Preference of Medicinal Plants in the Treatment of Malaria Fever in Akure South Local Government Area, Ondo State Nigeria

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Abstract

Malaria is a common and devastating disease affecting half of the world's population. The study investigated preference of medicinal plants in the treatment of malaria fever in Akure South Local Government Area of Ondo state, Nigeria. Primary data were obtained for the purpose of this study using structured questionnaire. The data collected included the socio-economic characteristics, preference and use of medicinal plants as well as types of medicinal plants utilized for malaria treatment. Multi-stage sampling was employed in the selection of one hundred respondents. Data were analyzed using descriptive statistics and probit regression model. The mean age of the respondents was 40 years and the mean household size was 6 persons. Despite access to modern health facilities, 64.0% of the respondents preferred medicinal plants in the treatment of malaria fever. Medicinal plants / parts commonly used in malaria treatment are neem leaves, lemon grass, mango bark and leaves, cashew bark and leaves, moringa olifera, bitter gourd and unripe pawpaw. Preference for medicinal plants in the treatment of malaria was influenced by sex, income, and taste. Lack of standardization and unpalatable taste are key constraints to utilization of medicinal plants in the treatment of malaria fever. The study recommends the extraction of the active agents in these plants by relevant

research and development agencies to ensure standardization. Government should intensify efforts towards the eradication of malaria fever in Nigeria.

OVERVIEW AND PROBLEM STATEMENT

Malaria is a common and devastating disease caused by protozoan parasites of the genus Plasmodium. These parasites are spread through the bites of Anopheles mosquitoes. There are four known species of *Plasmodium* that infect humans, these are: *P. falciparum, P. vivax, P. malariae* and *P. ovale*. Out of these four species, P. *falciparum* is known to be responsible for majority of the severity and loss of life associated with malaria (Bhatt *et al*., 2015). Half of the world's population which is about 3.3 billion people is affected by malaria. It is the third principal reason for death of children under five years across the globe. According to World Health Organization (WHO), 81% of the 216 million cases of malaria and 91% of deaths associated with the disease in 2010 occurred in Africa. Malaria stands as the second leading cause of death from infectious diseases in Africa, indicating that malaria is prevalent in Africa. Thirty countries in Sub-Saharan Africa (including Nigeria) accounts for 90% of global malaria deaths (Nigeria Malaria Factsheets, 2011). Malaria has a great morbidity and mortality effect than any other infectious diseases of the world (World Malarial Report, 2005). Hence, it has negative impact on the economy of prevalent countries.

The roll back malaria declarations in 2000 notwithstanding, malaria is prevalent in Nigeria where it remains the main health challenge and accounts for more deaths than in any other country in the world. Ninety seven percent of Nigerians is at the risk of malaria. This is buttressed by the fact that there are an estimated 100 million malaria cases with over 300,000 deaths per year in the country. The southwestern part of the country records the highest

prevalence of above 50% especially in children between age six and fifty nine months (Nigeria malaria factsheet, 2011). Malaria causes morbidity and mortality which results into social and economic losses. Due to malaria attacks, children spend days away from school and adults lose workdays. Malaria weakens the capability of people to work efficiently through loss of productive time during care-giving periods. This leads to reduction in the ability to work, earn income and save for family (Arese, 2001).

However, there are growing evidences that plasmodium parasite has developed resistance to most insecticides (pyrethroids) and affordable drugs thereby making anti-malarial drugs less effective (Arese, 2001; Nigeria malaria factsheet, 2011). This creates a severe menace to treatment of malaria in Nigeria. Furthermore, most anti-malarial drugs are not affordable by peopleand this necessitates the shift to self medication using medicinal plants (Arese, 2001; Muregi et al., 2003).

Medicinal plants are plants that are commonly used in the treatment and prevention of specific ailments and diseases. (Anselem, 2004). It was mentioned in the UNESCO report (1998) that "the expediency of medicinal plants may be pivotal to the development of new and effective anti-malarial drug". To buttress this statement, there is high reliance on traditional medicine in the treatment of malaria, most of which are prepared from plants and available at affordable prices (Alves and Rosa, 2007). Though, ethno-botanical studies (Odugbemi et al., 2007; Ajibesin et al., 2008; Titanji et al., 2008; Idowu et al., 2009; Bekalo et al., 2009; Dike et al., 2012 and Sangay and Rupashie, 2014) have been carried out on medicinal plants useful in treating malaria in Africa, Nigeria inclusive, however, there is need to update this list of plants and investigate the preference of these plants to orthodox medicine as well as the factors influencing the preference.

Hence, this study investigated the preference and utilization of medicinal plants in the treatment of malaria fever in Akure South Local Government Area of Ondo state, Southwest Nigeria.

