaria. Forty seven (85%) HCFs possessed and used national guidelines for management of malaria. Although 48.9% of HCFs had microscopes, fewer had microscope slides, lancets and Giemsa stain which are also required items for definitive diagnosis of malaria. Healthcare workers were not well informed on some aspects in the management of malaria. Selected healthcare workers from various categories attended a workshop where they were trained to correct inadequate knowledge, attitude and practice in the management of malaria. These workers were to train their colleagues on their return to their respective HCFs.

Keywords: *Healthcare facility capacity, malaria management*

Résumé

Utilisant un questionnaire structuré, ces surveillances étaient conduites dans 55 des 123 centres des soins de santé primaire et secondaire dans 4 districts au Sud Ouest du Nigeria. Les directeurs de centres inclus infirmières (41.8%), centres de soins de santé (21.8%) et personnels en santé communautaire (21.8%). 45.5% des directeurs ont des cliniques pédiatriques et 20.3% des personnels avaient reçu une éducation continue sur les soins du paludisme. 85% des directeurs avaient et utilisaient le guide nationale du ménagement du malaria. Bien que 48.9% des personnels utilisaient des microscopes, peu de centres avaient des lames et la poudre pour fixer les gouttes d'épaisse pour le diagnostic définitif du malaria.

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Introduction

Malaria remains an important public health problem in the world despite numerous methods aimed at its control. In Nigeria, malaria is the commonest cause of outpatient hospital attendance and is responsible for an estimated 300,000 deaths per annum among children below 5 years of age [1]. The infection is holoendemic in the southern parts of the country [2]. Children below the age of 5 years and rural dwellers bear the brunt of the disease. As with many ailments, home management of malaria is common all over Africa, Nigeria inclusive with many patients presenting at the health facilities having taken one drug or another [3-5]. Reasons adduced for this situation include insufficient number of health care facilities, inadequate staffing, lack of equipment and inaccessibility in many areas as a result of poor road network and transportation to the few available health care facilities [2, 6]. Although healthcare facilities serve as first line of care for some, most children are taken to the healthcare facility only when illness is severe or the clinical status of the child has deteriorated. It is thus important that healthcare facilities in sub-Saharan Africa have the capacity to diagnose and manage malaria of varying severity and drug sensitivity, as these healthcare facilities are the last resort.

There is a paucity of information on the capacity of health care facilities to manage malaria in endemic countries. In this study, the ability to prevent, diagnose, manage and refer children with malaria correctly has been grouped under capacity of healthcare facility. The level of training of available personnel in these healthcare facilities on clinical case management of children who have malaria as well as drugs and functional equipment provided for patient care were also covered in this study. The main objective of this study was to evaluate the capacity of healthcare facilities in selected local government areas of southwestern Nigeria to manage childhood malaria as part of needs assessment survey.

Materials and method

Two urban local government areas (Ogbomosho and Iseyin) were randomly selected in Oyo State, southwestern Nigeria. The contiguous rural local government areas (LGAs) to the two urban LGAs were listed and one each

