
**UTILIZATION OF MEDICINAL PLANTS IN MALARIA TREATMENT AMONG
RURAL DWELLERS IN OYO STATE, NIGERIA**

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ABSTRACT

This study investigated the utilization of medicinal plants in the treatment of malaria among rural dwellers in Oyo State. A well structured questionnaire with interview schedule was used to obtain primary data from 240 rural dwellers selected through multi stage sampling procedure. Data were obtained on common medicinal plants used in malaria treatment, parts and forms of its use, and factors influencing its use. Data were analyzed using descriptive statistics, and Analysis of Variance. Findings revealed that a total of 38 species of medicinal plants were used by rural dwellers in malaria treatment, out of which *Azadirachta indica*, *Chromolaena odorata*, *Mangifera indica*, *Carica papaya* and *Cymbopogon citrate* the most were commonly used. Results revealed that medicinal plant parts frequently used by the respondents were leaves of *Chromolaena odorata* (95.4%), *Cymbopogon citrates* (94.2%), Henna plant (94.2%), *Phyllanthus amarus* (87.5%), *Momordica charantia* (86.7%), and *Azadirachta indica* (84.6%). Also, 91.0% of the respondents indicated that extract from the leaves of the plants were consumed in liquid form after boiling. Furthermore, efficacy of herbal medicine (87.1%), indigenous knowledge of medicinal plants (82.1%), and availability of medicinal plants (65.8%) were the major factors that informed the use of these plants for malaria treatment. Majority (88.3%) of the rural dwellers consumed medicinal plants more than twice daily for malaria treatment. Result of ANOVA showed a significant difference ($p < 0.05$) in parts of medicinal plants ($F = 12.435$) and forms of medicinal plants ($F = 16.345$) used by respondents in the study area. The study concluded that the commonly used medicinal plants for malaria treatment in the study area were *Azadirachta indica*, *Chromolaena odorata*, Henna plant, *Gossypium barbadense* and *Cymbopogoncitrate*s. It was recommended that concerted efforts be made in developing malaria drugs locally from these identified plants.

Keywords: utilization, medicinal plants, malaria, treatment.

1. INTRODUCTION

An understanding of the trend of the health status of rural dwellers with the various prevailing conditions that actually aggravate their plight is of paramount importance. The exposure of rural dwellers to diseases and health disorders impairs their physical performance and equally affect their ability to fully utilize all inputs at their disposal. It is therefore important to note that good health and productive agriculture are important in the economy of any nation especially in the fight against poverty. Traditional medicine is the sum total knowledge, skills, and practices based on the theories, beliefs and experiences, indigenous to different cultures, whether explicable or not, used in the maintenance of health as well as in the prevention, diagnosis, improvement or treatment of physical and mental illness (Federal Ministry of Health -WHO, 2014).

Malaria is one of the important tropical diseases that has attracted a lot of attention and is one of humanity's worst diseases and the suffering it causes is now a global crisis. One fifth of the world population is at risk of malaria and there are more than 300 million cases each year (WHO 1998). The annual death rate has been recorded at between 1.2 and 2.7 million every year. Its area of spread covers more than 100 tropical countries and its control remains a major concern for improved healthcare worldwide. Majority (about 90%) of malaria cases are in sub-Saharan Africa and *Plasmodium falciparum* is the main cause of severe clinical malaria and eventual deaths (Adekunle, 2008). Malaria remains a serious public health challenge and causes death and illnesses in children in Nigeria (Uzochukwu, Ogochuckwu, Uloaku, Obinna and Florence, 2010). According to the latest estimates by the WHO, there were about 219 million cases of malaria in 2010 and an estimated 660,000 with most malaria deaths occurring in Africa with the Republic of Congo and Nigeria accounting for 40% of the deaths globally (WHO, 2013). Most of these deaths occur in children below the age of five due to low levels of immunity and poverty which makes it difficult for the parents of such children to obtain drugs for treatment (Ansah, Gyapong, Agyepong and Evans, 2001; Ricci, 2012). This has led to the use of alternative herbal concoctions in rural communities (Buabeng, Duwiejua, Dodoo, Matowe and Enlund, 2007).

