Malaria self medications and choices of drugs for its treatment among residents of a malaria endemic community in West Africa

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ABSTRACT

Objective: To assess people's knowledge about malaria treatment which is one of the main components of the roll back malaria (RBM) programme instituted on the African Continent with the aim of bringing the disease under control. **Methods:** The cross−sectional study was carried out between October and December 2009, involving 3 171 adult women who were selected from households using systematic sampling methods. Quantitative information such as age, educational level, marital status, occupation, number of children and knowledge of malaria were obtained using structured and semi−structured questionnaires, while qualitative information was obtained using focussed and in−depth group discussions to complement quantitative data. **Results:** The modes of approach to malaria treatment were 41.1% (1 302), 36.0% (1 143), 10.7% (339) and 0.5% (15) would attend hospital/clinic, buy drugs from pharmacy/chemist shop, take traditional herbs, and take no action respectively. Factors that were found to increase the level of knowledge about antimalarial drugs among the respondents were increasing educational level, being married compared to singles, having children and increasing family income ($P < 0.05$), while occupation and age differences had no contributory factors ($P > 0.05$). Knowledge about artemisinin combined therapy (ACT) was less than 15% similar with intermittent preventive treatment (IPT); home−based management for malaria (HBMM) was not in place. **Conclusions:** The drug component of the RBM programme in the community should be reviewed and appropriate amends instituted in order to ensure efficiency of the overall malaria control programme in the community.

1. Introduction

Malaria fever in this new millennium is still a global disease of serious public health importance[1−3]. The disease presently accounts for over a yearly 100 million deaths worldwide; at least one death every 45 seconds, most of which (over 70%) occurring in sub−saharan Africa's primarily pregnant women and children[4−6]. Globally still, the disease accounts for much higher morbidities and mortalities than that caused by tuberculosis, HIV/AIDS and enteric fevers put together with still documented weak control methods among most communities endemic for the disease[7−9].

Anthropologists, paleontologists, archeologists as well as medical historians generally believe that malaria could have existed quite long ago in the course of human existence[10−12]. Various herbs from ancient Egyptian tombs, excavations from ancient Mesopotamia presently Iran, ancient Babylon presently Iraq, and traces of herbal medicine from China dating as far back as 5 000 BC showed different and assorted herbs for different ailments. Malaria is generally though arguably believed to be among the ailments the ancient people prepared for its cure in the afterlife[13−15], therefore from the ancient people to date the choices of drugs for the treatment of malaria could and may have been influenced by several factors[17−19]. These include an understanding of the existence of the disease, its social as well as individual impact, and level of knowledge about availability of drugs used for its treatment[20−22].

Since the United Nations declared the year 2000−2010 as malaria decade with the constitution of the roll back malaria (RBM) initiative, efforts were made by the international

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organizations in collaboration with the malaria endemic nations primarily to bring the disease under control[23–25]. One of the key components of the RBM programme is the introduction of artemisinin–based combination therapy with home treatment and a re–definition of choices of antimalarial drugs. There was meant to create a high level of awareness on the recommended generally most potent antimalarial drugs available along with appropriate dosages to the people.

Ten years after the commencement of the RBM with the end of malaria decade, there is the need to assess the level of knowledge of the people about malaria treatment. Moreover recent studies in different parts of Benue state including Otukpo and environs in Nigeria showed a high prevalence of the disease[26–28]. A sustained control of malaria in a community would require, among others correct knowledge of the potent antimalarial drugs by the people for proper home management of the disease through home based malaria management (HBMM) programme. This requires clinical diagnosis of malaria at home by trained health personnel and subsequent prompt treatment with artemisinin combined therapy (ACT) or other potent antimalarial drugs with the training of the people at home on common symptoms and signs of malaria as well as the potent antimalarial drugs with correct dosages. The success of this treatment portfolio (HBMM) would significantly impact positively on the overall success of the RBM programme in a community. This would substantially reduce both morbidities and mortalities directly or indirectly associated with malaria in Africa[29–31]. This study was therefore set up to assess the level of self–medication and choices of drugs for malaria treatment among residents of Otukpo and environs, a semi–urban community in western Africa with a near–year–round high malaria transmission after a decade of malarial control.

