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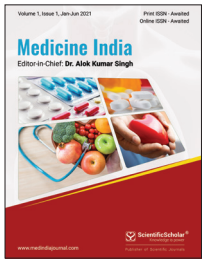

Original Article

Ethnobotanical survey of medicinal plants used by the indigenous people of Ilorin, North Central, Nigeria

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ABSTRACT

Objectives: The medicinal plant continues to play a key role in primary health-care delivery in Nigeria. It is important to preserve the indigenous knowledge of the use of these plants in the treatment of different ailments. In this study, a total of 46 informants were interviewed using a structured questionnaire administered within six randomly selected locations in Ilorin, Kwara State, North Central, Nigeria.

Materials and Methods: Demographic data, information on the medicinal plants, medicinal parts, method of preparation, administration, and uses were obtained.

Results: Fifty-five species belonging to 53 genera in 40 families were identified to be useful in the treatment of various ailments such as gonorrhea, yellow fever, measles, convulsion, fracture, skin diseases, piles, typhoid, and diabetes. The most frequently used families are *Solanaceae*, *Euphorbiaceae*, *Fabaceae*, *Meliaceae*, *Rubiaceae*, and *Malvaceae*. Herbal remedies were either prepared from dry or freshly collected plants, while the traditional solvents of choice included water, pure honey, alcohol, and aqueous extract from fermented maize. The most common method of preparation is decoction, followed by infusion; others include powder, pastry, and ointment. The leaves are the most common plant part used for herbal preparation.

Conclusion: Residents in the study areas found traditional medicine potent and cheaper compared to orthodox medicine. Conscientious efforts should be made to conserve medicinal plant genetic components for future use, and they should be exploited for the production of new drugs.

Keywords: Ethnobotanical survey, Medicinal plants, Diseases, Nigeria, Health care

INTRODUCTION

A medicinal plant is any plant which one or more of its organs contains substances that can be used for therapeutic purposes, or which are precursors for the synthesis of useful drugs.[1] Medicinal plants contain phytochemicals which are biologically active, naturally occurring chemical compounds found in plants, which provide health benefits for humans.[2] They protect plants from disease and damage and contribute to the plant's color, aroma, and flavor. Furthermore, they protect plant cells from environmental hazards such as pollution, stress, drought, ultra-violent exposure, and pathogenic attack.[3] Phytochemicals may be secondary metabolites such as alkaloids, terpenes, flavonoids, saponins, phenolic, and glycosides.[4]

Secondary plant metabolites have biological properties such as antioxidant, antimicrobial, modulation of detoxification enzymes, and stimulation of the immune system, decrease of platelet aggregation and modulation of hormone metabolism and anticancer property.

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The use of medicinal plants as remedies is common and widespread in Nigeria. Olajide *et al*.[5] reported that Nigerian vegetations are naturally endowed with arrays of floristic composition of different plant forms including trees, shrubs, herbs, and other non-wood forest resources. Within the natural forest abound several valuable non-timber resources of edible and highly nutritious plants whose fruits, twigs, barks, roots, gum, latex, or dyes are of medicinal value, these diversities available in tropical rainforest represent renewable resources for food and medicine if well managed.[6,7] Several workers have conducted ethnobotanical surveys among various tribes of the African continent and the different part of the world in search of plants with antibacterial, antiviral, and antifungal properties.[8]

Ethnobotanical surveys are important to understand the social-cultural and economic factors influencing ideas and actions concerning health and illness and to get information on the type of diseases and health problems prevalent among the people of a particular locality. Such studies, as suggested by Buwa-Komoren *et al*.,[9] may help to provide the basic health-care services needed to improve health challenges of the rural population.

