**Journal of Medicinal Plant Research**

*Full Length Research Paper*

# The extent of use of herbal medicine in malaria management in Ido/Osi Local Government Area of Ekiti State, Nigeria

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A survey to examine the extent of use of plants (herbal medicine) in the management of malaria was carried out in Ido/Osi Local Government Area (LGA) of Ekiti State, Nigeria. Pretested and structured questionnaires were administered to assess the knowledge, attitude and practice (KAP) of the people in the management of malaria with herbal medicines. Results showed that only 67.6% attributed the cause of malaria to mosquito bites and 88.1% identified malaria's symptoms. Majority of the respondents (74.3%) use herbal medicine to treat malaria while 66.0% use modern medicine. Only 34.2% of the respondents among those who use both herbal and modern medicines combine the medicines at a time to treat malaria. Up to thirty-nine plants were mentioned to be used in herbal anti-malarial recipes in the area. As the number of respondents (67.6%) who knew the cause of malaria is not appreciable enough, there is need for more enlightenment programmes in the area. Since the respondents claimed that the plants they use cure malaria is an indication that some of these plants could possess antimalarial properties.

**Key words:** Herbs, malaria, knowledge, attitude and practice (KAP), Ekiti, anti-malarials.

## INTRODUCTION

Plants are a great source of medicine useful in the treatment of various diseases (Bako et al., 2005). Humans learnt to exploit plants for medicine almost as early as they cultivated them for food (Muhammad and Amusa, 2005). Traditional medicines have not only played a vital role in providing healing but has also contributed to the discovery of most pharmaceutically active substances in plants (Principe, 1988; Pearce and Puroshothaman, 2002) which have been used in the commercial production of drugs. Persistence of presumptive malaria-associated symptoms after treatment with over the counter available antimalarial drugs has resulted in a gradual loss of faith in modern drugs. Ignoring community's attitudes and beliefs regarding treatment of malaria has contributed to the inability of control

programmes to achieve sustainable control. Understanding community perceptions of aetiology, symptom identification and treatment of malaria is an important step towards the disease control (Govere et al., 2000; Simsek and Kurcer, 2005). Within the context of traditional practice, malaria is commonly treated with decoctions or infusions from bitter plants (Randrianarivelojosia et al., 2003).