was selected to pair with the urban LGA. Kajola LGA was selected to pair with Iseyin while Orire LGA was selected to pair with Ogbomosho. Between January 2000 and August 2000, the capacity of selected primary and secondary healthcare facilities in 4 (2- rural, 2- urban) local government areas in southwestern Nigeria to manage childhood malaria was evaluated using three instruments. One was a structured questionnaire for healthcare facility (HCF) capacity assessment. This was administered to the head of the HCF or the assistant if the head of HCF was not available. The second instrument was an observation check list for equipment and materials for diagnosis and case management of malaria. The third instrument was a needs assessment questionnaire administered on a group of healthcare workers (HCWs) of different categories who were trained on the management of malaria in children. The local government areas (LGAs) involved in the study were Ogbomosho (north and south), Iseyin, Orire, and Kajola. Ogbomosho North and Ogbomosho South Local Government Areas are continuous and together make up the ancient city of Ogbomosho. For the purposes of this study, the two Ogbomosho local government areas were considered as a single unit. Ogbomosho North and South local government areas have a population of 332,068 while Orire LGA has a population of 93,438, Iseyin, 170,489 and Kajola, 172,288 [7]. Healthcare facilities were categorized into seven types namely, secondary level hospital, comprehensive health centre, primary health centre, maternity, dispensary, health post and nursing/convalescent homes. We counted all the HCFs in the LGAs and then stratified them into the different types. Fifty percent of the HCFs were selected from each stratum. Although the design was to survey 50% of healthcare facilities in each LGA, but we ended up with 43.9%, 57.6%, 60.8% and 15.4% in Ogbomosho, Iseyin, Kajola and Orire LGAs respectively. This came to a total average of 44.7% (55/123). The selection in Orire LGA fell far short of target because of inaccessibility of many of the healthcare facilities owing to poor road network and heavy rains. This small sample in Orire LGA represented the three types of available healthcare facilities in the LGA, namely, primary health centre, comprehensive health centre and convalescent home.

The study instruments were designed by investigators and face validated. Thereafter, the instruments were pre-tested in Irewole (urban) and Lagelu (rural) Local Government Areas with socio-demographic characteristics similar to the study LGAs. Amendments were made to the instruments before data collection was commenced. Parameters in the HCF questionnaire include demographic characteristics of respondents, type and location of study facilities, designation of heads of facilities, training of available staff, years of experience of staff and continuing education training on management of malaria received by members of staff. Information collected also included age distribution of patients treated for malaria in HCFs, availability of special clinics for children, standard operating procedure for management of malaria, availability of antimalarial drugs in HCFs and laboratory facilities for diagnosis of malaria and involvement of health care workers with the community in malaria control activities in the two years preceding the survey. The knowledge, attitude and practice (KAP) of 54 healthcare workers from 2 LGAs (Iseyin – urban, Kajola- rural) were assessed by the use of a structured questionnaire during a pre-test for their training. Information generated was added to the Federal Ministry of Health National Guideline for management of malaria for Primary Health Care workers and the WHO Malaria Training Manual to develop a training curriculum. The same instruments were used in a post-test evaluation after training. Trained interviewers supervised by investigators conducted the interviews. Each questionnaire took about twenty-five minutes to complete. Investigators conducted the training of trainers' workshops in the 2 LGAs. The training workshops were conducted over 3 days in each LGA.

The Joint University of Ibadan/University College Hospital Institutional Review Committee provided ethical approval for the study. Permission to carry out the study was obtained from the LGA chairman in each LGA, the Primary Health Care Department of each LGA and the head of each health care facility. In addition verbal informed consent was obtained from each respondent before interviews were carried out. Data obtained was entered into an IBM compatible computer using Epi info version 6.04 software and analyzed.

Results

Capacity of healthcare facilities for management of malaria

Fifty five of 123 registered healthcare facilities (HCF) in the selected Local Government Areas were surveyed. The types of healthcare facilities in the respective local government areas (LGAs) studied are shown in Table 1. Nineteen of 33 (57.6%) HCFs in Iseyin LGA were surveyed, 14/23 (60.8%) in Kajola, 18/41 (43.9%) in Ogbomosho and 4/26 (15.4%) in Orire LGAs. Ogbomosho and Iseyin LGAs constitute the urban LGAs while Orire and Kajola are the rural LGAs. HCFs surveyed include secondary HCFs [16 (29.1%), comprehensive health centre [11(20%)], primary healthcare centre [7(12.7%)], maternity centre [17(30.9%)], health post [2(3.6%)] and others (nursing/convalescent homes) [2(3.6%)].

