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Herbal remedy in the treatment of malaria: cross sectional survey of residents of Lagos State, Nigeria

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Summary

Semi structured questionnaires, designed to capture information on the type, composition, method of preparation, dosage, mode of administration, and frequency of use of herbal preparations in malaria treatment, were administered to 1,593 adults of the 3 main ethnic groups and a forth group comprising other smaller ethnic groups designated as "others", all resident in Lagos metropolis in a cross sectional survey. The 1,593 respondents were made up of 892 males and 701 females and their ages ranged from 19 to 60 years. A high percentage in all the ethnic groups especially the Yorubas admitted to the use of herbs in treating malaria [Yoruba (69%), Hausa (47%), others (32%) and Igbo (30%)]. Effectiveness of herbs in treating malaria episodes featured as the major factor for their use, as claimed by the majority (>50%) of the respondents in each of the ethnic groups, while cost consideration was the next most important factor. Other factors mentioned included the absence of side effect in herbal use, to avoid the itchy side effect and ineffectiveness of chloroquine and some other anti-malarials. An appreciable percentage across the ethnic groups had no idea of the constituents of the herbal remedies they use for treating their malaria episodes since they buy these from traditional herbalists. Varied combinations of these herbs in combination with different types of fruits and other substances are claimed to be used, the main ones of which are *Azardiracha indica* and pineapple. A large majority of respondents in all the ethnic groups claimed to use the same herbs for the treatment and prevention of malaria and great improvement is experienced after use [Hausas (90%), Igbos (83%), Yorubas (77%) and the others (88%)]. There is usually no specific dose or dose regimen, however a high proportion in all the ethnic groups use herbal preparation thrice a day and a few of the respondents take unspecified measures at arbitrary intervals. The lack of standards in the use of these herbal preparations needs to be urgently addressed especially as use continued until the malaria symptoms and signs are deemed to have disappeared. There is also need to standardize the usage of herbs if they are to play a significant role in malaria prevention and treatment.

Keywords: Herbal remedy, malaria, ethnicity

Résumé

Des questionnaires semi structurés en vue d'obtenir des informations sur le type, la composition, la méthode de préparation: le dosage, le mode d'administration et la fréquence d'usage des préparations herboles pour le traitement du malaria étaient administrés à 1593 adultes dans 3 groupes ethniques dans le métropolitain de Lagos. Ils y avaient 892 mâles et 701 femelles d'âge variant entre 19-60 ans. La fréquence d'emploi des préparations herboles pour traitement du malaria était plus élevée chez le Yorubas (69%), Hausa (47%) : Igbo (30%) et autre (32%). L'efficacité de l'emploi des préparations herboles pour le traitement des épisodes était de plus de 50% dans chaque groupe ethnique. Cependant le coût réduit était considéré très important. D'autres facteurs mentionnés étaient l'absence des effets indésirables, d'allergie et l'inefficacité de la chloroquine et autres médicaments antipaludiques. Un pourcentage appréciable parmi ces groupes ethniques n'avaient aucune connaissance des constituants des préparations herboles achetées des tradipraticiens et utilisées pour le traitement de la malaria. Des combinaisons variées de différents types de fruits et autres substances sont utilisées avec l'usage principal de l'*Azardiracha indica* et l'ananas. Le taux dosage de ce régime pour la prévention et le traitement du malaria parmi les groupes ethniques était de : Hausas (90%), Igbo (83%), Yorubas (77%) et d'autres (88%). Il n'y a pas d'habitude de doses spécifiques, cependant une proportion élevée dans les ethniques utilisent les préparations herboles trois fois par jour et souvent à des intervalles arbitraires. Le manque des standards dans l'usage des préparations herboles doit être adressé urgemment vu l'usage continu jusqu'à la disparition des symptômes de la malaria. Aussi le besoin de standardiser l'usage des plantes médicinales pourrait jouer un rôle significatif durant la prévention et le traitement de la malaria.