It is estimated that malaria could be responsible for an average annual reduction of 1.3% in economic growth in Africa with many families spending a significant portion of their income on treating it (WHO 2006). Children are more susceptible to malaria attacks during the first five years of life due to inadequate immunity (Frey *et al* 2006, WHO 2006). However, there is usually inappropriate treatment of malaria at home due to poor knowledge of causation and transmission of malaria as well as types and dosage of drugs used (Ajayi 2005, Falade *et al* 2005). Hence, deterioration of initial uncomplicated malaria to complicated one leading to death of a very large number of the under-five children (Falade *et al* 2006, Orimadegun 2010). Notwithstanding, some scholars across countries have carried out several researches on the use of medicinal plants in the treatment of malaria among people. Herbal medicines remain part of the history of the people despite the fact that orthodox medicines which came with colonization, appear to have occupied the centre stage in the treatment of diseases especially in modern medical practice (Osemene *et al.*, 2011). Meanwhile, the present unprecedented global upsurge of interest in herbal medicine is perhaps a measure of a more realistic perception of the limitations of orthodox medicines in terms of cost, accessibility, effectiveness and safety (Moody, 2007). Pharmanews, (2010) stated that in Nigeria, medical practitioners especially physicians still have some reservations prescribing herbal medicines for their patients. Various studies have also pointed out the potential of plants for integrating medicinal plants and folklore into regular medical practices and that several compounds that are now used in modern

pharmaceutical systems have been elucidated and validated from extracts of plants used in folklore therapies. (Akiyemi *et al.* 2005, Aslam 2002, Atindehou, Kone, Terreaux, Traore, Hostettmann and Dosso 2002, Dewick 2002, Healy and Aslam 2002 and Williamson, 2002).

In the study carried out by Burcher (2003), he found out that many rural communities have great faith in traditional medicine, particularly the inexplicable aspects as they believe that it is the wisdoms of their forefathers which also recognize their socio-cultural and religious background which orthodox medicine seems to neglect.

Problem statement

The introduction of western education, modern religious beliefs and increased contact with the global community has become the integral part of rural communities. However, the rural dwellers' taboos, traditions and customs have been affected and in some instances led to the abandonment of the use of medicinal plants for treating ailments and therefore traditional medicine may not retain the significance it once held (Kiringe and Okello 2005 and Sindiga, 1995). Furthermore, there has not been any significant improvement in the health status of the rural dwellers as the level of poverty in the rural areas is on the increase. This has led to unaffordable use of orthodox medicine with their resultant preference for herbal medicine which is affordable and available. There is also the high prevalence of malaria in the study areas due to lack of access to quality health services that could provide them with orthodox medicine. There is also the cost and side effects of orthodox medicine. Most Nigerians, especially those living in rural communities do not have prompt access to orthodox medicine due to unavailability of medical practitioners in most rural communities. It is estimated that about 75% of the populace still prefers to solve their health problems consulting traditional healers (Awudu, 2000). Several rural dwellers depend on traditional herbal medicine for treatment of many infectious diseases. The use of plants for medicinal purpose over the years is not new. Among some tribes, especially Yorubas, medicinal plants are valued and have elements of mysticism attached to them (Odugbemi, 2008). A number of plants like Neem, Lemon grass, Hog weed, Pigeon pea and Pawpaw have been used in traditional medicine for many years. Based on the backdrop, the following specific objectives were derived; identification of common medicinal plants used for the treatment of malaria; determination the parts and forms of medicinal plants used for the treatment of malaria; and determination of the factors that influence the use of medicinal plants among rural dwellers. The research hypothesis of the study shows that there is no significant difference between the parts and forms of medicinal plants used by the respondents in the treatment of malaria across the three agro-ecological zones of Oyo state.

Research design

The study was carried out in Oyo state within latitude 6° 55' - 045' and longitude 2° 50' - 3056' Southwest Nigeria respectively. The population of the study was the rural dwellers in the three agro-ecological zones of Oyo state. Multistage sampling procedure was used for the selection of respondents from the zones namely; guinea savannah, derived savannah, and lowland rainforest. One local government was selected randomly from each zone making three (3) LGAs in all which are Iseyin, Atiba, and Ido respectively. The second stage involved random selection of 30% of wards from 10 wards in each Local Government selected, making total of nine (9) wards from the 3 LGAs. The 3rd stage involved random selection of 6 villages from 3 wards in Iseyin, 4 villages from 3 wards in Atiba, and 5 villages from 3 wards in Ido respectively. The 4th stage involved the systematic random selection of respondents from each selected villages with 21, 11,

and 14 respectively. A total of 240 respondents were selected for the study. A well structured questionnaire was used for data collection in the study area while data were analyzed with descriptive and inferential statistics such as frequencies, simple percentages and analysis of variance.