The designation of heads of HCF among the 55 healthcare facilities surveyed was nurses [23 (41.8%)], medical officers [12(21.8%)], community health officers [12(21.8%)] and pharmacists or pharmacy assistants [4(7.3%)]. The designation of 4 (7.3%) was not stated. Details of the different categories of staff at the selected healthcare facilities are shown in Table 2. About half (53.4%) of the members of staff in the 55 healthcare facili-

Table 1: Distribution of the type of healthcare facilities in four Local Government Areas (LGAs) studied

Type of Healthcare Facility	Local Government Areas: Urban LGAs Ogbomosho N (%) 41 (100)	Urban LGAs Iseyin N (%) 33 (100)	Rural LGAs Kajola N (%) 23 (100)	Rural LGAs Orire N (%) 26 (100)	All LGAs Total N (%) 123 (100)
Secondary Hospital	10 (24.4)	9 (27.3)	2 (8.7)	0 (0)	21 (17.1)
Comprehensive Health Centre	9 (22)	4 (12.1)	2 (8.7)	13 (50)	28 (22.8)
Primary Health Centre	3 (7.3)	5 (15.2)	7 (30.4)	7 (26.9)	22 (17.8)
Maternity Centre	13 (31.7)	7 (21.2)	7 (30.7)	0 (0)	27 (22)
Dispensary	0 (0)	3 (9.1)	0 (0)	0 (0)	3 (2.4)
Health Post	4 (9.8)	0 (0)	2 (8.7)	0 (0)	6 (4.9)
Nursing home /Convalescence - home/ others	2 (4.9)	5 (15.2)	3 (13.0)	6 (23.1)	16 (13)

ties surveyed had at least two years experience in managing childhood malaria, while 20.3% (68/335) of members of staff had received continuing education training in management of malaria. Forty eight (87.3%) HCFs held clinical meetings at least once a month while 45.5% (25) run special clinics for children.

Table 2: Category of staff in selected healthcare facilities in four local government areas in southwestern Nigeria

Category of Staff	Number 335	(%) 100%
Nurse	147	43.9
Community Extension Worker (CHEW)	56	16.7
Midwives	47	14
Community Health Officer (CHO)	26	7.8
Health attendant	14	4.2
Doctor	13	3.9
Ward maid	7	2.1
Auxiliary nurse	5	1.5
Pharmacist	4	1.2
Pharmacy technician	4	1.2
Nursing aide	3	0.9
Laboratory technologist	2	0.6
Others	7	2.1

Chloroquine [90.9% (50/55)], sulfadoxine-pyrimethamine {Fansidar®, Swipha} [40% (20/50)] and halofantrine [8.9% (4/45)] were the three drugs most commonly used and often available antimalarial drugs in healthcare facilities for management of malaria. Other drugs used occasionally include amodiaquine, quinine, co-trimoxazole, promethazine and pyrimethamine. Eighty per cent of mothers and other caregivers obtained drugs from patent medicine stores when drugs are not available at HCF. Some caregivers were believed not to bother to get drugs once these were not available in the HCF. Six hundred and thirteen of an average of 771 (86.2%) of patients seen daily in the surveyed healthcare facilities received treatment for malaria. 43.4% patients treated for malaria were aged less than 10 years while 28.2% (173/613) and 28.4% (174/613) of these were aged 10-18 years and >18 years, respectively. Over half of the children less than 10 years of age in 76.4% (42/55) of healthcare facilities surveyed had received one form of treatment or another at home before presenting at the HCF.

Forty seven HCFs (85%) surveyed had guidelines for management of malaria and 80% (44/55) of them claimed that they use these guidelines at all times. Nineteen (34.5%) healthcare facilities had health educational materials. Posters (18/19) formed the large majority of health educational materials available. Sources of the health education materials could be ascertained in 13 (23.6%) of the healthcare facilities surveyed. The sources included the State Ministry of Health [10], the State Ministry of Education (2) and National Programme on Immunization Unit (1). Health education talks are included amongst services provided by over 80% of respondents. Topics treated during health education programs include advice on tepid sponging the febrile child (56.8%), use (15.7%) and selection (11.8%) of antimalarial drugs.

