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MEDICINAL UTILIZATION OF ROOTS OF FOREST PLANTS IN LERE LOCAL GOVERNMENT AREA OF KADUNA STATE, NIGERIA

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ABSTRACT
This paper evaluates some of the valuable medicinal forest plant roots commonly used by various ethnic groups in Kaduna State, Nigeria. A set of sixty (60) structured questionnaire was purposively administered to traditional healers, herbs traders, civil servants, and other herb users in Lere Local Government Area of Kaduna State. Descriptive and inferential statistics were used for data analysis. Results showed that age, sex, marital status, educational status and occupation of respondents have no significant relationship ($p>0.05$) with the uses of herbs. It also showed that there are a total of thirty seven (37) families of forest plant roots comprising of 60 different plants identified in the survey for treating various diseases or symptoms. These plants include Vitex doniana (Dinya), Anona senegalensis (Gwandan dabi), Khaya senegalinsis (Madaci). Opilia celtidifolia (Rufan gada), Moringa olifera (Zogale), Mangifera indica (Mangoro), Pisidium guijava (Gwaiba) Zimenia Americana (Tsada) Pakia biglobosa (Dorawa). Some of the uses cannot be proven scientifically. Efforts should be made to develop herbal medication to serve as an alternative to orthodox medication.

Key words: Forest plant roots, Alternative medicine, Biodiversity utilization,

INTRODUCTION
According to recent estimates by the World Health Organisation, more than 3.5 billion people in the developing world rely on plants as components of their primary health care (Balick and Cox, 2001). Just as many Africans know of the ssssuse of Neem (*Azadiracta indica*) to treat Malaria, many indigenous people have knowledge of some common plants and animals that have medicinal uses. Ethnobotanical and ethnozoological researches should not be limited to discovering new pharmaceuticals for Westerners; it can also be of some benefit to people in developing countries. Herbal medicine, also called botanical medicine or phytomedicine, is defined as the use of whole plants or part of plants to prevent or treat illness. Plants parts used include seeds, berries, roots, leaves, bark or flowers. Although a renaissance is occurring in herbal medicine all over the world, national control agencies such as the American food and drug administration (FDA) still classify herbs as food supplements and forbid manufacturers from claiming that their products are able to treat or prevent specific diseases. As a result, these agencies do not exert any control over the manufacture of herbal medicine (Hanasted, 2004). In many industrialized countries, more and more individuals are turning to herbal medicines and plant derived products to offset the high cost of personal healthcare. Many efforts have been made to commercialize production of the medical plant metabolites from plant cell culture (Laurain 2004). Health care and botany have evolved as inseparable domains of human activity:

the medicine man (shaman) is often regarded as the first botanical professional in human history (Sanimu, 2010). Though western medicine, as taught in most medical schools around the world, has largely switched from natural to manufactured drugs, plant products are still of paramount importance in traditional health care systems of developing countries. In traditional therapies of certain indigenous communities, herbs are administered along with chants, dances and spiritual ceremonies to expel bad spirits and to help reharmonise the sick person with his or her environment (Seters, 2001). Plants, however, also serve as anticonceptives in indigenous birth control procedures or to counteract tangible pathogenics such as fungi and parasites (e.g. worms, malaria). In developing countries, medicine men and women are particularly knowledgeable about the recognition and treatment of common diseases. In Amazonia, at least 1,300 plant species are being used as medicines, poisons or narcotics (Schultes, 1979). Traditional healers are also skilled botanists and have a great talent for locating the requisite plant from the green vastness that makes up their natural pharmacy. In Latin America and Africa, this knowledge has largely remained undocumented and is handed down orally from father to son or from mother to daughter. Today's younger generations often have very different ambitions and, therefore, these traditional skills are doomed to get lost even faster than the plants themselves. This is why ethnobotanists compare the death of a shaman to the loss of a national library and invest much effort in assembling this knowledge as written accounts (Seters, 2001).