In Nigeria, various plants are used for the management of malaria and these vary from one locality to another (Aiyeloja and Bello, 2006; Odugbemi et al., 2007). In this study, a survey was carried out in Ido/Osi Local Government Area (LGA) of Ekiti State, Nigeria, to examine the extent of use of plants in the treatment of malaria.
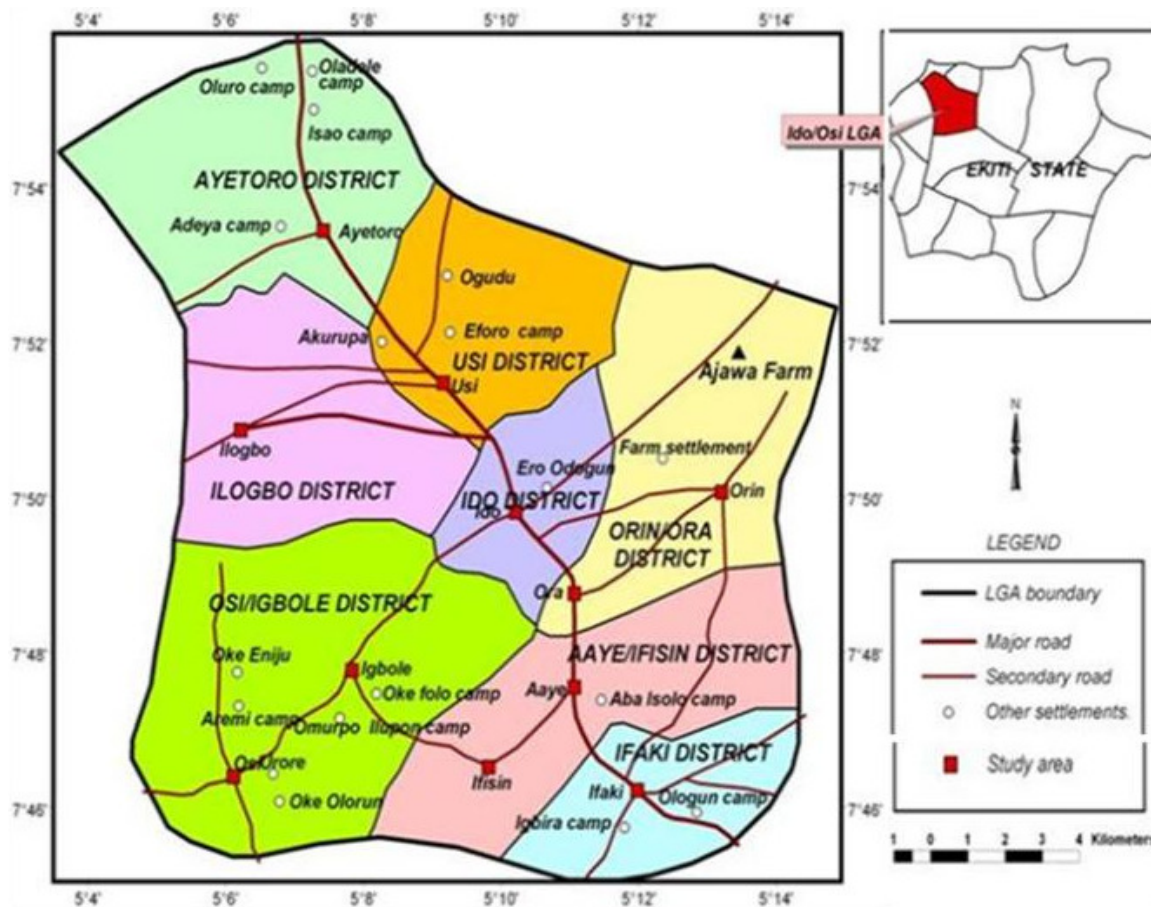
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**Figure 1.** Ido/Osi LGA, Ekiti State, Nigeria (Source: Ido/Osi LG Secretariat).

## MATERIALS AND METHODS

### Study area

Ido/Osi is one of the 16 Local Government Areas of Ekiti State in Nigeria. It lies between 7°40'12''N and 5°15'00''E and has 11 towns (Figure 1), with some other settlements (hamlets). The people are majorly Yoruba ethnic group with the population size of 159,114 (ESGN, 2006). The towns are Ido, Usi, Ora, Ifaki, Ifisin, Igbole, Orin, Osi, Aiyetoro, Aaye and Ilogbo.

### Data collection

Pretested and structured questionnaire was used for the study. The questionnaires were administered to people of different educational and occupational backgrounds in each of the 11 towns of the local government area. The sample was obtained through non-probability sampling method and the sample was made up of people who are easy to reach. The questionnaires were either self-administered (especially for the literate ones), or through interviews when respondents are not literate. Questions included demographic information about the respondents, their knowledge about malaria infection, types and uses of herbal plants in the treatment of malaria. The attitude of participants to modern (western) and herbal medicines was rated. Other attitudinal values of the participants examined included how they measure the dosage of the herbal medicine, methods of preparation and the parts of the plants used.

## RESULTS

Table 1 shows that a total number of five hundred and twenty-one (521) respondents from eleven towns in the LGA participated in the study. The age of the respondents ranged from 15 to ≥ 60 years (Table 1), 268 (51.4%) males and 253 (48.6%) females. The respondents included people engaged in different occupations (Table 2). Most of the respondents have secondary (38.4%) and tertiary (36.5) education (Tables 3 and 4).