2. RESULTS AND DISCUSSION

Common medicinal plants used by the rural dwellers for malaria treatment

Table 1 reveals that 42 species of plants made up of 23 families were noted to be used in the treatment of malaria by the rural dwellers in the study area. These plants were used singly or in combination with other herbal materials in the fresh or dried forms. The mode of consumption is mostly oral by drinking the extracts or concoctions. These finding tallies with other studies such as Colfer *et al.*, (2006) on the use of forest plants to treat some tropical diseases that some pharmaceutical components like quinine were extracted from *Cinchona spp* for the treatment of malaria. The most frequently mentioned plants and leaves used for the treatment of malaria by the respondents in Oyo state were *Dogonyaro - Neem (Azadirachta indica)*, *Ewe Akintola (Chromolaena odorata)*, Mango leaves (*Mangifera indica*), Pawpaw (*Carica papaya*), Orange leaves, lemon grass, cashew leaves, and some local resource(s) added to it. The people rural dwellers have learned the medicinal values of leaves, root and bark of trees from each other. However, the elderly people in the village were believed to have more experience than the younger ones.

Result of in-depth interview revealed that;

A 65 year old grandfather in Ekunle 1 argued that “almost everybody in this village is a healer. We all know the kind of leaves, plants or root to assemble to treat malaria either in children, youth or adult”.

Table 1: Common medicinal plants used by the rural dwellers for malaria treatment (n = 240)

S/No	Common names	Local names	Scientific Name (Species)	Family Names
1.	Akee-apple	Isin	<i>Blighia sapida</i>	<i>Sapindaceae</i>
2.	Bernuda grass	Esekanakana	<i>Cynodon dactylon</i>	Poeceae
3.	African cucumber	Ejirin wewe	<i>Momordica charantia</i>	<i>Cucurbitaceae</i>
4.	Mahogany	Oganwo, Apa-igbo	<i>Khaya grandifoliola</i>	<i>Meliaceae</i>
5.	Worm wood	Ewe imi	<i>Artemisia absinthium</i>	<i>Asteraceae</i>
6.	Senna	Kasia	<i>Senna siamea</i>	<i>Caesalpiniaceae</i>
7.	Baobab	Ose	<i>Adasonia digitata</i>	<i>bombacaceae</i>
8.	Neem	Dogonyaro	<i>Azadirachta indica</i>	<i>Meliaceae</i>
9.	Mango	Mangoro	<i>Mangifera indica</i>	<i>Anacardiaceae</i>
10.	Sausage nut	Pandoro	<i>Kigelia pinnata</i>	<i>Bignomiuceae</i>
11.	Siam weed	Ewe Akintola Ewe Awolowo	<i>Chromolaena odorata</i>	<i>Compositae</i>
12.	Pawpaw	Ibepe	<i>Carica papaya</i>	<i>Caricaceae</i>
13.	Giant milkweed, Sodom apple	Bomubomu	<i>Calotropis gigantea</i>	<i>Asclepiadaceae</i>