The development of drugs from plant roots by drug companies encourages large scale pharmacological screening of herbs. Chinese herbalism is the most dominant of the ancient herbal traditions. It is based on concepts of yin and yang and of Qi energy. Chinese herbs are considered “cooling” (yin), “stimulating” (yank) and are administered in combination according to the deficiencies or excesses of these qualities in the patient. Modern Western herbalism focuses on the effort of herbs on individual body systems rather than taking a holistic approach: herbs may be used for anti-inflammatory, haemostatic, expectorant, antispasmodic, or immune stimulatory properties (Ghillean, 2001). Whether a wonder medicine is developed from a plant or a local herbal remedy is harvested from the forest, there are many problems that need to be resolved. Historically indigenous peoples or even the countries in which they reside have benefited little from the development of medicines from their plant resources. When a herbal medicine becomes popular it can be over-exploited and the very resource threatened with extinction. The paper therefore examines the utilization of medicinal forest plant roots from selected families in Lere Local Government area of Kaduna State.

METHODOLOGY

Study Area

The study was conducted in Lere Local Government Area of Kaduna State, Nigeria (Figure 1). Lere Local Government Area comprises of Kayarda, and Saminaka districts. Lere Local Government Area was created in 1989. It was carved out from the former Saminaka Local Government Area. The Local Government covers about 2150 km^2 with a population of about 331,160 people (NPC, 2006). It is situated in the Eastern part of the State (NPC, 2006). The local government is located between latitude 9^0N and 10^0N and longitude 8^0E and 9^0E of the Prime Meridian. It shares boundary with Kano from the Northern part and with Bauchi and Plateau State in the East. The climate is considerably good for arable crops, the local government falls in the Guinea Savannah vegetation zone. The major occupation of the local government is farming, rearing of livestock (cattle), trading, fishing and civil servant. Rainfall extends from May to early

October, while the harmattan sets in the mid October/November and extends towards February (Lere Local Government Secretariat, 2009).