Only 36 (52.2%) respondents with primary education, 63.0% with secondary education and 80.5% with tertiary education attributed the cause of malaria to mosquito bites. A total of 36 (56.3%) out of 64 respondents who are uneducated attributed the cause of malaria to mosquito bites (Table 3). Overall, a total number of 352 (67.6%) had the knowledge that an individual could be infected with malaria through mosquito bites while 155 (29.8%) did not know the cause of malaria. The chi-square calculated ($\chi_c^2$) on the association between the knowledge on the cause of malaria and the educational background of the respondents was 29.3. Most respondents across the groups, 459 (88.1%) identified the symptoms of malaria while 8.3% did not know the

**Table 1.** Age of the study participants in Ido/Osi LGA, Ekiti state, Nigeria.

| Town | Age (year) | | | | | | | |
|------|------|------|------|------|------|------|------|------|
| | 15-19 | 20-29 | 30-39 | 40-49 | 50-59 | ≥60 | Not indicated | Total |
| Ido | 6 | 18 | 17 | 28 | 13 | 56 | 6 | 144 |
| Usi | 15 | 20 | 9 | 16 | 6 | 6 | 5 | 77 |
| Ora | 2 | 7 | 1 | 4 | 2 | 3 | 2 | 21 |
| Ifaki | 1 | 7 | 13 | 10 | 9 | 3 | 3 | 46 |
| Ifishin | 1 | 5 | 2 | 2 | - | - | - | 10 |
| Igbole | - | 3 | 4 | 3 | 1 | - | 1 | 12 |
| Orin | 4 | 9 | 6 | 4 | 8 | 2 | 5 | 38 |
| Osi | 25 | 5 | 2 | 5 | 1 | - | 3 | 41 |
| Aiyetoro | 3 | 31 | 9 | 5 | 6 | 2 | 2 | 58 |
| Aaye | 7 | 14 | 8 | 4 | 2 | 8 | - | 43 |
| Ilogbo | 3 | 9 | 7 | 1 | 3 | 8 | - | 31 |
| Total | 67 | 128 | 78 | 82 | 51 | 88 | 27 | 521 |

**Table 2.** Occupation of the study participants in Ido/Osi LGA, Ekiti state, Nigeria.

| Occupation | Number | % |
|------------|--------|---|
| Students | 150 | 28.8 |
| Teachers | 98 | 18.8 |
| Health workers | 5 | 1.0 |
| Traders | 64 | 12.3 |
| Commercial drivers and cyclists | 11 | 2.1 |
| Farmers | 63 | 12.1 |
| Herbalists | 2 | 0.4 |
| Civil and public servants | 53 | 10.2 |
| Artisans | 52 | 10.0 |
| Applicants | 9 | 1.7 |
| Clergyman | 1 | 0.2 |
| Not indicated | 13 | 2.5 |
| Total | 521 | 100 |

**Table 3.** Knowledge of the respondents about the cause of malaria.

| Educational background | Total No. of respondents (%) | No. of respondents who associated malaria with mosquitoes' bites (%) | No. of respondents who did not know the cause of malaria (%) | No. of respondents who did not indicate their opinion (%) |
|------|------|------|------|------|
| Primary | 67 (12.9) | 36 (52.2) | 28 (40.6) | 3 (4.5) |
| Secondary | 200 (38.4) | 127 (63.0) | 69 (34.5) | 4 (2.0) |
| Tertiary | 190 (36.5) | 153 (80.5) | 31 (16.3) | 6 (3.2) |
| Uneducated | 64 (12.3) | 36 (56.3) | 27 (42.2) | 1 (1.6) |
| Total | 521 (100) | 352 (67.6) | 155 (29.8) | 14 (2.7) |

At α 0.05, df = 3, $\chi_t^2 = 7.82$ and $\chi_c^2 = 29.3$, ($\chi_c^2 > \chi_t^2$).

symptoms (Table 4). Symptoms stated by the respondents included high body temperature, cold, shivering, coloured urine, headache, body pain and cough. The chi-square calculated ($\chi_c^2$) on the association between the knowledge on the symptoms of malaria and the educational background of the respondents was 3.6.

Some (29.9%) use only herbal medicines for the treatment of malaria while 74.3% use herbal medicines

**Table 4.** Knowledge of the respondents about the symptoms of malaria.

| Educational background | Total No. of respondents (%) | No. of respondents who identified malaria's symptoms (%) | No. of respondents who did not identify malaria's symptoms (%) | No. of respondents who did not indicate their opinion (%) |
|---|---|---|---|---|
| Primary | 67 (12.9) | 59 (88.1) | 7 (10.4) | 1 (1.5) |
| Secondary | 200 (38.4) | 170 (85.0) | 20 (10.0) | 10 (5.0) |
| Tertiary | 190 (36.5) | 173 (91.1) | 10 (5.3) | 7 (3.7) |
| Uneducated | 64 (12.3) | 57 (89.1) | 6 (9.4) | 1 (1.6) |
| Total | 521 (100) | 459 (88.1) | 43 (8.3) | 19 (3.6) |

At α 0.05, df = 3, $\chi_t^2 = 7.82$ and $\chi_c^2 = 3.6$, ($\chi_c^2 < \chi_t^2$).