Modern pharmacology looks for one active ingredient and seeks to isolate it to the exclusion of all the others; most of the research that is done on plants continues to focus on identifying and isolating active ingredients, rather than studying the medicinal properties of whole plants.[10] Herbalists, however, consider that the power of a plant lies in the interaction of all its ingredients. Plants used as medicines offer synergistic interactions between ingredients, both known and unknown.[11]

Furthermore, many medicinal plants are gradually becoming endangered due to over-exploitation by people in the environment. Thus, there is a need to conserve these plants, and document their role and decrease the erosion of medicinal plant use by different societies. This study seeks to study and identify various medicinal plant uses in Ilorin, Kwara state for proper documentation.

MATERIALS AND METHODS

Study design

This is a cross-sectional prospective study.

Study area

The study was conducted among the villagers, traditional healers, and herbalists in six locations (Iporin, Oke-Oyi, Gaa-Asibi, Ilota, Ogidi, and Adewole) within Ilorin, the Capital city of Kwara State. Kwara is a state in Western Nigeria. Kwara is located within the North Central geopolitical zone, commonly referred to as the Middle Belt. It is located on latitude 8° 25 N and 9° 20 and longitude 6° 39.

The primary ethnic group is Yoruba, with significant Nupe, Bariba, Hausa, and Fulani tribes. The total land and water masses of the State stands at 3,677,865.03 Ha and it is unevenly distributed among the 16 Local government areas. As of 2006, the population of Kwara state was 2.37 million (NPC, 2006). Kwara State, Nigeria is generally classified as savannah ecotone lying at the transition belt of the derived savannah and forest zones.[12] The vegetation characteristic of the state is depicted with 47.78% forest with 35.04% of savanna coverage. Kwara State lie within a region described as tropical climate and is characterized by double rainfall maxima and has tropical wet and dry climate.[13] Both seasons last for about 6 months. Kwara State is a summer rainfall area, with an annual rainfall range of 1000–1500 mm. The rainy season begins at about the end of March and lasts until early September, while the dry season begins in early October and ends in early March. The temperature is uniformly high and ranges between 25°C and 30°C in the wet season throughout the season except in July–August when the clouding of the sky prevents direct insolation (heatstroke) while in the dry season, it ranges between 33°C and 34°C.

Sample size

A total of 60 questionnaires were administered in six locations that were randomly selected in Ilorin, namely, Iporin, Oke-Oyi, Gaa-Asibi, Ilota, Ogidi, and Adewole. Ten questionnaires were administered in each village.

Data collection tools

Questionnaires were administered to collect data. This study was conducted over a period of five months. The people were visited in their various settlements. Since most of them can neither read nor write, each of the questionnaires was filled by asking them the questions therein and appropriate answers were ticked, while some were written in Yoruba language and interpreted.

Precautions were taken to thoroughly explain the aims of the study and we got maximum cooperation from them. A translator was always made available during the administration of the questionnaires.

Statistical analysis

The data collected were collated and analyzed using descriptive statistics, such as percentages and frequency, using Microsoft Excel 2010 version of the software.

RESULTS

Demography of informants

In this survey, 46 informants made up of 10 (21.7%) traditional healers, 27 (58.7%) herbalist, and 9 (19.6%)

elders were interviewed using a structured questionnaire administered within six randomly selected locations in Ilorin, Kwara. The data generated from this survey gave an insight into the age, sex, educational background, working experience, religion, and tribe of the informants. Fourteen informants (30.4%) were of the age bracket 40–49 and a majority of informants were male, as shown in Table 1. Furthermore, Table 1 shows that 69.5% of the respondents claimed to have in-depth knowledge of ethnomedicine, 4% had average knowledge, and 10 (21.7%) did not have knowledge of ethnomedicine practice [Table 1]. Thirty-two (32/46) (69.5%) informants claimed to have more than 10 years of experience in ethnomedicine, 4/46 informants (4.6%) had 5–10 years of experience, whereas 10/46 informants (21.7%) have no experience [Table 1]. In addition, 42 informants (91.2%) claimed to have gotten knowledge ancestrally, while 3/46 (6.5%) informants got their knowledge purely by formal training. Forty-six informants 46/46 (100%) reported that the plants they needed for their practice were always available [Table 1].

Table 1: The demographic characteristics of respondents.