Introduction

At present, at least 300 million people are infected by malaria globally and there are between 1 to 1.5 million deaths per year. In Africa, malaria accounts for up to a third of all hospital admissions, and up to a quarter of all deaths of children under the age of five years. There are up to 800,000 infantile mortalities and a substantial number of miscarriages and very low birth weight (VLBW) babies born per year due to the disease. The cost of malaria in economic

terms is also high; treatment cost ranges between US\$0.80 and US\$5.30 per treatment whereas herbal treatment cost only US\$0.6. Malaria continues to be a major health problem of the tropics and sub-tropics [1].

In 1989, World Health Organization (WHO) declared malaria control to be a global priority due to the worsening situation, and in 1993, the World Health Assembly urged countries and WHO to increase control efforts. Roll Back Malaria (RBM) was launched by WHO in 1998 [2-3].

In Nigeria, it is estimated that 50% of the population has at least one episode of malaria each year. It is also estimated that children under the age of 5 years have 2 to 4 attacks of malaria a year. Malaria accounts for 50% of outpatient consultations/visits and 15% to 31.3% of hospital admissions in Nigeria. Malaria ranks among the top three causes of death in the country. It accounts for 30% of all childhood deaths and is associated with about 11% of maternal deaths [4].

In Africa traditional healers, and remedies made from plants play important roles in the health of millions of people [5-8]. Each community has its own particular approach to health and disease. Nigeria is endeared with vast resources of medicinal and aromatic plants. These plants have been used over the millennia for human welfare [9]. Many rural people and the urban poor rely on the use of herbal medicine when they are ill. In fact, in many rural communities, traditional herbal medicine is the major source of health care available [9].

Historically, investigations on the herbs used in local treatment of many diseases have paved way to solutions for diseases. Artemisin based drugs currently advocated for use in malaria treatment were discovered through investigations on the local measures on the treatment of malaria in China. This paper describes the different herbs and combinations claimed to be used by ethnic groups in Lagos metropolis, in the treatment of malaria.

Materials and methods

The study was carried out in 5 Local Government Areas (LGA): Ibeju-Lekki, Lagos Island, Mushin, Ojo and Surulere, all located within Lagos metropolis, Nigeria. These 5LGAs were selected from the list of 20 LGAs in Lagos State by simple random selection using balloting method. Subsequently, some enumeration areas based on the 1991 National census delineation exercise were selected using simple random selection. Thereafter, listed streets in each of the selected enumeration area were also subjected to simple random selection. Finally, systematic sampling was adopted to select households from where respondents were identified. These respondents were of different background. Multi-stage sampling procedure was used to select 1593 respondents in randomly selected streets from the 3 main ethnic groups namely; Yoruba, Hausa, Igbo and the others comprising of other ethnic groups usually locally referred to as 'minorities'. Eight hundred and ninety

two (892) of the respondents were males and 701 were females, their ages ranged between 19 to 60 years. Informed consent of each respondent was obtained prior to the interview.

Semi structured questionnaires designed to capture information on the types, constituents, methods of preparation, dosage and frequency of use of the herbal remedies were administered to the selected 1593 individuals. The data obtained was cleaned, coded, entered and analysed using Epi Info Software (version 6.04) [10].

Results

Educational and socio-economic background

The educational background of respondents revealed that 34(33.7%) of the Hausas had no formal education while 33(32.7%), 26(27.5%) 8(7.9%) had primary, secondary and tertiary education respectively. Majority of the respondents among the Igbos 293(60.1%) and Yorubas 360(52.3%), had secondary education, as was the case for the other 209 (63.3%) (Table 1).

Seventy 70(69.3%) of the Hausa respondents were married while 29(28.7%) were single. Most of the respondents among the Igbos were either single 238 (48.9%) or married 232 (47.6%). Similarly 248(36.7%) and 401 (59.4%) respondents among the Yorubas were single and married respectively while other ethnic group had 174(52.7%) single and 141(42.8%) married (Table 1). Most of respondents were not willing to reveal their monthly income. Of those who revealed their income most of them earned between N1,000 to N11,000 (US\$7.14 to US\$79.57)per month in all the ethnic groups (Table 1).