**Table 5.** Use of herbal and modern medicines for treating malaria by study participants.

| Town | Total No. of respondents | Respondents that use herbal medicine only | Respondents that use modern medicine only | Respondents that use both medicines | Respondents that did not indicate any medicine | Total No. of respondents that use herbal medicine | Total No. of respondents that use modern medicine |
|---|---|---|---|---|---|---|---|
| Ido | 144 | 48 | 39 | 52 | 5 | 100 | 91 |
| Usi | 77 | 20 | 18 | 36 | 3 | 56 | 54 |
| Ora | 21 | 5 | 2 | 14 | - | 19 | 16 |
| Ifaki | 46 | 14 | 7 | 22 | 3 | 36 | 29 |
| Ifishin | 10 | 4 | - | 5 | 1 | 9 | 5 |
| Igbole | 12 | 5 | 5 | 2 | - | 7 | 7 |
| Orin | 38 | 7 | 12 | 16 | 3 | 23 | 28 |
| Osi | 41 | 20 | 7 | 13 | 1 | 33 | 20 |
| Aiyetoro | 58 | 24 | 9 | 23 | 2 | 47 | 32 |
| Aaye | 43 | 4 | 7 | 29 | 3 | 33 | 36 |
| Ilogbo | 31 | 5 | 7 | 19 | - | 24 | 26 |
| Total (%) | 521 (100%) | 156 (29.9%) | 113 (21.7%) | 231 (44.3%) | 21 (4.0%) | 387 (74.3%) | 344 (66.0%) |

either only or in combination with modern medicines (Table 5) and most (58.4%) prefer the use of herbal medicine among those who use both medicines (Table 6). Only 34.2% combine both medicines at a time to treat malaria among the respondents who used both herbal and modern medicines, 61.5% do not combine the two medicines and 4.3% did not indicate whether they do so or not. A total number of 309 (79.8%) out of 387 who take herbal plant in form of a concoction to treat malaria claimed that they measure the dosage of the medicine which may be one, two or three cups twice or thrice per day until they were no longer feeling feverish, while 68 (17.6%) do not have any measurement at all as they drink as much as their body system can tolerate and 10 (2.6%) did not indicate whether they do so or not. Water is the usual medium to prepare the concoction.

Table 7 shows the list of plants used for treating malaria in Ido/Osi LGA of Ekiti State, their preparation, parts used and mode of use. The local names of the medicinal plants that are used to treat malaria in the area were mentioned by the respondents. The local names of the plants were the bases of knowing their scientific names while considering other related works. Odugbemi et al. (2007), Oladele and Adewumi (2008) and Idowu et al. (2010) made mention of these local names as well as their scientific names in their works. Since plants are generally called by the same local names among the Yoruba ethnic group of Southwest Nigeria from where this work and the other related works were carried out.

## DISCUSSION

The percentage (67.6%) of respondents who knew the cause of malaria is not high enough to effectively keep the disease under control in the area. This observation is consistent with the findings of other studies (Tarimo et al., 2000; Agbaje, 2006; Dike et al., 2006; Khumbulani et al., 2009; Kinung'hi et al., 2010). It has been demonstrated that people with good knowledge about malaria's cause and transmission do take appropriate treatment and preventive measures (Kinung'hi et al., 2010). The association between knowledge on malaria and malaria disease was reported in Mvomero district, Tanzania