The specific objectives were to:

1. examine the preference of medicinal plants to orthodox drugs in the treatment of malaria in the study area;

2. identify the medicinal plants used in the treatment of malaria;

3. investigate factors influencing preference for medicinal plants in the treatment of malaria and

4. identify the major constraints to utilization of medicinal plants in the treatment of malaria fever.

Materials and methods

This study was carried out in Akure South Local Government Area of Ondo State, Nigeria. Geographically, the Local Government Area is between Longitude 4° 15' East and 4°, 30° East and Latitude 7° 30° North and 7° 38' North. It has an area of 331km^2 and a population of 353,211 at the 2006 population census. The predominant ethnic group is Yoruba. The area was characterized by two distinct seasons; the rainy and the dry season. The rainy season is from April to November while the dry season is from December to March. The major occupations of the people in the area are civil service, farming and trading.

Data Collection and Sampling Procedure

Primary data were obtained for the purpose of this study using structured questionnaire. The data collected include the socio-economic characteristics such as age, sex, marital status, household size and income; preference and use of medicinal plants, types of medicinal plants

utilized for malaria treatment and constraints to the utilization of medicinal plants in malaria treatment. Multi-stage sampling procedure was employed in the selection of the respondents. The first stage involved random selection of Akure South Local Government Area. The second stage involved selection of five (5) communities from the list of the communities in the Local Government while in the last stage, twenty respondents were randomly selected from each communities resulting to a total of one hundred respondents.

Analytical Techniques

Analytical techniques employed in the study include: descriptive statistics (such as mean, frequency, tables, percentage) and probit regression model. Objectives 1, 2, and 4 were analyzed using descriptive statistics while probit regression model was used to achieve objective 3.

The probit model is a binary response model in which the response variable can take only the values 0 and 1.

The model is specified as follows:

$Y = \beta_0 + \beta_i X_i + e_i$

Where β_0 is the intercept, β_i is the slope (coefficient) of the independent variables, e_i is the error term. Y is a dichotomous variable which can assume a value of 0 if no preference and 1 if there is preference of medicinal plants to orthodox drugs in malaria treatment.

The independent variables are as follows:

X_1 = Age (years)

X_2 = Sex (0-male, 1-female)

X_3= Years of formal education (years)

X_4= Household size (number)

X_5= Marital status (0-single, 1-otherwise)

X_6= Income (Naira)

X_7= Modern health care access (1- access to modern health care, 0 –if otherwise)

X_8= Distance to the nearest health care (kilometer)

X_9= Location (0- rural, 1-urban)

X_{10}= Access to medicinal plant (1- access to medicinal plant, 0-if otherwise)

X_{11}= Taste (1-Palatable, 0-if otherwise)

Results and Discussion

Socio-economic Characteristics of the Respondents

The socio-economic characteristics of the respondents are shown in Table 1. Age distribution of respondents revealed that the majority of the respondents were in their active age with a mean age of 40 years. Male constitutes 54 percent of the respondents while 46.0% were female. Forty percent of the respondents were single while 53.0%, 10.0% and 7.0% of the respondents were married, divorced and widowed respectively. Distribution according to the educational status revealed that majority (75.0%) of the respondents had formal education while 25.0% do not. The mean household size was 6 persons. Thirty-two percents of the respondents engaged in trading as their primary occupation, 18.0% and 17.0% are students and retired civil

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servants while 9.0%, 18.0% and 6.0% reported farming, civil service, artistry respectively as their primary occupation. Ninety-four percent of the respondents have access to modern health services in the study area.

Table 1: Distribution of Respondents by Socio-economic Characteristics

VARIABLE	FREQUENCY	PERCENTAGE
Age		
≤30	17	17
31-40	39	39
41-50	23	23
51-60	17	17
>60	4	4
Sex		
Female	46	46
Male	54	54
Marital status		
Single	40	40
Married	53	53
Divorced	10	10
Widowed	7	7
Educational level		
No formal	25	25
Primary	6	6
Secondary	17	17
Tertiary	52	52
Household size		
≤5	64	64
6-10	28	28
11-15	6	6
16-20	2	2
Primary occupation		
Trading	32	32
Farming	9	9
Civil service	18	18
Student	18	18
Retiree	17	17
Artistry	6	6
Location		
Rural	18	18
Urban	82	82
Modern Health care		
Access	94	94
No access	6	6

Preference and Use of Medicinal Plants in the Treatment of Malaria

All the respondents reported incidence of malaria within the last three months of interview. This reveals that malaria is prevalent in the study area. Sixty-four percent of the respondents preferred and used medicinal plants in the treatment of malaria in the study area (Table 2). The medicinal plants/parts commonly used in the treatment of malaria fever were: Neem (leaf) 18%, Lemon grass (10%), mango bark and leaf (40%), cashew bark and leaf (22%), Moringa olifera (12%), unripe pawpaw fruit (7%), unripe pineapple (7%) bitter gourd (12%), lime (20%), ginger (3%), bitter leaf (4%) and bitter kola (1%).