Criteria	Characteristics	Frequency	Percentage
Age	70–79	6	13
	60–69	4	8.7
	50–59	12	26
	40–49	14	30.4
	30–39	5	10.4
	20–29	4	8.7
	10–19	1	2.1
Education background	Primary	20	43.5
	Secondary	4	8.7
	Tertiary	2	4.4
	No education	20	43.5
Gender	Male	29	63
	Female	17	37
Years of experience	>10	32	69.6
	5–9	10	21.7
	1–4	4	8.7
Source of ethnomedicine Knowledge	Ancestral	42	91.3
	Training	3	6.5
	Training and ancestral	1	2.2
Frequency of treatment	Regularly	46	100
Tribe	Yoruba	45	97.8
	Fulani	1	2.2
Profession	Traditional healer	10	21.7
	Herbalist	27	58.7
	Elders	9	19.6
Religion	Christianity	20	43.5
	Islam	26	56.5

97% of the respondents were Yoruba, while 2.2% were Fulani with no educational background.

Medicinal plants and their uses

Medicinal plants used in the management of different diseases in Ilorin, as documented by this study are 55 different plant species belonging to 53 genera and 40 families. The most frequently identified families include *Solanaceae*, *Euphorbiaceae*, *Asteraceae*, *Fabaceae*, *Meliaceae*, *Rubiaceae,* and *Malvaceae, as* shown in Table 2 and Figures 3 and 4. Furthermore, the local name, the methods of preparation, the part used in making herbal remedies, and the different diseases that the informants claimed to have been treated are shown in Table 2.

DISCUSSION

In this survey, medicinal plants used in Ilorin, Kwara State were identified. The majority of informants (63%) were male, while 37% were female. This was because most of the males were herbalists. In their tradition, males inherit the properties of their parents, and thus, the acquired knowledge of medicinal plants is passed like an inheritance from fathers and grandfathers along their lineage. Furthermore, there is a belief among the people that women can destroy the potency of some herbal remedies. However, a few informants learned the profession. These categories may be of any sex.

The result showed that informants aged between 10 and 19 years are just (1%) and most of the practitioners are between 40 and 49 years; this may be due to the fact that knowledge is passed mainly from the old parents to their offspring. This traditional method of knowledge transfer is a slow process whereby it is only when the parents are old before they start teaching their children. This result is different from the work of Ayodele[14] who carried out ethnobotanical survey in Ogun State, Nigeria, which is a more cosmopolitan city with high level of literacy. He recorded (30.4%) of the informants between the ages of (1–20). The age 40–49 recorded as the highest number of informants is at a productive age and this shows that people are interested in the knowledge of medicinal plants as a profession and a source of livelihood.

Data from the formal educational attainment showed that 20 (43.5%) respondents are without formal educational, 20 (43.5%) acquired primary school certificate, only 4 (8.7%), and 2 (4.4%) acquired secondary and tertiary education. This may be because ethnomedicine practices in this area are restricted to mainly acquiring knowledge through the ancestral method; it is only the uneducated folks that may be available for such knowledge transfer. This level of education of the informants may be a major disadvantage to adapting newer innovations in the studied areas.

This ancestral mode of knowledge transfer is also reflected in years of experience; only 32 (69.5%) have more experience in medicinal plant knowledge above 10 years, while 10 (21.7%)

Table 2: List of medicinal plants used in the treatment of diseases.