Patients suffering from malaria are referred to bigger and better equipped health facilities when there is deterioration in clinical condition of the patient (42.9%), severe anaemia (25%), children presenting in coma (21.4%) and dehydration (7.1%). Staff of 28 (50.9%) HCFs refer children to government hospitals, 32.7% (18) to private hospitals while 16.4% (9) did not respond to the question. Referral was guided by standardized guidelines given by the State Ministry of Health. Records of referrals were available in only 36.4% (20/55) of healthcare facilities visited.

Table 3: List of equipment available for diagnosis of malaria in patients attending selected healthcare facilities in Southwestern Nigeria

Equipment available	Yes N (%)	No N (%)	Total N (%)
Thermometers	52 (96.3%)	2 (3.7%)	54 (100)
Microscope	23 (48.9%)	24 (51.1%)	47 (100)
Slides	16 (35.6%)	29 (64.4%)	45 (100)
Haemolet/Lancet	15 (35.6%)	27 (64.3%)	42 (100)
Capillary tubes	18 (42.9%)	24 (57.1%)	42 (100)
Microhematochrit Centrifuge/Reader	14 (33.3%)	28 (66.7%)	42 (100)
Stains – (Giemsa/Lieshman)	13 (31.0%)	29 (69.0%)	42 (100)
Staining rack	11 (28.2%)	28 (71.8%)	39 (100)
Methylated spirit	40 (83.3%)	8 (16.7%)	48 (100)
Cotton Wool	45 (88.2%)	6 (11.8%)	51 (100)

Table 4: Knowledge, and practice of healthcare workers on various aspects of malaria

Characteristic	*Iseyin**	*Iseyin#*		*Kajola**	*Kajola#*	
	(N=25) %	*(N=25)* %	*p value*	*(N=29)* %	*(N=29)* %	*p value*
Malaria is caused by plasmodium	0	84	-	34.5	79.3	0.00
Malaria is transmitted by mosquitoes	84	88	1.00	100	89.7	0.24
Children below 10 are at high risk of having malaria	48	56	0.57	44.8	68.9	0.06
Pregnant women are at high risk of having malaria	36	40	0.77	24.1	82.8	0.00
Fever is an important clinical feature of malaria	48	64	0.25	17.5	65.5	0.00
Microscopic examination of blood smear for parasite is the best way to diagnose malaria	80	88	0.69	55.2	82.2	0.02
Chloroquine is an effective drug used to treat malaria	100	100	-	86.2	96.6	0.35
Fansidar® is used for treating malaria	64	76	0.35	31.0	68.9	0.00
Intramuscular chloroquine is the best route for treating malaria	36	0	-	55.2	0	-
Change therapy to Fansidar® if illness does not respond to chloroquine	0	36	-	20.7	55.2	0.00
Environmental sanitation is a good malaria control strategy	64	88	0.04	62.9	75.5	0.26
Tepid sponging can be used to bring down fever	92	100	0.47	79.3	86.2	0.49
Antipyretics can be used to bring down fever	68	72	0.76	0	48.3	-
Inadequate dosage of drugs is a cause of non-response to treatment	0	64	-	34.5	41.4	0.59

*Key * = Pre-test, # = Post test*

Equipment for diagnosis of malaria

The distribution of equipment available in health care facilities surveyed is shown in Table 3. Although 48.9% of healthcare facilities (23/47) had microscopes, only 35.6% (16/45) had microscope slides, 35.7% (15/42) had lancets while 31% (13/42) had Giemsa stain which are other essential items of supplies required for preparation and staining of blood films for the definitive diagnosis of malaria by microscopy. Healthcare workers from 58.2% (32/55) of HCFs surveyed were involved in malaria control activities in their respective communities. These include health education (46.8%), clearing of bushes around the homes (21.9%), environmental sanitation (12.5%), drainage of stagnant water (12.5%) and netting of windows and doors (6.3%).