**Table 6.** Preference for the use of herbal and modern medicines.

| Town | Respondents that use herbal medicine more often | Respondents that use modern medicine more often | Respondents that use both medicines equally | Not indicated | Total |
|------|------|------|------|------|------|
| Ido | 27 | 15 | 10 | - | 52 |
| Usi | 27 | 7 | 2 | - | 36 |
| Ora | 7 | 5 | 2 | - | 14 |
| Ifaki | 16 | 4 | 2 | - | 22 |
| Ifishin | 2 | 3 | - | - | 5 |
| Igbole | - | 2 | - | - | 2 |
| Orin | 11 | 1 | 4 | - | 16 |
| Osi | 7 | 2 | 3 | 1 | 13 |
| Aiyetoro | 14 | 5 | - | 4 | 23 |
| Aaye | 9 | 8 | 11 | 1 | 29 |
| Ilogbo | 15 | 3 | 1 | - | 19 |
| Total | 135 (58.4%) | 55 (23.8%) | 35 (15.2%) | 6 (2.6%) | 231  (100%) |

**Table 7.**  List of plants used for the treatment of malaria in Ido/Osi LGA, Ekiti State Nigeria.

| Scientific name  (Family) | Yoruba name | No. of Respondents using plants (%) | Preparation | Mode of use | Part used |
|------|------|------|------|------|------|
| *Aframonium melegueta* (Zingiberaceae) | Ataye | 0.5 | Boil in water with other plants | Drinking | Leaf, Bark |
| *Alstonia boonei* (Apocynaceae) | Ahun | 19.5 | Soak alone in water or palm wine, | Drinking | Bark |
|  |  |  | In combination with other plants; heat with water. | Drinking and bathing | Bark |
| *Anacardium occidentale* (Anacardaceae) | Kasu | 30.3 | In combination with other plants; heat with water. | Drinking and bathing | Bark and leaf |
|  |  |  | Grind into palm wine | Drinking | Young leaf |
| *Ananas comosus* (Bromeliaceae) | Ope oyinbo/Ekunkun | 3.4 | Cut the fruit and cook with other plants in water | Drinking | Leaf |
| *Azadirachta indica*  (Meliaceae) | Dongoyaro | 51.3 | In combination with other plants; heat with water. | Drinking and bathing | Leaf |
|  |  |  | Grind the leaf into local alcohol, palm wine or '7up' drink | Drinking only | Bark |
| *Bambosa vulgaris* (Poaceae) | Oparun | 1.2 | Use to make concoction with other plants | Drinking and bathing | Leaf |
| *Carica papaya* (Caricaceae) | Ibepe | 17.7 | Cut and soak in water. | Drinking | Unripe fruit |
|  |  |  | Boil in water with other plants | Drinking and bathing | Yellow leaf and root |
| *Chromolaena odorata* (Compositae) | Akintola | 14.7 | Boil in water with other plants | Drinking and bathing | Leaf with young stem |
| *Citrus aurantifolia* (Rutaceae) | Osan wewe | 13.3 | Squeezing the fluid of fruit into lipton tea. | Drinking | Fruit |
|  |  |  | Boil in water with other plants | Drinking | Leaf |
| *Citrus paradise* (Rutceae) | Osan gerepu | 2.3 | Cut the fruit and boil in water with other plants | Drinking | Fruit |