S/No	Common names	Local names	Scientific Name (Species)	Family Names
14.	Guava	Gilofa	<i>Psidium guajava</i>	<i>Myrtaceae</i>
15.	Haemorrhage plant	Yunyun	<i>Aspilia Africana</i>	<i>Asteraceae</i>
16.	Asthma weed	Emi-ile	<i>Parietaria judaica</i>	<i>Urticaceae</i>
17.	Physic nut	Lapalapa	<i>Jatropha curcas</i>	<i>Euphorbiaceae</i>
18.	Sand paper tree	Ewe ipin	<i>Ficus coronata</i>	<i>Moraceae</i>
19.	Lime	Osan wewe	<i>Citrus aurantifolia</i>	<i>Rutaceae</i>
20.	Pigeon pea	Otili	<i>Cajanus cajan</i>	<i>Fabaceae</i>
21.	Grape	Osan gerepu	<i>Citrus paradisi</i>	<i>Rutaceae</i>
22.	Cocoa	Koko	<i>Theobroma cacao</i>	<i>Malvaceae</i>
23.	Cotton	Owu	<i>Gossypium barbadense</i>	<i>Malvaceae</i>
24.	Tree of life	Ewe Akoko	<i>Newbouldia laevis</i>	<i>Bignoniaceae</i>
25.	Iyeye	Iyeye	<i>Spondias monbin. L.</i>	<i>Anacardiaceae</i>
26.	Yanni	Igi Awopa	<i>Annickia (syn. Enantia)</i>	<i>annonaceae</i>
27.	N/A	Igi Ogbon	<i>Parquetina nigrescens</i>	<i>Asclepiadaceae</i>
28.	Hygrophilia	Mofowokanmi	<i>Acatospermum hispidum</i>	<i>Acanthaceae</i>
29.	Calabash	Igi Sogba	<i>Crescentia kujete</i>	<i>Bignoniaceae</i>
30.	Palm family	Igi Agbon	<i>Cocos nucifera</i>	<i>Arecaceae</i>
31.	N/A		<i>Hyptis suaveolens</i>	<i>Labiatae</i>
32.	Gliricidia	Igi Agumaniye	<i>Gliricidia sepium</i>	<i>Fabaceae</i>
33.	Brimstone tree	Oruwo	<i>Morinda lucida</i>	<i>Rubiaceae</i>
34.	Bitter leaf	Ewuro	<i>Vernonia amygdalina</i>	<i>Compositae</i>
35.	African star apple	Agbalumo	<i>Chrysophyllum albidum</i>	<i>Sapotaceae</i>
36.	Cashew-nut tree	Kasu	<i>Anacardium occidentale</i>	<i>Anacardaceae</i>
37.	Lemon grass	Kooko-Oba	<i>Cymbopogon citratus</i>	<i>Poaceae</i>
38.	Phyllantus amurus	Eyin Olobe	<i>Phallantus amurus</i>	

Source: Field survey (2014).

Parts and forms of medicinal plants used among the rural dwellers

Traditionally different parts of plants are taken for medicinal purpose such as the leaves, barks, stems or roots. Table 2 reveals that the part of medicinal plants frequently used by the respondents were the leaves of *Akintola (Chromolaena odorata)* (95.4%), lemon grass (*Cymbopogon citrates*) (94.2%), Henna plant (94.2%), cotton (*Gossypium barbadense*) (90.0%), Eyin olobe (*Phyllantus amurus*) (87.5%), African cucumber (*Momordica charantia*) (86.7%), *dogonyaro (Azadirachta indica)* (84.6%), Oruwo (*morinda lucida*) (81.7%). lime (*Citrus aurantifolia*) (78.3%), and pawpaw (*Carica papaya*) (77.5%).

Table 2: Parts of medicinal plant used by the rural dwellers in the study area (n = 240)