Table 2: Preference of Medicinal Plants

Preference	Frequency	Percentage
Yes	64	64.0
No	36	36.0
Total	**100**	**100.0**

Source: Field Survey, 2016

Table 3: Medicinal plants/parts used in Malaria Fever Treatment

Common name	Botanical name	Frequency	Percentage
Mango	*Magifera indica*	**40**	**40**
Cashew	*Anacardium occidentale*	**22**	**22**
Lime	*Citrus aurantifolia*	**20**	**20**

Neem	*Azadirachta indica*	**18**	**18**
Moringa	*Moringa oleifera*	**12**	**12**
Bitter gourd	*Mormordica charantia*	**12**	**12**
Guava	*Psidium guajava*	**10**	**10**
Lemon grass	*Cymbopogon citratus*	**10**	**10**
Pawpaw (unripe)	*Carica papaya*	**7**	**10**
Pineapple (unripe)	*Ananas comosus*	**7**	**7**
Bitter leaf	*Vernonia amygdalina*	**4**	**4**
Ginger	*Zingiber officinale*	**3**	**3**
Bitter cola	*Garcinia kola*	**1**	**1**

*Multiple response

Source: Field Survey, 2016

Determinants of Preference for Medicinal Plants in the Treatment of Malaria Fever

The influence of some socio-economic variables on preference of medicinal plants in treating malaria fever among the respondents is shown in Table 4. The results of the probit regression analysis revealed that sex, access to medicinal plants, taste and income significantly influenced the preference for medicinal plants. From the results being a female household head significantly ($p<0.05$) increases the likelihood of preferring medicinal plants to orthodox drugs in the treatment of malaria. Income had a negative but significant ($p<0.05$) influence on medicinal plants preference. Increase in income increases the purchasing power of respondents to buy orthodox medicine. A unit increase in income will reduce the likelihood of preferring medicinal plants in the treatment of malaria by 11.33%. Access to medicinal plants significantly ($p<0.05$) increases the likelihood of preferring medicinal plants. Furthermore, taste had a significant

(p<0.001) but negative effect on the preference for medicinal plants in treating malaria. Non-palatability of the medicinal plant decreased the likelihood of using medicinal plants to treat malaria. This implies that the bitter taste may likely reduce the urge of using medicinal plants.

Table 4: Probit Results of Preference for the Utilization of Medicinal Plants

Variables	Coefficient	Standard error	T-value
Years of formal education	-0.0249034	0.0372001	0.6694
Age	0.021946	0.0258984	0.8474
Sex	0.9732863**	0.4393575	2.2152
Household size	0.894888	0.1011478	0.8847
Marital status	0.3377587	0.4649373	0.7265
Income	-0.13356**	0.06577435	2.0307
Modern health access	.1625636	0.2105725	0.7720
Distance to nearest health centre	-0.1073386	0.091726	1.1704
Location	0.4556919	0.614027	0.7422
Access to medicinal plants	0.1594276**	0.701239	2.2732
Taste	-2.020513***	0.6308669	3.2025
Constant	3.659362**	1.602689	2.2832

Prob> chi^2 = 0.0002; Log likelihood = -54.486355   Pseudo R^2 = 0.5407

, * represents significant level of 5% and 1% respectively

Main Constraints to the Utilization of Medicinal Plants

Main constraints to the use of medicinal plants in the treatment of malaria fever were: no standardization (30%), non-palatable taste (48%), unpleasant odour (17%), lack of information on expiration (9.0%).

Table 6: Distribution of Respondents by Constraints to the Utilization of Medicinal Plants

Constraints	Frequency	Percentage
No standardization	30	30
No expiration information	9	9
Non-palatability	48	48
Unpleasant odour	17	17

Source: Field Survey, 2016

Conclusion and Recommendations

The study focused on preference and utilization of medicinal plants in the treatment of malaria. There is high incidence of malaria fever in the study area. Medicinal plants were more preferred in the treatment of malaria fever compared to orthodox medicines. The commonly used medicinal plants were: Mango bark and leaf, Neem tree, Lemon grass, Cashew bark and leaf, Moringa leaf, unripe pineapple, unripe pawpaw, Lime fruit, Guava bark and leaf, Ginger, Bitter gourd and bitter cola. Preference for medicinal plants is influenced by sex, income, taste and

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access to medicinal plants. The major constraints to utilization of medicinal plants were lack of standardization, lack of information on expiry, unpalatable taste and unpleasant odour. The study recommends research on the confirmation of the efficacy of these plants as well as the extraction of their active agents by relevant research and development agencies. This will ensure more effective cure to malaria fever and standardization. Interventions on malaria eradication should also be scaled up.

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