Training needs assessment

Knowledge, attitude and practice (KAP) of healthcare workers

All healthcare workers (29) from Kajola LGA who participated in the training workshops knew that mosquitoes transmitted malaria while 34.3% (10/29) knew the causative agent for malaria is a parasite. However, 94% of HCWs from Iseyin LGA said that malaria is caused by and transmitted by mosquitoes (Table 4). Less than half (44.8% and 48.4%) of the HCWs from Kajola and Iseyin LGAs respectively knew that children are a high-risk group for malaria. The increased susceptibility of pregnant women to malaria was not appreciated by the HCWs from both LGAs (Table 4). Although, headache, body pains, vomiting and chills were recognized as prominent symptoms and signs of malaria, raised body temperature was not. In addition, 55.5% of HCWs from Kajola LGA and 36% of those from Iseyin LGA considered the use of intramuscular route as the best route of administering chloroquine. Not only did HCWs learn that children and pregnant women are at high risk of developing malaria, they also learnt that non-immune travellers and sickle cell anaemia patients require special care when they have malaria by the end of the workshops. Healthcare workers from both LGAs were conversant with methods for reducing transmission of malaria. The pre- and post- training attitudinal disposition of HCWs to the management of malaria is shown in Table 5. Only 3.4% (1/29) of HCWs from Kajola LGA considered malaria to be a serious illness in children while 56% and 44.8% of HCWs from Iseyin and Kajola felt that malaria could be correctly treated at home by mothers at the pre-test. Statistically significant differences were observed between pre- and post training in many aspects of KAP of malaria as well as in attitudinal disposition to the management of malaria (tables 4 and 5). This was more so among healthcare workers from Kajola LGA.

Table 5: Attitude of healthcare workers to home management of malaria

Attitude of healthcare workers	*Iseyin** *N=25 (%)*	*Iseyin#* *N=25 (%)*	*P value*	*Kajola** *N=29 (%)*	*Kajola#* *N=29 (%)*	*P value*
Malaria in children is a serious illness	19 (76.0)	21 (84.0)	0.72	1 (3.4)	28 (96.6)	0.001
Only health care workers can treat children					26 (89.7)	0.001
Malaria can be correctly treated at home by mothers	14 (56.0)	23 (92.0)	0.009	13 (44.8)	26 (89.7)	0.0008
Health workers should train mothers in the management of malaria	22 (88)	25 (100.0)	0.23	19 (65.5)	29 (100.0)	0.002

*Key: * = Pre-test, # = Post-test*

Discussion

During this study, urban LGAs were found to have larger and better-staffed health care facilities (HCF) than the rural LGAs. There were 10 and 9 hospitals (secondary HCFs) in the two urban LGAs of Ogbomosho and Iseyin compared with 2 and none in the 2 rural LGAs of Kajola and Orire respectively. This lopsided distribution of primary and secondary healthcare facilities between urban and rural LGAs is a major concern as this poses a serious impediment to successful malaria control efforts among rural dwellers that are particularly affected by the disease. The abundance of breeding sites, lack of anti-vector measures and ignorance of the etiology of malaria among rural dwellers make them particularly vulnerable to the infection. Findings of this study also confirm that malaria is a major cause of morbidity in southwestern Nigeria being responsible for 79.5% of patient attendance in the HCFs. Over a third (34.5%) of these children were less than ten years of age. These findings are in keeping with findings by previous workers [2].

The level of training of headship of the facilities is generally adequate for the categories of healthcare facilities manned. The number of HCFs running special children's clinics is inadequate for the proportion of children treated in HCFs daily. When compared with findings from Malawi, another developing country in sub-Saharan Africa, a higher proportion of HCFs studied had (83.6% - Nigeria versus 44% - Malawi) and frequently referred to (67.3% versus 27%) malaria treatment guidelines [8]. When compared with the Malawi study, a higher proportion of HCF staff had adequate basic training (74.3% versus 66%) while a similarly low proportion of staff (20.3% in Nigeria versus 18% in Mali) had received continuing education training in both countries. Compliance with national guideline for the management of acute uncomplicated malaria in the survey was quite good as chloroquine, the first line drug for the treatment of malaria in Nigeria at the time of the study, was found to be the most commonly used anti-

malarial drug and was almost always available. In addition, Fansidar® (sulfadoxine/pyrimethamine) the second line drug [1] was also the second most commonly used and available antimalarial drug.