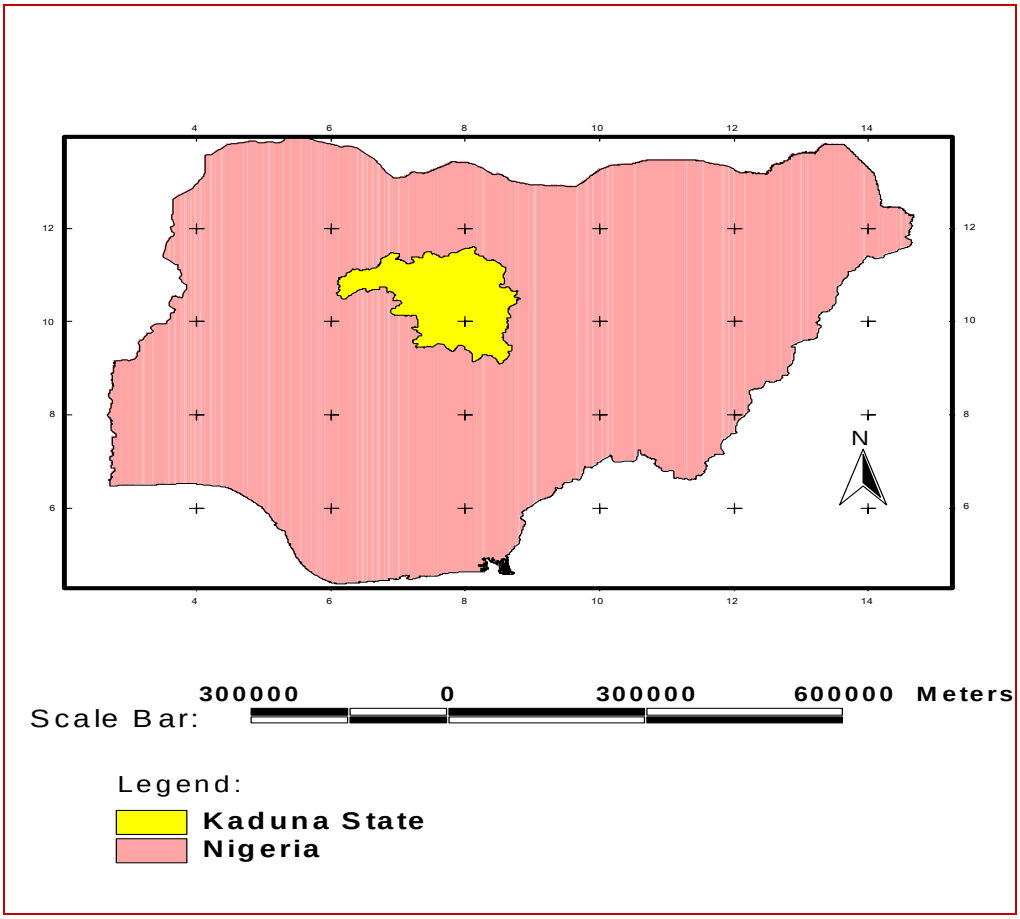

Figure 1: Map of the Study Area

The population of the study covers the A set of sixty questionnaire were administered to purposively selected respondents (including traditional healers, medicine traders, civil servants, and farmers) who are quite knowledgeable about herbal medicine and the utilization of plant and animal species in traditional medicine. The questionnaire was divided into two sections, A, and B section. Section (A) covered the bio data of the respondents while section (B) question were framed in order to identify the medicinal plant roots for treating various diseases and mode of use of the herbs. Data obtained were analysed using descriptive statistics in the form of Frequency counts and percentages while inferential statistics in the form of chi-square was used to test for relationships.

Chi-square (x^2)

$$\chi^2 = \frac{\Sigma(O-E)^2}{E}$$

Where E = expected value (s)
O = Observed value (s)

RESULTS AND DISCUSSION

Table 1 showed that majority of the respondents fall under age range of 21 and 50 years. This implies that the respondents are still in their active ages and could have been involved in providing traditional medicine in the study area. This agrees with the work of Faleyimu and Akinyemi (2010) that young people in the study area were known to be very active in administering herbs to the sick people.

Table 1: Age and sex distribution of Respondents

Age	**Frequency**	**Percentage**
10-20	3	5.00
21-30	10	16.67
31-40	12	20.00
41-50	20	33.33
51-60	10	16.67
60 and above	5	8.33
Sex		
Male	45	75.00
Female	15	25.00

Source: Field survey, 2010.

Table 1 also shows that 75% of the respondents are male while 37.5% are female. This can be ascribed to the fact that the males are more experienced in sourcing medicinal plant root because they are more involved in farming activities and should therefore know the areas in the forest to easily get these medicinal plant roots. Besides, collection of these roots requires digging and excavation of soil which males can do better than females because of the physical strength involved. In many localities in Nigeria, males are more involved in general traditional medicine practice than females as heads of households and custodians of culture and tradition. Nevertheless that does not mean that males utilize herbal medicine more than females in the study area. Chi square test of relationship showed no significant relationship (P>0.05) between sex of households and uses of the herbs (Table 2). Results obtained are not gender biased.

Table 2: Chi square test of relationship between Herbs utilization and Sex of Respondents

Chi-Square Tests	Value	Df	Asymp. Sig (2-sided))
Pearson chi-Square	3.388[a]	3	0.336**
No of Valid Cases	60		

**Not significant at p>0.05

There is no significant relationship (P>0.05) between sex and uses of herbs in the study area.
Table 3 showed that most of the respondents in the study area engaged in providing traditional medicine were widow(er) (41.67%) while the married are 33.33%. The fact that widowers top the list among the respondents cannot be unconnected with loneliness. With the feeling of

loneliness and psychologically ostracized, they use the practice as a way of keeping themselves busy. Involvement of the married ones could be attributed to the fact that the respondents have many household members including children; who frequently require medical attention as they always suffer ailments. The frequency of the occurrence of ailments and the difficulty to afford the high cost of providing health care in hospitals could make respondents to become interested in herbal medicine. Only 13.33% and 11.67% of the single respondents and divorced respondents respectively are involved in providing traditional medicine due to the fact that they have few or no dependants and can therefore afford the cost of treatments in hospitals. However, Chi square test of relationship showed no significant relationship (P>0.05) between marital status and uses of the herbs (Table 3b). This implies that though differences exist in utilization of herbs on the basis of marital status but in the difference is not scientifically significant.

Table 3a: Marital status of respondents in the study area

Marital status	Frequency	Percentage
Single	8	13.33
Married	20	33.33
Divorce	7	11.67
Widow(er)	25	41.67
Total	**60**	**100**

Source: Field survey 2010.

Table 3b: Chi square test of relationship between utilization of Herbs and Marital Status of Respondents

Chi-Square Tests	Value	Df	Asymp. Sig (2-sided))
Pearson chi-Square	3.388[a]	3	0.336**
No of Valid Cases	60		

**Not significant at p>0.05

There is no significant relationship (P>0.05) between marital status of respondents and utilization of the herbs in the study area.