**Table 7.** Contd.

| | | | | | |
|---|---|---|---|---|---|
| *Cymbopogon citrates* ( Poaceae) | Ewe tea | 7.6 | Boil with other plants | Drinking and bathing | Leaf |
| *Enantia chloranta* (Anonaceae) | Osopa/Awopa | 3.2 | Use to make concoction with other plants | Drinking | Bark |
| *Garcinia kola* (Gutiferae) | Orogbo | 1.2 | Grind with other plants and add water | Drinking | Seed |
| *Gossypium barbadense* (Malvaceae) | Owu | 4.4 | Grind into palm wine | Drinking | Leaf |
| | | | Grind with ginger to make soup | Eating | seed |
| *Harungana madagascariensis* (Hypericaceae) | Arunje, Asuje | 3.5 | Soak into water | Drinking | Bark |
| *Jatropha curcas* (Euphorbiaceae) | Lapalapa | 1.8 | Boil with other plants | Drinking | Leaf , root |
| *Khaya grandifoliola* (Meliaceae) | Ogawo | 39 | In combination with other plants; heat with water. | Drinking and bathing | Bark |
| *Mangifera indica* (Anacardiaceae) | Magoro | 41.1 | In combination with other plants; heat with water. | Drinking and bathing | Bark and leaf |
| | | | Grind the budding leaf to make soup | Eating | Young leaf |
| *Melicia excels* (Moraceae) | Iroko | 0.5 | Boil in water with other plants | Drinking | Bark, root |
| *Momordica charantia* (Curcubitaceae) | Ejinrin | 11.7 | Squeeze into water | Drinking | Shoot |
| *Morinda lucida* (Rubiaceae) | Oruwo | 40 | Grind to make soup | Eating with food | Root and leaf |
| | | | Squeeze into water or palm wine | Drinking | Leaf only |
| *Nauclea latifolia* (Rubiaceae) | Gberesi | 2 | Squeezing in water for infusion | Drinking | Leaf |
| *Ocimum gratissimum* (Labiatae) | Efinrin | 2.8 | Squeeze into water for infusion and add salt | Drinking | Leaf |
| *Parquetina nigrescens* (Periplocaceae) | Ogbo | 0.5 | Squeeze into water for infusion | Drinking | Leaf and stem |
| *Phyllantus amarus* (Euphorbiaceae) | Eyinolubi-sowo | 2 | Squeezing in water for infusion | Drinking | Leaf |
| *Piper guineense* (Piperaceae) | Ihere | 1.6 | Cook in water with other plants | Drinking | Fruit |
| *Psidium guajava* (Mytaceae) | Gurofa | 3 | Boil in water with other plants. | Drinking | Bark and leaf |
| *Pycnanthus angolensis* (Myristicaceae) | Akomu | 1.4 | Cut the bark to collect the juice and lick it | Licking the bark juice | Bark |
| *Pyrenacantha staudtii* (Icananaceae) | Arorodegbo | 3.7 | Squeeze into water or palm wine | Drinking | Leaf |
| *Rauvolfia vomitoria* (Apocynaceae) | Asofeyeje | 0.3 | Boil in water | Drinking | Root |
| *Senna alata* (Caesalpinaceae) | Asunwon | 0.5 | Use to make concoction with other plants | Drinking | Leaf |
| *Senna siamea* (Caesalpiniaceae) | Kasia | 12.9 | In combination with other plants; heat with water. | Drinking and bathing | Bark and leaf |
| | | | Ground into water or palm wine | Drinking | Leaf |
| *Spondias monbin* (Anarcardiaceae) | Okika | 0.5 | Soak in water with pawpaw leaf and *Alstonia* leaf | Drinking | Root |
| *Theobroma cacao* (Malyaceae) | Koko | 0.7 | Boil in water | Drinking | Leaf, bark |
| *Tithonia diversifolia* (Asteraceae) | Sanfilawa (Sunflower) | 1 | Squeeze into water for infusion | Drinking | Leaf |
| *Trema orientalis* (Ulmaceae) | Afefe | 1 | Boil in water with other plants | Drinking and bathing | Bark |
| *Trichilia monadelpha* (Meliaceae) | Orokoro | 2.5 | Soak in water or palm wine | Drinking | Bark |
| *Vernonia amygdalina* (Compositae) | Ewuro | 7.6 | Squeezing into water and add small salt or into palm wine | Drinking | Leaf |
| *Zingiber officinale* (Zingiberaceae) | Ata ile | 3.4 | Grind with other plants like cotton seed, *Ocimum gratissimum* to make soup | Eating | Under-ground stem |

(Mboera et al., 2010).

The study observed that individuals with little knowledge about malaria experienced 2 or 3 times more malaria cases in their households compared to individuals with more knowledge. This has been one of the reasons for observing high prevalence of malaria in most endemic areas. Among the respondents who lacked the basic knowledge of the cause of malaria, working

in the sun, walking under the sun, drinking dirty water, bed bug bites, hard labour and lack of rest were stated as causes of malaria. This corresponds to the studies in other areas where people gave similar reasons (Oguonu et al., 2005; Idowu et al., 2008; Koudou et al., 2008; Kinung'hi et al., 2010).