Medicinal plants*	L (%)	B (%)	R (%)	L/B (%)	L/R(%)	L/B/R(%)	Seed	No Response
Lemon grass	226(94.2)	–	–	–	–	–	–	14(5.8)
Neem tree	203(84.6)	–	–	16 (6.7)	6 (2.5)	15 (6.2)	–	–
Pawpaw	186(77.5)	–	–	3 (1.2)	9 (3.8)	3 (1.2)	39(16.3)	–
Mango	55 (22.9)	4 (1.7)	–	161(67.1)	6 (2.5)	14 (5.8)	–	–
Akee-apple	48 (20.0)	7 (2.9)	–	8 (3.3)	–	–	–	177(73.8)
Mahogany	38 (15.8)	3 (1.2)	–	1 (0.4)	–	–	–	198(82.6)
Bermuda grass	30 (12.5)	–	5(2.1)	–	–	–	–	205(85.4)
African cucumber	208(86.7)	–	–	–	–	–	–	32(13.3)
Worm wood	47 (19.6)	–	–	–	–	–	–	193(80.4)
Cashew-nut tree	94 (39.2)	9 (3.8)	8(3.3)	7 (2.9)	–	7 (2.9)	–	115(47.9)
Lemonade tree	55 (22.9)	7 (2.9)	–	–	–	6 (2.5)	3 (1.2)	169(70.5)
Sausage nut	31 (12.9)	–	–	4 (1.7)	–	–	8 (3.3)	197(82.1)
Giant milk weed	22 (9.2)	–	–	–	–	–	–	218(90.8)
Haemorrhage plant	50 (20.8)	–	–	–	–	–	–	190(79.2)
Bamboo	170(70.8)	–	–	–	–	–	–	70(29.2)
Asthma weed	26 (10.8)	3(1.2)	–	–	–	–	–	211(88.0)
Physic nut	99 (41.2)	–	8(3.3)	–	6 (2.5)	–	–	127(53.0)
Henna plant	226(94.2)	–	–	–	–	4 (1.7)	–	10(4.1)
Sand paper tree	84 (35.0)	–	–	–	9 (3.8)	–	–	147(61.2)
Akintola	229(95.4)	–	–	–	–	–	–	11(4.6)
Cotton	216(90.0)	–	–	4 (1.7)	–	–	–	20(8.3)
Pigeon pea	116(48.3)	11(4.6)	–	3 (1.2)	–	–	–	110(45.9)
Cocoa	48 (20.0)	62(25.8)	–	20 (8.3)	–	–	–	110(45.9)

Guava	142(59.2)	5 (2.1)	–	30(12.5)	2 (0.8)	–	–	61(25.4)
Phyllantus	210(87.5)	1(0.4)	–	4 (1.7)	–	–	–	25(10.4)
Newbouldia leavis	92 (38.3)	4 (1.7)	4(1.7)	–	4 (1.7)	–	–	136(56.6)
Ijan	104(43.3)	1(0.4)	–	–	–	–	–	135(56.3)
Cassia	131(54.6)		2(0.8)	2(0.8)	–	–	–	105(43.8)
Igi awopa	73 (30.4)	4 (1.7)	–	–	–	–	–	163(67.9)
Igi ogbon	59 (24.6)	7 (2.9)	–	–	–	–	–	174(72.5)
Morinda lucida	196(81.7)	2 (0.8)	–	7 (2.9)	15(6.2)	10(4.2)	1 (0.4)	9(3.8)
Lime	188(78.3)	4 (1.7)	–	4 (1.7)	7 (2.9)	–	16 (6.7)	21(8.7)
Chrysophyllum albidum	60 (25.0)	17 (7.1)	3(1.2)	10 (4.2)	3 (1.2)	–	–	147(61.3)
Spondia mombin	59 (24.6)		–	8 (3.3)	–	–	–	173(72.1)
Mafowokanmi	23 (9.6)	4 (1.7)	–	1 (0.4)	–	–	–	212(88.3)
Coconut	18 (7.5)	91(37.9)	–	2 (0.8)	3 (1.2)	–	–	126(52.6)
Gliricidia sepium	54 (22.5)	6 (2.5)	–	–	–	–	–	180(75.0)
Grape	98(40.8)	3 (1.2)	–	–	–	–	112(46.7)	27(11.3)
Igi sogba	24 (10.0)	–	–	–	–	–	–	216(90.0)
Patanma	8 (3.3)	3 (1.2)	–	–	–	–	–	229(95.5)
Fig tree	2 (0.8)	–	–	–	–	–	–	238(99.2)

Source: Field survey (2014)

* = Multiple response

Key: L = Leaf, B = Bark, R = Root, L/B = Leaf/ Bark, L/R = Leaf/Root, L/B/R = Leaf/Bark/Root

Table 3 also reveals that most of the plants are consumed in liquid forms by the respondents after boiling such as, mango (97.1%), henna plant (93.5%), neem tree (93.3%), lemon grass and Akintola (91.7%), lime (91.2%), cotton (90.8%), morrinda lucida (89.6%), phyllantus (87.9%), pawpaw (86.7%). The result implies that very few of the respondents take the plants both in liquid and powder forms. However, most of the respondents take mixture of leaves, barks and plants together for treatment of malaria in liquid or powder form. Majority of them believed medicinal plants parts to be more effective in the treatment of malaria.