Table 4 showed that most of the respondents are Herbs trader (50.00%) followed by the traditional healers. This implies that majority of the respondents were involved in herb trading as their primary occupation while other economic activities are additional source of income. This also shows that respondents have good knowledge of herbs' sourcing, marketing and utilization in the study area. However, Chi square test of relationship showed no significant relationship (P>0.05) between occupation and herbs uses (Table 4b).

Table 4a: Occupational distribution of respondents

Occupational status	Frequency	Percentage
Traditional healers	20	33.33
Herb trader	30	50.00
Civil servant	5	8.33
Farmers	5	8.33
Total	60	100

Source: Field survey, 2010.

Table 4b: Chi square relationship of Herbs uses and Occupation of Respondent

Chi-Square Tests	Value	Df	Asymp. Sig (2-sided))
Pearson chi-Square	6.053	3	0.109**
No of Valid Cases	60		

**Not significant at p>0.05

There is no significant relationship (P>0.05) between occupation and herbs uses. Table 5a showed that most of the respondents in Lere Local Government have no formal education. Both educated and non educated respondents utilise roots of plants for medicine. This indicates that information generated from the research are valid because of the respondents whose educational background cuts across different levels. However, most respondents had no formal education (38.33%). Traditional healers and herb sellers in most rural communities are always people who are not formally educated. The fact that a greater percentage of the respondents have no formal education could lead to high rate of unsustainable harvesting.

The fact that up to 25.00% of the respondents are graduands of tertiary institution and 20.00% attended secondary school indicates that the respondents can reason critically and can give valid judgment on matters concerning medicinal utilization of plant roots. It also implies that both educated and non educated people are aware of the efficacy of herbal treatments in the study area. There is no significant relationship (P>0.05) between Educational level and uses of the herbs (Table 5b).

Table 5a: Distribution of respondents based on Educational level

Educational status	Frequency	Percentage
Primary school	10	16.67
Secondary school	12	20.00
Tertiary institution	15	25.00
No formal education	23	38.33
Total	60	100

Source: Field survey 2010.

Table 5b: Chi square test of relationship between Educational Level of Respondents and utilization of herbs

Chi-Square Tests	Value	Df	Asymp. Sig (2-sided))
Pearson chi-Square	1.845[a]	3	0.605**
No of Valid Cases	60		

**Not significant at p>0.05

There is no significant relationship (P>0.05) between Educational level and uses of the herbs.

Medicinal Plant roots used for treating various diseases

Table 6 presents the various species of plant utilized for herbal treatment by the respondents, and household's method of preparing the herb for use in the study area. The most common method of preparation is the extraction of the phytochemicals by soaking in water. Soaking in water is simple and can easily be carried out by most households irrespective of their profession or educational background. Besides, water can easily be sourced at little or no cost. Many of the plants are cultivated in homestead gardens to make them readily available for multipurpose utilization by respondents. The respondents use roots of a wide range of plants from about thirty six families for medicinal purpose (Table 7). The family of Caesalpinoideae is more frequently utilized due to its diversity and relative abundance in the study area.

Table 6 : Roots of plants utilized for herbal treatment

Local Name	**Botanical Name**	**Family Name**	**Type (T-trees, S-shrubs)**	**Cultivated (C) or Wild (W)**	**Ailment / Sickness**	**Use Method**
Tsamiya	*Tamarindus indica*	Caesalpinaceae	T	C	Fever	Soaked in water and drank for 3 days.
Lemon stami	*Citrus lemon engl*	Rutaceace	T	C	Sun scotching	Soaked in water and drank for 3 days.
Rufangada	*Opilia celtidifolia*	Opilianceae	T	C	Malaria	Soaked in water and drank for 3 days
Aduruku	*Newbouldia leavis*	Bignonia ceae	T	C	Swelling / swollen area	Soaked in water and drank for 3 days.
Madaci	*Khaya senegalensis*	Loganiaceae	T	C	Energy giving	Soaked in water and drank for 3 days
Kajiji dan tunugu	*Cyperus tonkinesis*	Cyperaceae	T	C	fever	Soaked in water and drank for 6 days