Table 1: Educational marital and income profile of respondents in number and percentages.

Variables	Hausa	Igbo	Yoruba	Other ethnic groups
<i>Education</i>				
None	34 (37.7)	15(3.1)	40(5.8)	13 (3.9)
Primary	33 (32.7)	90 (18.5)	177 (26.2)	42 (12.7)
Secondary	26 (25.7)	293(60.1)	360 (52.3)	209 (63.3)
Tertiary	8 (7.9)	89(18.3)	106 (15.7)	66 (20.1)
<i>Marital status</i>				
Single	29 (28.7)	238 (48.9)	248 (36.7)	174 (52.7)
Married	70 (69.3)	232 (47.6)	401 (59.4)	141 (42.8)
Divorced	0 (0)	8 (1.6)	6 (0.9)	3 (0.9)
Separated	1 (1.0)	5 (1.1)	11 (1.7)	6 (1.8)
Widowed	1 (1.0)	4 (0.8)	9 (1.3)	6 (1.8)
<i>Income profile</i>				
< N1,000	2 (2.0)	16 (3.3)	54 (8.0)	17 (5.2)
N1001-N5000	22 (22.2)	125 (25.7)	223 (33.1)	82 (25.0)
N5001-N11,000	29 (29.3)	102 (21.0)	87 (12.9)	82 (25.0)
N11,001-N21,000	11 (11.1)	21 (4.3)	23 (3.4)	4 (1.2)
N21,0001-N23,000	0 (0)	4 (0.8)	7 (1.04)	0 (0)
No response	35 (35.4)	218 (44.9)	279 (41.4)	143(43.6)

Use of herbs

All the ethnic groups especially the Yorubas admitted to the use of herbs in treating malaria. For instance, (69%) of the Yorubas, (47%) of the Hausa, (32%) of the other ethnic and (30%) of the Igbos admitted to the use of herbs in the treatment of malaria. Effectiveness of the herbs in treating their malaria episodes featured as the major factor for their use, as claimed by the majority (>50%) of each of the ethnic groups (Table 2).

Table 2: Reasons for using herbs

Reasons	Ethnic groups in percentages				
	Hausa N=49	Igbo N=45	Yoruba N=463	Other ethnic groups N=113	All ethnic groups N=770
Cheap	22.4	17.2	19.4	16.0	18.70
Effective/ reliable	55.1	53.8	56.6	55.1	56.1
Temporary cure	2.0	2.8	1.5	2.7	2.0
More lasting effect	4.1	2.8	3.7	4.4	3.6
*Others	13.5	19.9	14.5	13.0	14.9
No response/ don't know	2.9	3.5	4.3	8.8	4.7

*chloroquine itches, avoid resistance, no side effects, relief headache and no hospital/chemist

factors mentioned included absence of side effect in herbal use, avoidance of itchy side effect associated with chloroquine, ineffectiveness of chloroquine and other anti-malarials and, lack of health facility/chemist nearby.

Composition of herbal remedies

An appreciable percentage across the ethnic groups had no idea of the constituents of the herbal remedies they use for treating their malaria episodes (36% of the Hausa, 34% of the Igbos, 28% of the Yorubas and 35% of the other ethnic group since they buy these from traditional herbalists in the market. The same proportion of the Hausas but slightly lower proportions of the other three ethnic groups claimed to use different types of herbs (36% of the Hausa, 21% of the Igbos, 20% of the Yorubas and 27% of others). Varied combinations of these herbs in combination with different types of fruits and other substances are claimed to be used, the main ones of which are *Azadirachta indica* and pineapple as listed in Table 3. Mixtures of other different combinations such as *Aristolochia ringens*, *Lawsonia inermis*, *Cecropia cajan*, *Nauclea latifolia*, and *Puntumia elastoca* used by a few Hausas, Igbos and Yorubas (6% each) and, the other ethnic 2%. Majority of those who claimed to use herbal preparations across all ethnic groups (Hausas, 90%; Igbos, 73%; Yorubas, 72% and, others, 81%) obtain the herbs from the market while the rest obtain them from the bush or farm (Table 4). When the respondents were prompted on the types of herbs they used for treating, and in preventing malaria, most of them, in all the groups, claimed to use the same types of herbs for both (Table 3).