Although 48.9% (23/47) of HCFs surveyed had microscopes only 35.7%, 35.6% and 31% had lancets, microscope slides and Giemsa stain respectively which are also essential for laboratory diagnosis of malaria (Table 3). It is also noteworthy that only two laboratory technologists were available in 55 HCFs surveyed. The gold standard for definitive diagnosis of malaria in clinical setting is by microscopy [9]. Laboratory diagnosis of malaria is thus highly compromised in the healthcare facilities surveyed and as a consequence, presumptive, in a large proportion of cases. Presumptive diagnosis of malaria has been shown to result in significant risk of mismanagement [10, 11]. The lack of facilities for definitive diagnosis of malaria is of particular concern as *falciparum* malaria [12, 13]. Although all HCFs had clinical thermometers, the differential diagnosis of a persistent or recurrent fever will create a major dilemma due to lack of laboratory facilities.

Inadequate KAP of malaria by HCWs was detected during a needs assessment evaluation of selected HCWs from Kajola and Iseyin LGAs. The inadequate KAP of malaria was more striking in the rural than urban LGA. Specifically, lack of knowledge about causative agent, high body temperature and a preferential intramuscular route of chloroquine administration despite the well recognized toxic effects of chloroquine following intramuscular route [14, 15] were encountered and subsequently corrected by training. During the pre-test, 3.4% and 76% of HCWs from Kajola LGA (rural) and Iseyin LGA (urban) respectively said that malaria is a serious illness in children before the training workshop. The proportion of HCWs with correct knowledge in the two LGAs rose to 84% and 96.6% respectively post training. Also, the change of attitudinal disposition of HCWs to one of increasing willingness to collaborate with mothers in correct home management of malaria at the post workshop test when compared with findings during the pre-test is a welcomed change that will have a positive impact on the control of malaria if actualized. This assertion does not tally with their attitude to treatment of malaria by mothers at the pretest. HCWs also increasingly affirmed that malaria can be correctly treated at home by mothers (56% and 44.8% which increased to 92% and 89.7% pre- and post-test in Iseyin and Kajola LGAs respectively) and that HCWs are the ones who can train the mothers in malaria management. There appears to be a conflict in that HCWs are not willing to give up their professional monopoly of treatment and this may have been extended to show that they should train the mothers in home management of malaria. Perhaps this means that while HCWs believe that mothers could treat malaria, there might be certain aspects of malaria management modalities that mothers cannot handle. Another possibility could be that the HCWs were considering childhood fevers in the broader perspective of other causes of fevers that mothers might not be able to diagnose and treat correctly. There is actually a need to pose this question to health workers.

Conclusions and recommendations

From the findings of this study, the spatial distribution of secondary level HCFs between the rural and urban LGAs is grossly uneven. The need to make provision for secondary HCFs in the rural LGAs cannot be overemphasized as provision of well equipped and adequately staffed secondary level HCFs in the rural LGAs will enhance malaria control efforts in these areas. In addition, both primary and secondary healthcare facilities surveyed do not have the capacity to manage severe or complicated childhood malaria.

Although the headship of the healthcare facilities appear to be adequately trained for the level at which they operate, the facilities are poorly equipped and inadequately staffed. Health facilities, especially secondary HCFs should be strengthened in the areas of relevant equipment and properly trained laboratory staff. Necessary equipment and consumables should be provided in all HCFs to enhance their diagnostic capability and hence better management of childhood malaria. In the absence of microscopy, rapid diagnostic techniques (RDT) that obviate the need for equipment, reagent and trained technical staff is an option worth considering for definitive diagnosis of malaria especially when malaria is severe, in our healthcare facilities. OptiMal® dipstick, an antigen capture technique that utilizes parasite specific lactate dehydrogenase has been shown to have a high sensitivity and specificity for the diagnosis of malaria [9]. Although, the cost of these RDTs is currently high, this is expected to come down with large-scale production as they become more widely used.