2. Materials and methods

2.1. Study area

The study was carried out in Otukpo, a semi–urban community in Benue state of north–central Nigeria. It is located in the Savannah zone between latitude $7°20'$ N and longitude $8°12'$ W, and latitude $7°20'$ S and longitude $8°20'$ E with annual rainfalls of about 1 650 mm from April to October. Based on the 2006 population census, the town is estimated at 600 000 inhabitants; at least 95% are of Idoma ethnic group while the remaining 5% is shared among the Ibos, Tivs, Hausa and Igede ethnic groups.

2.2. Study setting

The study was carried out between October and December 2009. Five major parts of the town comprising Ogwonu Igbolafa, Ukpu, GRA, Sabon geri and Oweto were selected to cut across, ethnic, socioeconomic, and religious backgrounds of the inhabitants. Interviewers were trained on the art of questionnaire administration and subsequently

recruited for the study. All adult women aged 18 years and above in each household were individually interviewed to assess their knowledge about malaria and choices of drugs used for its treatment. Women were selected for the study in the community because of the central role they play in the quality of healthcare delivery at home, either as caregivers to their children and grandchildren or to themselves especially during pregnancy and largely the healthcare of their spouses.

2.3. Sampling technique

Households were selected using systematic sampling methods in which one after another household in each direction faced by the interviewers was recruited into the study while the first household was selected with the aid of head or tail of a coin. Central locations in each part of the five key locations of the town were arbitrarily chosen as the starting point. Households were selected using systematic sampling methods in which one after another household in each direction faced by the interviewers was recruited into the study. Pre–coded and pre–tested questionnaires were either self or interviewer administered to the respondents to obtain the information[32]. Information such as age, educational level, occupation, marital status, parity and knowledge about malaria and choices of drugs for self–medication of malaria were obtained. Focused group discussions (FGDs) on factors surrounding choices of drugs chosen for self–medication were also carried out with 10 groups of adult women (average 11 women per FGD) this qualitative data was used to strengthen the quantitative data obtained from the questionnaires. Adult women were chosen for the study due to the significant role they play at home in determining the type and quality of healthcare either as caregivers to themselves, their children or grandchildren as well as to their spouses.

2.4. Data collection

For the purpose of the study, knowledge about antimalarial drugs was graded from Poor or below average (0), Average or Fair (1), and Above average or Good (2) as follows: Poor or below average–inability to list correctly at least one potent antimalarial drug; Average–ability to list correctly one or two potent antimalarial drugs; Above average– ability to list correctly more than two potent antimalarial drugs with or without ACT. FGDs were conducted using FGDs guide, the DILO (a day in the life of villagers) was adopted whereby the team designated to collect data in each locality worked only from morning to evening[32]. A minimum work was required from each but while they were moving in the town they were free to make use of any event (e.g. a febrile child, death, social gathering etc).

2.5. Evaluation of economic status for households

Principal component analysis (PCA) was used to develop wealth indices for the households based on ownership of durable assets including radio, television, telephone,

refrigerator, bicycle, motorcycle/scooter and car/truck. Ownership was coded as 0 or 1 and missing cases were excluded. The households were then divided into socio–economic quartiles based on their scores. Cronbach's alpha was then calculated to test consistency–reliability[33,34].

2.6. Data management and analysis

Data obtained was analysed using Epi Info 6 statistical software while Pearson's Chi squared test or Mantel–Haenszel were used to determine association with a P–value of <0.05 accepted as significant. Fisher's exact test was calculated for borderline significance and for cells with counts less than five. Analysis of variance (ANOVA) was used to determine the predictors for correct knowledge about antimalarial drugs among the respondents[35]. Qualitative data was analysed using MAXQDA software. Each day, the team made use of the lessons learned in the previous working day.

3. Results

From the 3 385 questionnaires administered, 3 293 (97.3%) were returned of which 3 171 (96.3%) were correctly filled. The age range of the respondents was 18 and 83 years with a mean age of 38.5 years and a bimodal age of 27 and 34 years. Those aware of the existence of malaria were 99.5% (3 155). 83.5% (2 648) of the respondents knew the mode of transmission with at least one method of prevention and one correct drug for its treatment while the remaining 16.5% (523) had faint, cloudy or absent knowledge about malaria.