S. No.	Family	Botanical name	Common name	Local name Y=Yoruba, H=Hausa	Plant part	Method of preparation	Use
1.	*Solanaceae*	*Physalis angulata* L.	Cut leaf ground cherry	Ewe kuropo (wuwo)	Leaves	The leaves are squeezed freshly with water taken orally, twice a day.	Chronic pile
2.	*Boraginaceae*	*Heliotropium indicum*. L.	English combs comb, Indian heliotrope.	Ogbe akuko	Leaves	The leaves are used to prepare decoctions and it is taken orally twice a day.	Easy delivery, stomach Pain and part of baby herbs when he/she is about to walk.
3.	*Araceae*	*Caladium bicolor*. Var.	Heart of Jesus, elephant ear	Eje Jesu	Leaves	Leaves are pound with soap for bathing	Skin diseases
4.	*Caesalpiniaceae*	*Senna occidentalis* (L.)	Negro coffee	Ewe Rere	Leaves	Leaves are boiled to prepare decoction.	Chronic pile, stomach pain, it can be added to baby herb
5.	*Cucurbitaceae*	*Momordica charantia* (L.)	Bitter guard	Ejinrin	Leaves	The leave are squeezed with water, the extract is taken orally	Diarrhea
6.	*Solanaceae*	*Solanum lycopersicum* L.	Tomato	Tomati	Leaves and fruits	Leaves are squeezed with water for drinking. Fruit is used to prepare soup.	Stomach pain, freshen the skin.
7.	*Poaceae*	*Cymbopogon citratus* DC.	Lemon grass	Ewe tea	Leaves	The leaves are boiled singly or with other leaves to be taken orally.	Malaria fever
8.	*Euphorbiaceae*	*Jatropha curcas* L.	physic nut	Ewe lapalapa (iyalode) fun fun	Sap	Get the sap from the tree in a teaspoon and drink or use wet the cotton bud with the sap to scrub the tongue.	Cough
9.	*Nyctaginaceae*	*Boehaavia diffusa L.nom. cons*	Hogweed	Ewe etinponla	Leaves	The leaves are boiled to prepare decoction for baby to drink. 1 teaspoon daily. It can be combined with other leaves.	Flush baby system (Rebo faces).
10.	*Crassulaceae*	*Kalanchoe pinnata (Lam.) pers.*	Africa never die/leaf of life	Ewe abamoda	Leaves	Leaves are boiled in combination with *Vernonia amygdalina* and *Ocimum gratissimum* to be taken orally.	Human immuno deficiency virus
11.	*Euphorbiaceae*	*Jatropha gossypifolia* L.	Bellyache bush	lapalapa (pupa)	Fruits	The fruits are burnt with *Aframomum melegueta* (alligator pepper) and pour into palm kernel oil applied topically.	Navel disease

(*Contd...*)

Table 2: *(Continued)*

S. No.	Family	Botanical name	Common name	Local name Y=Yoruba, H=Hausa	Plant part	Method of preparation	Use
12.	*Euphorbiaceae*	*Jatropha multifida Linn.*	Coral bush	Ewe ogege	Sap	The sap with tom-tom, bitter kola and white alum grand them together and poured into palm oil taken orally.	Cough
13.	*Bignoniaceae*	*Kigelia africana* (lam.)	Sausage tree	Ewe pandoro	Leaves	The leaves are robbed on the palm, extract is applied topically into the eye	Clear dirt in the eye
14.	*Solanaceae*	*Nicotiana tabacum* L.	Tobacco	Ewe taba	Leaves	Tobacco leaves with *Allium cepa and Parquetina nigrescens* leave are boiled together to prepare decoction, it is taken orally and for bathing.	Ebola
15.	*Apocynaceae*	*Parquetina nigrescens* (Afezl)	African Parquetina	Ewe ogbo	Leaves	The leaves are squeezed with little water and milk is added to be taken orally.	Blood supply
16.	*Asteraceae*	*Ageratum conyzoides* L.	Goat weed, Chickweed	Ewe imi esu	Leaves	The fresh leaves are being squeezed with water and it is taken orally. Leaves with salt and little water are squeezed and taking orally in the morning and evening.	Chronic pile Diabetes
17.	*Talinaceae*	*Talinum triangulare* (jacq.)	Water leaf	Ewe gure	Leaves	Fresh leaves are squeezed with water after then little honey is added and the mixture is taken orally.	Ulcer
18.	*Lamiaceae*	*Ocimum gratissimum* L.	Mint	Ewe efinrin nla	Leaves	The leaves are used to prepare assorted pepper soup, also the fresh leaves can be squeezed, and it can be applied directly on skin	Prevent blood parasite and skin disease
19.	*Fabaceae*	*Abrus precatorius* L.	Rosary pea	Ewe omisinmisin	Leaves	Fresh leaves are squeezed and then mixed with honey, and it is taken orally.	Cough
20.	*Asteraceae*	*Vernonia amygdalina Delile.*	Bitter leaf	Ewe ewuro	Leaves	Fresh leaves are squeezed, add to palm wine, and it is applied topically on the body. 2.The fresh leaves are squeezed with water and taken orally	1.Measles 2.Stomach pain 3.Skin disease