There was an association between knowledge on the cause of malaria and the educational background of the people. At α = 0.05, df =3, ($\chi_c^2 > \chi_t^2$), showing a statistical significance (Table 3). The level of the knowledge of the respondents that mosquitoes transmit malaria decreases progressively from well educated individuals to uneducated ones (Table 3). Similar association was observed by Al-Adhroey et al. (2010) in their work on the Aboriginal and rural participants in Pahang state of Peninsular Malaysia. Agbaje (2006) also observed association between level of education and knowledge of malaria and drug compliance. The role that education plays in the lives of people in understanding diseases' transmission pattern cannot be overemphasized. Educating people on the causes and transmission pattern of malaria would therefore be of great help in controlling the disease in the area and all other endemic areas. Such an education which can either be given in schools especially at the elementary schools or through talks and lectures for the grassroots should be properly delivered to provide accurate and adequate knowledge.

The average percentage of the respondents who did not know the symptoms of malaria was very low (8.3%) when compared with the results of Joshi and Banjara (2008) where 21% of the respondents did not have knowledge about the signs and symptoms of malaria. No significance association was observed on the knowledge of symptoms of malaria and the educational background of the people. At α = 0.05, df =3, ($\chi_c^2 < \chi_t^2$), showing no statistical significance (Table 4). Fever was the most frequently mentioned symptom by the respondents also similar to the report of Kinung'hi et al. (2010). The knowledge of the respondents on the symptoms of malaria is however not influenced by their educational background.

Majority of the respondents (74.3%) use herbal medicines to treat malaria which is in line with the report of WHO (2002) where 80% of population in developing countries was reported to rely on the use of medicinal plants to help meet their primary health care needs. While quantifying how well the respondents use herbal and modern medicines to treat malaria, most of them prefer herbal medicines. Many of the respondents claimed that, though, herbal medicines do not usually provide quick relief as modern medicines in treating malaria, they usually have a lasting curative effect. Most (61.5%) of the respondents who use both herbal and modern medicines do not usually combine the two at a time to treat malaria. They are of the general opinion that doing this could be harmful to the body system and also amount to over dosage. However, those who combine the two medicines claimed that, doing so make the therapy more effective.

It will be of scientific interest to note that most of the plants mentioned by the respondents for treating malaria may not altogether be antimalarial in nature. This is because more than three plants are always put together to prepare concoction, and this might mean that not every plant used is actually antimalarial and yet the people would assume all the plants to be antimalarial. Secondly, once the people have a fever, they usually assume it is malaria as a result of the high prevalence of malaria in the area. It might not be malaria as there is usually no parasitological test to confirm this. Some other diseases which may have the same symptoms as malaria and which some of these plants could cure might also be what the people are suffering from. Therefore, information collected during malaria herbal therapy survey studies on the use of plants to treat malaria cannot be totally accepted to be correct unless such plants are scientifically tested for antimalarial properties.

Virtually all the people use herbs indiscriminately without any standard measurement or standard dosage as also confirmed by the work of Idowu et al. (2006) neither do they consider any damage the arbitrary use of the medicines could cause to their body system. Those who claimed to measure the concoction only take arbitrary dosage as there is no uniform dosage among the respondents. The so called 'dosage' could be two or three cups (without standardized volume) taken twice or thrice per day. Though, plants commonly used in traditional medicine are assumed to be safe due to usage in the treatment of diseases according to knowledge accumulated over centuries, but scientific findings have shown that many plants used as food or in traditional medicine are potentially toxic, mutagenic and carcinogenic (Schimmer et al., 1994). Most of the plants mentioned by the respondents (Table 7) are also used to manage malaria in other areas of Southwest Nigeria. Oladele and Adewumi (2008), reported most of these plants in their work on medicinal plants used in the management of malaria among the traditional medicine practitioners in Southwest Nigeria. Odugbemi et al. (2007) and Idowu et al. (2010) also mentioned many of these plants in their respectively studies on malaria herbal therapy in Okeigbo, Ondo State and Ogun state both in Southwest Nigeria. The need to search for more effective drugs to treat malaria in which plants could be a good source call for more researches in the field of malaria herbal therapy. This will pave way for more investigation of the antimalarial properties of many plants claimed to effectively treat malaria in various communities

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