Tafashiya	*Nauclear diderricii*	Caesalpina oideae	T	C	Hernia	Soaked in water and drank for 7 days
Zogale	*Moringa oleifera*	Moringaceae	T	W	Liver problems	soaked in water and drank for 3 days
Marke	*Anogeissus leiocarpus (linn)*	Combreta melastomataceae	T	W	Stomach pain	Soaked in water and drank for 3 weeks
Hankufa	*waltheria indica*	Melas tomatacea	T	W	Small pox	Soaked in water and drank for 2 days.
Tafashiya	*Wancles diderrichi*	Caesalpina oideae	T	W	Hernia	Soaked in water and drank for 7 days
Nigidda	*Arachis hypogea*	Leguminoceae	T	W	Cholera	Soaked in water and drank for 3 days
Damage	*Cirozophora senegalssis*	Cecropiaceae	T	C	Yellow fever	Soaked in water and drank for 2 days
Mangoro	*Magifera indica*	Anarcadiaceae	T	C	Abdominal pain	Soaked in water and drank for 3 days
Dan gafara	*Cadaba faranosa*	Caesalpinio odeae	T	C	Fever	Soaked in water and drank for 7 days

Tarkon bera	*Asparagus africanus*	Chailleiha cage	T	S	Chicken pox	Soaked in water and drank for 3 days
Gwandardaaji	*Annona senegalensis*	Annonaceae	T	W	Stop bleeding	The material is dried, grinded and t applied on the wound / over the broken part.
Namijin baabar	*Indigofera bracteolate*	Irvincia ceae	S	C	Hypertension	Soaked in water and drank for 7 days
Maiyardo	*Archis hypogea*	Leguminoceae	T	C	Typhoid	Soaked in water and drank for 7 days
Kwaikwarito	*Ny phaealotus & Trapenatana*	Pandanaceae	T	C	Measles / Mumps	Soaked in water and drank for 3 days
Kiryaa	*Porsopia Africana*	Mimosoideae	T	W	Dysentery	Soaked in water and drank for 3 days
Gamji	*Ficus platypylla & ovale*	Moraceae	T	W	High temperature	Soaked in water and drank for 3 days.
Saiwadubu	*Ipomoea coptica*	Convolvulacea	T	C	Rashes	Soaked in water and drank for 7

						days
Namijin baabaa	*Indigofera bracteolate*	Incacina ceae	S	C	For labour	Soaked in water and drank for 2 days
Kotogo	*Arachis hypogeae*	Leguminoceae	S	C	Tetanus	Soaked in water and drank for a day.
Runhuu	*Cassigsing vena*	Caesalpin oideae	S	C	Fever	Soaked in water and drank for 1 day.
Dinyan (kano)	*Vitex doniana*	Verbena ceae	T	W	Diphtheria	Soaked in water and drank for 3 days.
Gwandandaji	*Anona senegalansis*	Annonaceae	T	W	Gonorrhea	Soaked in water and drank for 2 days
Kadanyaa raafii	*Adina microcephala*	Rubiaceae	T	W	Typhoid fever	It soaked in water and drank for 2 days
Tukuwa	*Raphia sp*	Pandanaceae	T	C	Small pox	Soaked in water and drank for 7 days
Kalgo	*Pillostigma reticulatum*	Ceasalpinaee	S	C	Chicken pox	Soaked in water and drank for 1 day.
Gogamassu	*Mitra curpaseaber*	Rubiaceae	T	C	Small fox	Soaked in water

						and drank for 2 days
Turburko	*Millethia thonningii bak*	Papiliona ceae	T	C	Gonorrhea	It soaked in water and drank for 3 days
Din yar raafi	*Vitex chrysocapa*	Verbena ceae	T	C	Leprosy	It soaked in water and drank for 2 days
Gwandan daji	*Carica papaya*	Caricaceae	T	C	Cancer	Soaked in water and drank for 3 days
Maje	*Daniellia oliveri*	Caesal piniodeae	T	C	Malaria	Soaked in water and drank for 2 days.
Zogale	*Moringa olifera*	Moringaceae	T	C	Hypertension	soaked in water and drank for 7 days
Kwanduri	*Terminalla macroplera*	Combretaceae	T	C	Diarrhoaeth	Soaked in water and drank for 5 days.
Tunfaafiyaa	*Calotropic procera*	Ceasalpi nioidea	T	C	Ear problem	Soaked in water and drank for 3 days.
Dabiinoo	*Phoenix dactylifera*	Palmae	T	C	Abdominal pain	Soaked in water and drank for 7 days.