(*Contd...*)

Table 2: *(Continued)*

S. No.	Family	Botanical name	Common name	Local name Y=Yoruba, H=Hausa	Plant part	Method of preparation	Use
21.	*Fabaceae*	*Senna alata (L.) Roxb*	Ringworm plant	Ajarere, Asuwon oyinbo	Leaves	In a male, cut the leave into pieces and allow to dry, ground it with potash, take the powdery form with pap. In female, dry bark of bitter kola is added. 2.Plant leaves and alligator are burnt, and it is added into palm oil. Applied on the topically.	1. Gonorrhea 2. Convulsion
22.	*Meliaceae*	*Azadirachta indica*	Neem tree	Dogoyaro	Leaves, barks, and roots	The leaves are boiled with water to make decoction, twice daily.	Fever
23.	*Amaryllidaceae*	*Crinum jagus*	St. Christopher's Lilly	Ogede odo	Leave	The leaves are boiled and taken 3 times daily.	Convulsion
24.	*Menispermaceae*	*Chasmanthera dependens* Hoechst.	Chasma thera	Ewe ato	Leave	The fresh leaves are pounded and mixed with shell butter applied topically to the affected area.	Fracture
25.	*Phyllanthaceae*	*Bridelia ferruginea* Benth		Epo ira	Bark	The bark of the tree is boiled to prepare decoction.	Anemia and treat hemoparasite.
26.	*Anacardiaceae*	*Spondia mombin*	Hog plum	Ewe iyeye	Leave	Decoction	Fever, baby navel diseases.
27.	*Combretaceae*	*Anogeissus schimperi*	Axle wood, giant fern	Epo ayin	Bark	The bark is dried with that *Allium ascalonicum Aframomum melegueta* grinded together with little salt to form powdery and it is taken with water.	Skin diseases
28.	*Rutaceae*	*Citrus lemon*	Lime	Ewe orombo	Leave	The fresh leave of citrus lemon can be boiled together with coconut fiber, aqueous fermented maize water is combined to prepare decoction to be taken twice daily.	Typhoid fever
29.	*Irvingiaceae*	*Irvingia gabonensis*	Wild mango	Epo opon	Bark	The dry bark soaked in water, takes one teaspoon daily.	Cure weigh loss in baby
30.	*Meliaceae*	*Pseudocedrela kotschy*	Dry zone cedar	Epo emigbegiri	Bark	The dry bark is boiled with water to prepare decoction. Adult, full stainless cup. Children, half a cup.	Pile

(*Contd...*)