3.1. Effect of age on knowledge about antimalarial drugs

Analysis of age distribution of the respondents showed that 15.2% (47/310), 9.4% (92/979), and 23.5% (4/17) of those aged < 20, 30–39, and ≥80 years had poor knowledge about antimalarial drugs respectively. There was no significant age difference (Table 1).

Table 1
Age distribution pattern in relation to knowledge about malaria among women in Otukpo, Nigeria [n (%)].

Age interval (years)	Average & above	Poor	Total
≤20	263 (84.8)	47 (15.2)	310 (100.0)
21–30	708 (90.1)	78 (9.9)	786 (100.0)
31–40	887 (90.6)	92 (9.4)	979 (100.0)
41–50	429 (83.5)	85 (16.5)	514 (100.0)
51–60	226 (78.2)	63 (21.8)	289 (100.0)
61–70	156 (74.6)	53 (25.4)	209 (100.0)
71–80	52 (77.6)	15 (22.4)	67 (100.0)
≥81	13 (76.5)	4 (23.5)	17 (100.0)

SSE=2.973, df=7, MSE=4.248, P> 0.05.

3.2. Modes of approach to malaria treatment

A review of the most common modes of approach to malaria treatment among the respondents showed that 41.1% (1 302/3 171) would visit hospital or clinic, 36.0% (1 143/3 171) would buy drugs from pharmacy stores or chemists, and 10.7% (339/3 171) would usually take traditional herbs (Figure 1 and Table 2). There was no clear cut boundaries among the respondents that used various options for malaria treatment. From FGDs however, the general order of approach to malaria treatment was herbs, the remaining drugs at home, drugs from shop, tepid sponging, and then lastly, seek advice from health personnel. Knowledge about ACT was found to be 15.0% (476/3171), and intermittent preventive treatment for malaria (IPTM) 4.7% (149/3 171); home based management of malaria (HBMM) programme was non operational, this is where trained health personnel would routinely visit homes with ACT and promptly treat clinical cases of malaria.

Table 2
Choices of drugs used for malaria treatment among females in Otukpo, Nigeria.

Drug	Frequency	Percent (%)
Amatem (antifolate)	375	10.8
Panadol	275	8.7
Fansidar (antifolate)	103	3.2
Artesunate	266	8.4
Ibumol (NSAID)*	74	2.3
Procold (expectorant)	321	10.1
Maladrin	71	2.2
Amalar	388	12.2
Latacin	172	5.4
Lomart	292	9.2
Herbs	339	10.7
Flagyl	268	8.5
Chloroquine	260	8.2
Maloxine	53	1.7
Metakelfin (sulphonamide)	27	0.9
Optalidon	39	1.2
Septrin	98	3.1
Tetracycline	141	4.4
Quinine	89	2.8
Ampiclox	133	4.2
No Idea	156	5.0

NB: Respondents were allowed to list as many antimalarial drugs as they could.
NSAID= Non–steroidal anti–inflamatory drug.

3.3. Choices of drugs for malaria treatment

Some of the drugs listed for treatment of malaria among the respondents include Panadol 8.7% (275), Fansidar 8.4% (103), Chloroquine 8.2% (260), Septrin 3.1% (98), and Ampiclox 4.2% (133), 5.0% (156) had no idea of any antimalarial drug (Table 2).

3.4. Effect of occupation on knowledge of antimalarial drugs

Based on occupation, all the healthworkers, military and paramilitary and 99.1% of the civil servants interviewed had average and above knowledge on antimalarial drugs. Also 90.2% (340), 86.5% (1 393), and 81.9% (68) of the petty traders, farmers and artisans respectively had good knowledge about antimalarial drugs, there was no significant occupational difference (P> 0.05) (Table 3).

Table 3
Occupational distribution and knowledge of antimalarial drugs among females in Otukpo, Nigeria [n (%)].