Table 3: Constituents of different herbal remedy claimed to be used in the treatment of malaria by the ethnic groups

Ethnic group	Composition of herbal remedy/mixture in percentages			
	<i>Azadirachta indica</i> (dongoyaro), <i>Alabukun</i> lime and lipton tea	pineapple, orange, lime, pawpaw (<i>Carica papaya</i>) leaf and <i>Alabukun</i>	Ginger red, (mineral drink) "Awopa"	7up Lemon grass and lime
Igbos N=144	23.0	8.0	2.0	4.0
Yorubas N=463	13.0	6.0	8.0	5.0
Hausas N=49	2.0	13.0	0.0	0.0
Other ethnic groups N=113	10.0	14.0	4.0	5.0

Majority of the respondents in all ethnic groups claimed great improvement in their conditions following herbal treatment [Hausas 44 (90%), Igbos 119 (82.2%), Yorubas 357 (77%) and others (88%)] with significant difference ($P=0.05$, $X^2=43.41$ df=9). Cost consideration was the next most important factor as it cost between US\$0.6 - 0.80 to treat an episode of malaria by herbal remedy. Other

Herbal preparation

Different methods are employed in the preparation of herbs for malaria treatment, although the main ones are boiling, cooking or simply by extraction of the main ingredients into water by soaking. A small proportion in each of the ethnic groups bathe with the liquid herbal preparations and as well ingest some. For instance 41% of the Hausa,

66% of the Igbos, 74% of the Yorubas and 60% of the others group boil or cook the herbs before use while some: Hausa (22%), Igbos (9%) Yoruba (10%) and 4% others either soak or dilute in water. However, some claimed to buy already prepared herbal remedies from herbal vendors (22% of the Hausas, 9% of the Igbos, 10% of the Yorubas and 4% of the others had no knowledge of how they were prepared. [Hausas (16%), Igbos (10%), Yorubas (5%) and the others (9%)]. In addition, locally produced black herbal bathing soap is also claimed to be used.

Table 4: Sources where the respondents obtain herbs used to treat malaria

Source	Ethnic groups in percentages				
	Hausa N=49	Igbo N=144	Yoruba N=463	Other N=113	All ethnic groups N=769
Market	89.8	72.9	71.7	81.4	74.5
Bush/farm	6.1	20.1	21.3	7.0	18.0
Relation	2.0	3.4	4.5	2.6	3.9
Others	2.1	3.6	2.5	9.0	3.6

Table 5: Use of herbal preparation by ethnic groupings

Herbal usage Length of time/ duration of use	Ethnic groups in percentages			
	Igbos N=145	Yorubas N=463	Hausa N=49	Other ethnic groups N=113
1-4 days	44.9	21.7	27.7	41.4
1 week	27.2	30.9	14.9	23.5
More than a wk	9.5	15.4	8.5	2.7
Not specific	13.2	20.5	36.2	27.0
Time to time as preventative	1.5	4.0	12.7	0.9
Other*	3.7	7.5	0.0	4.5
Frequency of use				
Twice (1-0-1)	41.2	20.0	26.5	31.0
Thrice	31.6	50.0	34.7	35.0
One cup/day	14.7	10.8	18.4	14.0
Unspecified measure at unspecified time	1.5	6.2	10.2	4.5
Others**	11.0	13.0	10.2	15.5

*Until herbs preparation loses concentration/taste, No response, Don't know

**Use as snuff, mixed with liquid drink, hourly drink.

Period of use of herbal preparation

Herbal preparations are used mainly within 4 days for malaria across the different ethnic groups, most especially, the Igbos and the minority ethnic groups. The length of time of use is at times determined by the period it takes for the malaria symptoms to disappear. A relatively low proportion of the Igbos, the minority group and the Yorubas take the preparation from time to time, as prophylaxis (Table 5).