The statements by one of the respondents through in- depth interview was captured below as:

*“Everybody in this rural area knows that I and my children don’t go to the hospital for the treatment of malaria at all and that most modern drugs are extracts from local trees and plants, since I have the indigenous knowledge (IK) inherited from my father’s pertaining to the medicinal plant used in the treatment of malaria, I utilized it and I get good results all the time.”*This also agrees with a report by the World Health Organization in Nigeria, Gambia, Ghana and Mali that more than 60% of children with malaria are treated at home with indigenous medicines (Abdullahi, 2011).

Table 3: Forms of medicinal plants used by the rural dwellers in the study area. (n =240)

Medicinal Plants*	Liquid (%)	Powder (%)	Both (%)	No Response
Lemon grass	220 (91.7)	–	3 (1.2)	17(7.1)
Neem tree	224 (93.3)	–	7 (2.9)	9(3.8)
Pawpaw	208 (86.7)	4 (1.7)	–	28(11.6)
Mango	233 (97.1)	–	–	7(2.9)
Akee-apple	54 (22.5)	–	–	186(77.5)
Mahogany	42 (17.5)	–	–	198(82.5)
Bermuda grass	25 (10.4)	–	–	215(89.6)
African cucumber	200 (83.3)	–	–	40(16.7)
Worm wood	56 (23.3)	–	–	184(76.7)
Cashew-nut tree	117 (48.8)	–	–	123(51.2)
Lemonade tree	64 (26.7)	–	–	176(73.3)
Sausage nut	34 (14.2)	–	–	206(85.8)
Giant milk weed	23 (9.6)	–	–	217(90.4)
Haemorrhage plant	37 (15.4)	–	–	203(84.6)
Bamboo	170 (70.8)	–	–	70(29.2)
Asthma weed	41 (17.1)	3 (1.2)	–	196(81.7)
Physic nut	100 (41.7)	–	–	140(58.3)
Henna plant	225 (93.5)	–	–	15(6.5)

Sand paper tree	105 (43.5)	–	–	135(56.5)
Akintola	220 (91.7)	–	–	20(8.3)
Cotton	218 (90.8)	–	–	22(9.2)
Pigeon pea	97 (40.4)	–	–	143(59.6)
Cocoa	130 (54.2)	–	–	110(45.8)
Guava	185 (77.1)	–	–	55(22.9)
Phyllantus	211 (87.9)	–	–	29(12.1)
Newbouldia leavis	93 (38.8)	–	–	147(61.2)
Ijan	111 (46.2)	–	–	129(53.8)
Cassia	146 (60.8)	–	–	94(39.2)
Igi awopa	59 (24.6)	–	–	181(75.4)
Igi ogbon	54 (22.5)	–	–	186(77.5)
Morinda lucida	215 (89.6)	–	–	25(10.4)
Lime	219 (91.2)	–	–	21(8.8)
Chrysophyllum albidum	93 (38.8)	–	–	147(61.2)
Spondia mombin	70 (29.2)	–	–	170(70.8)
Mafowokanmi	20 (8.3)	3 (1.2)	–	217(90.5)
Coconut	119 (49.6)	2 (0.8)	–	119(49.6)
Gliricidia sepium	65 (27.1)	–	–	175(72.9)
Grape	199 (82.9)	–	–	41(17.1)
Igi sogba	39 (16.2)	–	–	202(83.8)
Patanma	18 (7.5)	–	–	222(92.5)
Igi ajadi	–	–	–	240(100.0)
Fig tree	2 (0.8)	–	–	238(99.2)

Source: Field survey (2014)

* = Multiple response

Factors that influence the use of medicinal plants among rural dwellers

Table 4 reveals the factors that really influence utilization of medicinal plants by majority of rural dwellers in Oyo state as; efficacy in the use of herbal medicine (2.84), high indigenous knowledge of medicine plants (2.73), strong belief in herbal medicine(2.71), ready availability of medicinal plants (2.49) and cheap cost of medicinal plants when compared with orthodox medicine (2.44). The overall wellbeing of rural dwellers is very essential in achieving sustainable rural development and for maximum agricultural productivity since the rural dwellers engaged in farming as their main source of income. The result also implies that influencing factors serve as a motivation among the rural dwellers to utilize medicinal plants.