Ka awoo	*Afzelia africana*	Leguminocae	S	W	Diabetes	Soaked in water and drank for 7 days
Aduruku	*Newbouldia leavis*	Bignoniaceae	T	W	Gonorrhea	Soaked in water and drank for 6 days.
Marke	*Anogeissus Leicarpus (linn)*	Combretaceae	T	C	Ulcer	Soaked in water and drank for 7 days
Baure	*Ficus sycomorus*	Moraceae	S	W	Cough	Soaked in water and drank for 3 days
Baakisu udaa	*Polycarpea cirym bosa*	Polygalaceae	T	C	Typhoid	Soaked in water and drank for 3 days
Malmo	*Guineese*	Ibymeluca ceae	S	W	Rabies	Soaked in water and drank for 3 days
Dunduu (sok)	*Dichrostahyscinerea*	Mimosoideae	T	C	Reduction in weight	Soaked in water and drank for 7 days.
Duman dunsee	*Aristolochia albida*	Simarouba ceae	T	C	Yellow fever	Soaked in water and drank for 3 days.
Hunnoo	*Baswellia daizielli*	Bursera ceae	T	W	High body temperature	Soaked in water and drank for 2 days

Gwaibaa	*Pisidium gajava*	Sapindaceae	T	W	Dysentery	Soaked in water and drank for 3 days
Tsada	*Zimenia americana*	Olaceceae	T	W	Dysentery	Soaked water and drank for 3 days
Koki ya	*Strychnos innocua*	Loganiaeee	T	W	Cholera	Boiled with water for 3 hours and drank.
Madachi	*Khaya senengalensis*	Mimoceae	T	C	Stomach pain	Soaked in water and drank for 3 days
Dorawa	*Parkia biglobosa*	Fabaceae	T	W	Malaria	The herb is soaked in water and drank for 2 days
Kuka	*Adansonia digitata*	Rutaceae	T	W	Influenza or flu	Soaked in water and drank for 2 days
Dinya	*Vitex doniana*	Verbenace	T	W	Typhoid	Soaked in water and drank for 3 days
Baure	*ficus sycomorus (mig)*	Alliaceae	T	W	Liver problem	Soaked in water and drank for 3 days
Tafarnuwa	*Allium sativum*	Alliaceae	T	W	Malaria	Soaked in water

						and drank for 3 days
Namibin gaude	*Gardenia agualla*	Rubiaceae	T	W	Tuberculosis	Soaked in water and drank for 3 days
Kokiya	*Strychnos innocu (Hutch)*	Loganianceae	T	W	Gonorrhea	The herb is boiled with water for at least 3 hours and taken.

Table 7: Families of plant roots utilized for various treatments in the study area

FAMILY	**FREQUENCY**
Caesalpinoideae	10
Loganiaea	1
Mimoceae	1
Fabaceae	1
Rutaceae	2
Verbanaceae	2
Morceae	2
Alliaceae	1
Rubia ceae	3
Irvinciaceae	2
Araliacege	2
Pandanaceae	3
Mimosoide	2
Convolvulaceae	1
Incacinaceae	1
Arachinaceae	1
Annonaceae	1
Papilionaceae	1
Ochenaceae	1
Moriigaeneae	2
Combretaceae	3
Leguminocea	2
Bignomaceae	2
Icacinaceae	1

Polycilaceae	1
Thymelaceae	1
Simaroubeae	1
Bursearceae	1
Sapidaceae	1
Olacacere	1
Opilianceae	1
Cypernuaceae	1
Metha tormatecea	1
Anarcadiaceae	1
Alliaceae	1
Chailletiaceae	1
TOTAL	60

The study revealed that a total of thirty six families of forest plant roots were identified with the ability to control and cure various ailments. Most of the forest plant roots are alone.

CONCLUSION

The study has shown that herbs from plant roots are frequently used to treat or prevent a range of health problems. The majority of the rural people in Lere Local Government Area of Kaduna State use plant - based traditional medicines for health care. However, these are still produced using age old methods which can affect their quality, stability and efficacy. The efficacy of these herbs when extracted by soaking in water should be researched on and compared with when extracted through other methods. The most effective dose to be administered to a patient should be researched on to prevent cases of over dose or drug abuse. Awareness should be created on the need to harvest the roots of these medicinal plants sustainably to ensure that the medicinal plants do not go into extinction. There should be effective legislation that guides the control of harvesting and trade of medicinal plants. Also, there should be awareness among many of the end users, as to the extent to which wild harvested materials are used.

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