Dosage

A high percentage in all the ethnic groups use herbal preparation more than once a day. For instance some use it twice daily, some take one cup per day while others take unspecified measures at arbitrary intervals during the treatment period (Table 5). 41.2% of the Igbos, 20% of Yorubas, 26.5% of Hausas and 31.0% of the others used herbs twice daily while 31.6% of the Igbos, 50% of Yorubas, 34.7% of Hausas and 35.0% of the others used it thrice daily.

Discussion

The use of herbs for malaria treatment is a long standing practice in Nigeria especially among the Yorubas and Hausas. There is relatively less use of herbal remedies among the Igbo and the minority ethnic groups, although there is similarity in the type of herbs, combination, preparation and dosage used for malaria treatment by all groups. Local herbs have over the years been tried and are effective in the treatment of symptoms and signs associated with the disease [11]. The general use of herbal remedies by respondents of the different ethnic groups is related to the perceived efficacy (56.1%), low cost (18.7%) traditional belief and miscellaneous factors. The ineffectiveness adduced to anti-malarials, such as chloroquine, by respondents may be due to the general widespread incidence of fake drugs, especially in the metropolis, the problem of drug resistance, ethnic beliefs and attitudes.

The herbal preparations in the treatment of malaria vary in their constituents, however two major items which feature frequently are "*dogonyaro*" (*Azadirachia indica*) and pineapple. Ethnic differences and preference of different herbal remedies occur and needs to be further assessed. These herbal preparations are usually obtained from the market, although a significant proportion of the Igbos and Hausas source the ingredients from farms and they are usually boiled. The lack of standards in the use of these herbal preparations results in diverse quantities and daily pattern of consumption. These need to be urgently addressed to avoid unnecessary side effects as a result of "overdosing" especially as usage continued until the malaria symptoms and signs are deemed to have disappeared. The antimalarial properties of components of certain herbal remedies have been evaluated. The antimalarial activities, impact and usage of *Morinda lucida* Benth (Rubiaceae), *Khaya grandifolia*, *K. senegalensis*, *Azadirachia indica*, *Spathodea campanulata*, *Vernonia amygdalis*, *Cymbogon giganteus* and *Eustia chlorantha* have been documented [11-17]. Some of these plants have been documented to have antimalarial properties [18]. Seasonal variation in the antimalarial activity of *Morinda lucida* was indicated [19]. These herbs have been established to possess antimalarial properties, however the active ingredi-

ents need to be affirmed. Also there is a need to standardize the usage of herbs if they are to play a significant role in malaria prevention and control.

The use of orthodox antimalarials in combination with herbal remedies has earlier been reported from this area [20]. As some of the remedies possess antimalarial properties, over exposure and over dosage will be a major risk. These attitudes and practice may influence malaria resistance and transmission. Intensive health education amongst the various ethnic groups on treatment practices is necessary to avoid adverse effects from over dosage.

There is a tendency in the Western oriented biomedical tradition to focus on the risks of African herbal remedies and play down traditional African medicine and the expertise of traditional healers [21]. We cannot deny the drawbacks of traditional medicine, which include incorrect diagnosis, imprecise dosage, low hygiene standards, the secrecy of some healing methods and the absence of written records about the patients. Governments should therefore establish the necessary institutional and financial support to promote the potential role of herbal medicine in primary health care delivery, considering the preference and attitude of the diverse ethnic groups, the proffered efficacy and the current trend in utilizing combination therapy to slow down the rate in the appearance of drug resistance in the current orthodox antimalarials.

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