Table 4: Distribution based on factors that influence the use of medicinal plants among rural dwellers (n = 240)

	Variables	Major factor (%)	Minor factor (%)	Not a factor (%)	Mean	Rank
i	The efficacy of herbal medicine	209 (87.1)	24 (10.0)	7 (2.9)	2.84	1st
ii	The indigenous knowledge on medicinal plants is high.	197 (82.1)	22 (9.2)	21 (8.8)	2.73	2nd
iii	Strong belief in herbal medicine	194 (80.8)	23 (9.6)	23 (2.6)	2.71	3rd
iv	Medicinal plants are readily available.	158 (65.8)	41 (17.1)	41 (17.1)	2.49	4th
v	Use of medicinal plants cost less when compared with orthodox medicine.	146 (60.8)	53 (22.1)	41 (17.1)	2.44	5th
vi	Due to the popularity of the use of medicinal plants.	140 (58.3)	58 (24.2)	42 (17.5)	2.41	6th
vii	Herbal medicine is more effective than orthodox medicine	118 (49.2)	45 (18.8)	77 (32.1)	2.17	7 th
viii	Preference for taste.	91 (37.9)	52 (21.7)	97 (40.4)	1.98	8 th
ix	Lack of orthodox medicine.	71 (29.6)	76 (31.7)	93 (38.8)	1.91	9 th
x	Lack of trust in orthodox medicine	47 (19.6)	76 (31.7)	117 (48.8)	1.71	10 th
xi	Medicinal plants usage does not have specified dosage.	59 (24.6)	53 (22.1)	128 (53.3)	1.71	10 th
xii	The side effects on the use of medicinal plants are high.	32 (13.3)	48 (20.0)	160 (66.7)	1.47	11 th
xiii	Unavailability of modern drugs.	24 (10.0)	43 (17.9)	173 (72.1)	1.38	12 th
xiv	Religious belief	32 (13.3)	13 (5.4)	195 (81.2)	1.32	13 th
xv	Modern health care is inaccessible.	19 (7.9)	33 (13.8)	188 (78.3)	1.30	14 th

Source: Field survey (2014).

Hypothesis of the study

There is no significant difference between the parts and forms of medicinal plants used by the respondents in the treatment of malaria across the three agro-ecological zone of Oyo states.

The result of ANOVA presented in Table 5 showed a significant difference in the parts of medicinal plants (F = 12.435, p<0.05) and forms of medicinal plants (F = 16.345, p<0.05) used

by the respondents in the agro-ecological zones of Oyo state. This indicated that the parts of medicinal plants used by the rural dwellers in the treatment of malaria was different across the agro-ecological zones and also the forms of utilizing these plants were not the same across the three agro-ecological zones of the state. This may be adduced to the different plants readily available in the different agro-ecological zones. This means that the stated hypothesis is rejected.

Table 5: Test of means of medicinal plants parts and forms of medicinal plants used by the respondents for the treatment of malaria across agro-ecological zones of Oyo State

		Sum of Squares	df	Mean Square	F	p-value
Forms of medicinal plants	Between Groups	755.767	1	755.767	28.523	0.000
	Within Groups	6306.295	238	26.497		
	Total	7062.063	239			
Part of medicinal plants	Between Groups	11537.922	1	11537.922	115.758	0.000
	Within Groups	23722.074	238	99.673		
	Total	35259.996	239			

$P \leq 0.05$ @ 5% level of significance

3. CONCLUSION

The findings revealed that the commonly used medicinal plants for malaria treatment among rural dwellers in Oyo state were *Azadirachta indica*, *Chromolaena odorata*, *Henna* plant, *Gossypium barbadense* and *Cymbopogon citratus*. The most frequently used parts was the leaves. However, utilization was influenced by cheap and readily available medicinal plants in liquid and powder extracts from the leaves, barks, and roots, the high indigenous knowledge of medicinal plants and their efficacy to treating malaria.

RECOMMENDATION

There should be concerted efforts in the development of malaria drugs locally from these identified plants. Also, government and non-governmental organizations should synergize to conserve, sustain, and multiply these herbal gene banks across the ecological zone in the country.

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