Occupation	Average & above	Below average & poor	Total
Petty trading	340 (90.2)	37 (9.8)	377
Civil servant	220 (99.1)	2 (0.9)	222
Farming	1 393 (86.5)	217 (13.5)	1610
Military/Paramilitary	61 (100)	0 (0.0)	61
Artisan	68 (81.9)	15 (18.1)	83
Applicant	527 (76.5)	162 (23.5)	689
Health worker	36 (100.0)	0 (0.0)	36
Business	53 (98.1)	1 (1.9)	54
Others	26 (92.9)	2 (7.1)	28
Unclassified	10 (90.9)	1 (9.1)	11

SST=4.00, df=15, MS=0.50, $P>$ 0.05.
NB: There was no significant association of any of the other professions with altered knowledge on antimalarial drugs compared to the health workers or military/paramilitary workers.

3.5. Effect of educational levels on knowledge of antimalarial drugs

Analysis of educational levels of the respondents vis–à–vis their knowledge of antimalarial drugs showed that 385 (12.1%), 521 (16.4%), 957 (30.2%), and 1 308 (41.3%) had nil, primary, secondary and tertiary education respectively. There was a strong association between level of educational attainment and increasing knowledge of antimalarial drugs among the respondents from 25.5%, 73.4%, 98.8% to 100% among those with nil, primary, secondary and tertiary education respectively (MD= 525.666 67, SE= 2.092 9, CI= 95%, P<0.05) (Figure 2).
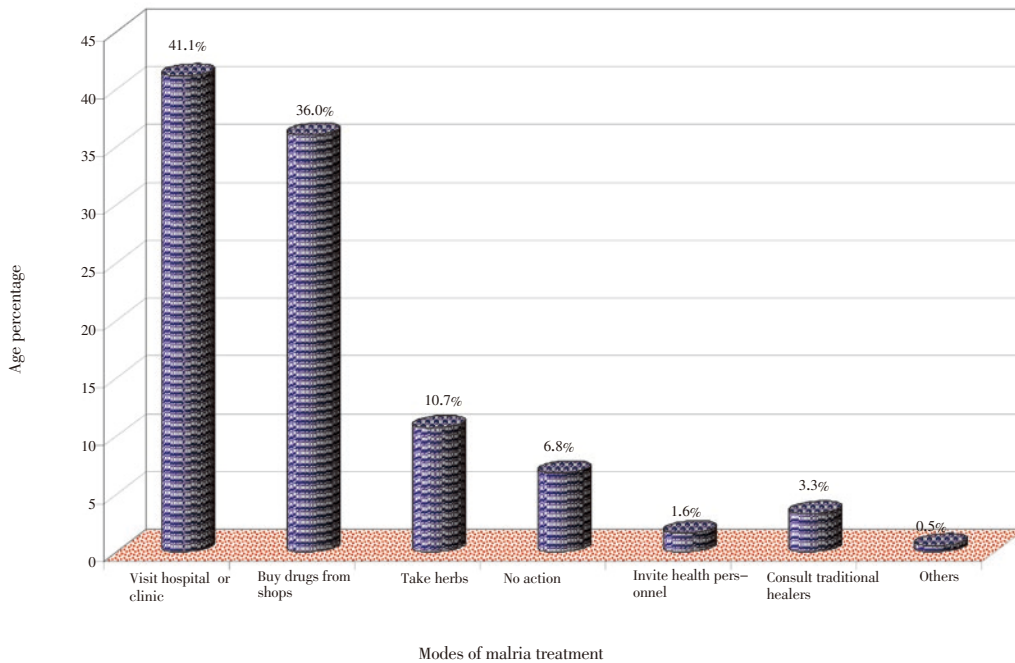