Healthcare facility workers need to be well informed about the malaria burden in the community, as this will motivate them to face the challenges posed by this disease. The statistically significant improvement in the KAP of malaria and attitudinal disposition observed following a training of trainers workshop (tables 4 and 5) suggests that HCF workers are open to new ideas and willing to learn in order to improve their professional competence. Appointment of appropriate cadres of staff to healthcare facilities will enhance performance of duties, community participation and adherence to standard operating procedures. The need for continuing education programs for HCWs is another area requiring attention. Continuing education training will allow for detection and correction of wrong notions, KAPs for improved health care service and management practices as was done at the workshops held during this study. Continuing education programs for healthcare workers should be mandatory and held at

regular intervals so as to update workers on current advances in the management of malaria.

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References

1. Federal Ministry of Health (FMOH), Focus on Malaria – New Guidelines – (Editorial) Nigerian Bulletin of Epidemiology 1991:1 (3):1
2. Salako LA, Ajayi FO, Sowunmi A and Walker O. Malaria in Nigeria: A revisit. Ann Trop Med Parasitol, 1990; 84: 435-445
3. Foster S. Treatment of malaria outside the formal health services. J Trop Med Hyg 1995; 98: 29 –34.
4. McCombie SC. Treatment seeking for malaria: A review of recent research. Soc S i Med 1996; 43: 933-945
5. Ajayi IO, Falade CO, Adeniyi JD and Bolaji MO. Role of patent medicine sellers in home management of childhood malaria: A situational analysis of experience in rural Nigeria. Inter Q. Comm Health Edu. 2002-2003; 21: (3). 271-281.
6. Kroeger A, Meyer R, Mancheno M and Gonzalez M. Health education for community-based malaria control: an intervention study in Ecuador, Columbia and Nicaragua. Trop Med Int Health. 1996; 6: 836-846.
7. National population census report 1999. National Population Commission of Nigeria
8. Lin Y and Franco LM. Assessing malaria treatment and control at peer facilities in Malawi. Quality Assurance Project Case study. Published for the U.S. Agency for International Development (USAID) by quality assurance Project (QAP): Bethesda Maryland, USA. 2000
9. World Health Organization (2003) Malaria rapid diagnosis: making it work. RS/2003/GE/05(PHL)
10. Trape JF, Peelman P, Moranl T and Peelman B. Criteria for diagnosing clinical malaria among a semi-immune population exposed to intense and perennial transmission. Trans R Soc Trop Med Hyg 1985; 79: 435-442.
11. Olvar M, Develoux M, Abari A. and London L. Presumptive diagnosis of malaria results in a significant risk of mistreament of children in urban Sahel. Trans R Soc Trop Med Hyg 1991; 85: 729-730.
12. Falade CO, Salako LA, Sowunmi A, Oduola AMJ. and Lacier P. Comparative efficacy of halofantrine, chloroquine and sulphadoxine-pyrimethamine for the treatment of acute uncomplicated malaria in Nigerian children. Trans R Soc Trop Med Hyg 1997; 91: 58-62.
13. Sowunmi A, Ayede AI, Falade AG. Randomized comparison of chloroquine and amodiaquine in acute uncomplicated malaria. Ann Trop Med Parasitol. 2001; 96: 409-418.
14. Warrell DA. "Treatment and prevention of malaria" in Bruce-Chwatt's essential malariology, 3rd edition. Eds Gilles H.M. and Warrell D. A. Arnold publishers 1993; page 174.
15. Salako LA. Toxicity and side effects of antimalarials in Africa: a critical review. Bull WHO 1984; 62: Suppl 63-68.

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