Figure 1. Modes of approach to malaria treatment among females in Otukpo, Nigeria.
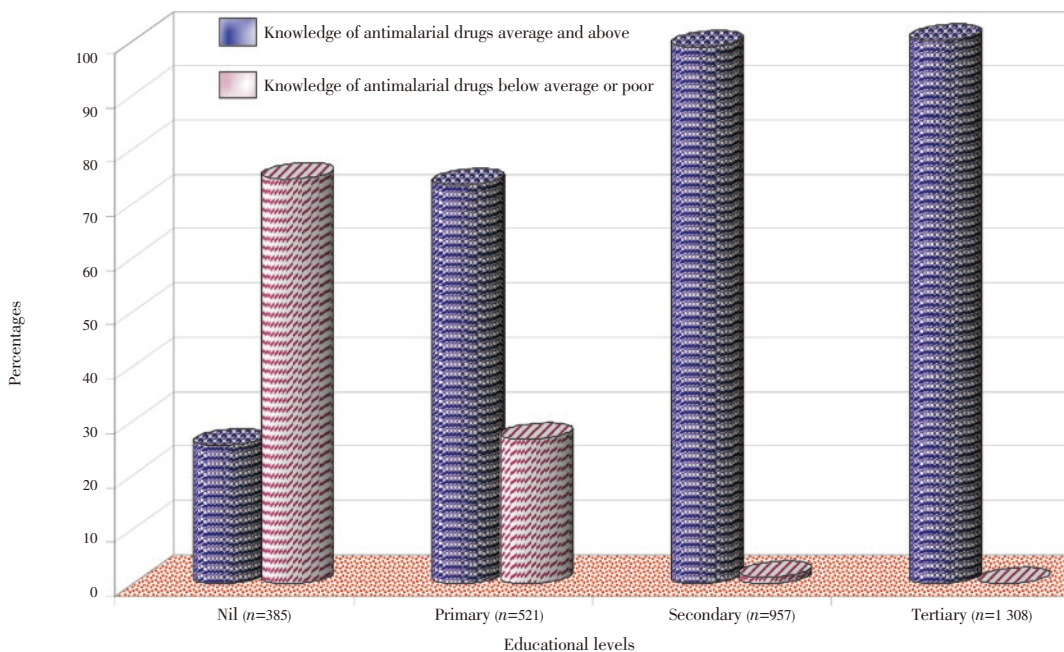

Figure 2. Knowledge of antimalarial drugs in relation to educational levels among females in Otukpo, Nigeria.

3.6. Effect of marital status on knowledge of antimalarial drugs

A review of the marital status of the respondents showed that 38.4% (1 217), 10.2% (325), and 51.4% (1 629) were singles, divorced/separated or widowed, and married respectively. The knowledge of antimalarial drugs was significantly higher among those married compared to the singles (χ^2 =10.17, OR=0.22, RR=0.85, P=0.001); there was however no significant difference between the separated or divorced or widowed compared to the singles (χ^2=0.31, OR=1.21, RR=1.03, CI=95%, P= 0.57).

3.7. Effect of number of children on the knowledge of antimalarial drugs

Among the 3 171 respondents, 1 224 (38.6%) had no child, 384 (12.1%) had one child, 787 (24.8%) had two children, and 674 (21.4%) had three or more children. There was a strong association between increasing number of deliveries and knowledge of antimalarial drugs from 35.5%, 47.9%, 62.0%, to 68.0% for those with nil, one, two, three and above number of deliveries respectively (SS=8.000, MS=1.000, df=11, CI=95%, $P<$ 0.05). There was however no significant difference in level of knowledge of antimalarial drugs between those having and under five child and those having children greater than five years of age (χ^2=0.48, OR=1.22, RR=1.02, CI=95%, P= 0.67).

3.8. Effect of family economy on knowledge of antimalarial drugs

A review of knowledge of antimalarial drugs vis–à–vis wealth index of the respective families showed that 1 111 (35.0%), 869 (27.4%), 603 (19.0%), and 588 (18.6%) belonged to respectively, first, second, third and fourth quartiles. There was a strong association between knowledge of antimalarial drugs and increasing wealth index from 80.8% to 100% in the first to the fourth quartiles respectively (SS= 8.000, df= 1.000, CI=95%, $P<$ 0.05) (Table 4).

Table 4
Knowledge about antimalarial drugs in relation to wealth index among females in Otukpo, Nigeria [n(%)].

Quartiles	Above average	Average	Poor	Total
First	775 (69.8)	123 (11.0)	213 (19.2)	1 111
Second	514 (53.2)	189 (21.7)	166 (19.1)	869
Third	105 (17.4)	442 (73.3)	56 (9.3)	603
Fourth	447 (76.0)	139 (23.6)	2 (0.4)	588

SST=8.00, df=1. 000, $P<$0.05.

4. Discussion

The level of awareness about malaria among adult women in Otukpo town was found to be over 99%, while 83.5% knew about transmission, prevention and treatment. There were various approaches towards malaria treatment as 36%

usually bought drug pharmacy or chemists, 10.7% would take traditional herbs, and 41.1% visit hospital or clinics. Paracetamol, Flagyl, Septrin, Ampiclox, Tetracycline were among the drugs listed for malaria treatment while 5% of the respondents did not know any antimalarial drug. There was a significant association between educational levels, being married, having children and increasing family income and knowledge of antimalarial drugs ($P<$0.05). There was however no significant difference among those with various occupations, age differences, as well as having or not and under five child in the house ($P>$0.05). Knowledge about ACT and IPTM was generally less than 15% while HBMM was non–operational in the community and its environs.

The findings from the present study appear to have significantly contributed to the high prevalence of malaria in a recent survey carried out in the community as well as other neighbouring communities[34–36]. The high reliance on self–medication with probably wrong drugs and dosages (>38%); the use of herbs with usually unproven antimalarial properties; and the obvious delays in the course of trial medications before seeking appropriate medical attention will no doubt contribute to several morbidities and mortalities and a continuous spread of the disease in the community. Introduction of HBMM using community health workers with special training in clinical diagnosis and treatment of malaria and other voluntary health workers would be useful in reducing malaria deaths in the community. Also introduction of community medicine distributors (CMDs) adequately armed with artemether + lumefanthrine combinations so as to help introduce the more potent and efficacious antimalarial drug in the community. Findings from the present study compares well with that in Tanzania and Abeokuta, Nigeria where reliance on traditional medications for treatment of were found to compound the malaria burden in the respective areas[36,37]. Also the high rate of self–medications with over the shelf drugs for malaria treatment, as in the present study was a common practice in Ibadan, Nigeria and Ugandan communities with their associated respective high burdens of malaria[38–40]. Lack of adequate knowledge about antimalarial drugs appear to be a general problem across sub–Saharan Africa and has generally been attributed to the high mortality of the disease on the continent. A more aggressive health education campaign could probably improve on the people's knowledge in this regard as well as elevating the literacy level of the communities to facilitate the general understanding of the malaria control programme including its drug treatment[41].

Regional blocks in Africa as well as individual member states should adequately collaborate on the on–going fight against malaria by accessing the global fund meant to fight malaria in Africa as well as other foreign aids towards the same cause[41–45]. A significant proportion of this fund should be devoted to the procurement and distribution of ACT freely to Africa's most disadvantaged communities[46,47].

Findings from the present study are however different from the findings in Nairobi, Kenya, Dakar, Senegal and Kigali, Rwanda, where utilization of traditional medications for malaria was not a common practice[47–50]; and in Banjul,

The Gambia where self–medication for malaria was rare[51]. These feats were achieved due to the high awareness and treatment campaigns put up by the local authorities with a corresponding drop in malaria mortalities and morbidities[51–53].

We wish to make the following recommendations:

Public enlightenment should be stepped up in the community through town cries, erection of bill boards with jingles in local languages to redirect the people towards proper treatment of malaria. This should be extended to the traditional herbs vendors so as to limit their operations voluntarily through adequate health education and probable recruitment into integrated malaria control programme in the community.

Government should procure enough doses of ACT for free distribution to the people so as to break down the socioeconomic and knowledge barriers towards effective treatment of malaria in the community through drug availability at people's door steps[54].

Policy formulators and implementers should see the urgent need to institute HBMM programme in the locality as well as recruitment of CMDs to reach out to the people for antimalarial drug distribution and also educate the people on the correct dosages of potent antimalarial drugs[55].

In conclusion, the present study has shown that as far as drug treatment of malaria and its components is concerned the RBM decade in Otukpo community failed to realise set goal. There is still a wide gap between the high level of awareness about malaria as a disease, and the low knowledge about appropriate drugs for its proper treatment among women in the community. This was largely attributed to illiteracy, socio–economic factors as well as a poor implementation of the RBM programme as a whole especially as concerns availability and distribution of potent antimalarial drugs including ACT in the community. These factors should therefore be reviewed and appropriately remedied.

Conflict of interest statement

We declare that we have no conflict of interest.

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