Table 2: *(Continued)*

S. No.	Family	Botanical name	Common name	Local name Y=Yoruba, H=Hausa	Plant part	Method of preparation	Use
31.	*Rubiaceae*	*Morinda lucida* Benth	Brimstone tree	Ewe Oruwo	Leave	The fresh leaves in combination with *Chasmanthera dependens* and *Lawsomia inermis* are boiled to prepare decoction.	Typhoid Fever and chronic pile
32.	*Malvaceae*	*Abelmoschus esculentus*	Okra	Ila/ilasa	Leave and fruit	The leaves of *Abelmoschus* are grinded together with *Morinda lucida* leaves to make soup.	Infertility and improve iron deficiency.
33.	*Araceae*	*Xanthosoma sagittifolium*	Tannia	Koko	Seed	The crop serves as food, also contain iron	Weak bone
34.	*Meliaceae*	*Azadirachta indica*	Neem tree	Dogoyaro/ cassia	Leaves root.	The bark and the leaves of *Azadirachta* can be boiled with water to prepare decoction. Root soaked in gin.	Malaria, chewing stick
35.	*Malvaceae*	*Theobroma cacao*	Cocoa	Koko	Leave	The leaves are boiled for a few minutes with water. It is taken orally.	Anaemia
36.	*Myrtaceae*	*Psidium guajava L.*	Guava	Gova	Leave	The leaves are boiled with water to make decoction	Fever, diabetes and losing weight
37.	*Rubiaceae*	*Nauclea latifolia*	African peach	Ogbesi	Leaves barks and root	The leaves and bark with the root can be boiled with water, the decoction is taken orally.	Hemoparasite effect and yellow fever
38.	*Combretaceae*	*Teminalis glabrescens*	wandering jew	Igi idi	Root	The roots are added with the root of *Nauclea latifolia* and *Hymenocardia acida* and it is soaked in a container with water.	Fever
39.	*Rutaceae*	*Citrus lemon*	Lime	Osan wewe	Fruits	The fruit juice is extracted, and the bark is dried and grinded with potash, charcoal and black soap with the juice to make "aporo". 1 teaspoon a day. Apply to wound topically.	Cough. Constipation. Wound such as snake or scorpion bite.
40.	*Asteraceae*	*Chromolaena odorata*	Siam weed, and baby bush.	Akintola (Awolowo)	Leaves	The fresh leaves are tweezed and applied on wound.	Stop bleeding.

(*Contd...*)

Table 2: *(Continued)*

S. No.	Family	Botanical name	Common name	Local name Y=Yoruba, H=Hausa	Plant part	Method of preparation	Use
41.	*Zingiberaceae*	*Aframomum melegueta*	Alligator pepper	Ata re	Seeds	The seeds are grinded together with Tabaco leaves, *Aframomum melegueta*. Pour into a container with gin. Drink small cup once daily	Laryngitis and tooth ache.
42.	*Musaceae*	*Musa nana*	Banana	Ogede wewe	bark and fruit	The fresh bark is boiled with water to prepare decoction. One full cup is taken in the morning and evening.	Diabetes.
43.	*Arecaceae*	*Elaeis guineesis*	Palm kernel tree	Igi ope	Bark	The bark of *Elaeis guineesis* together with bark of *Ceiba pentandra* to prepare decoction.	Human immunodeficiency virus diseases.
44.	*Caricaceae*	*Carica papaya*	Pawpaw	Ibepe	Bark	The bark of *Carica papaya* in combination with bark of *Mangifera indica and Azadirachta indica* are boiled together with water and then taken morning and night.	Yellow fever typhoid. Diabetes
45.	*Cucurbitaceae*	*Citrullus colocynthis*	Bitter apple, bitter cucumber	Egusi bara	Fruit	The seed is kept in the bottle with potash and then soaked inside water for 2 days and it is taking 1 cup every day.	Gonorrhea
46.	*Arecaceae*	*Elaeis guineesis*	Palm kernel	Ekuro	Nut	Oil is gotten from the kernel and is being applied on the person head	Head aches
47.	*Apocynaceae*	*Calotropis procera*	Giant milk weed	Ewe bomubomu	Leave	The leave of *Calotropis procera* and that of tobacco are cut into pieces and it is soaked inside container containing alcohol.	Asthma
48.	*Meliaceae*	*Khaya grandifoliola*	African mahogany	Epo oganwo	Bark	The bark of the tree is peeled and boiled together with *Mangifera indica, Azadirachta indica* both leaves and root to prepare decoction which is taken orally for 5 days. Morning and night.	Typhoid fever

(*Contd...*)

Table 2: *(Continued)*

S. No.	Family	Botanical name	Common name	Local name Y=Yoruba, H=Hausa	Plant part	Method of preparation	Use
49.	*Myrtaceae*	*Psidium quajava*	Guava	Guofa	Leaves	The leave is boiled together with unripe *Carica papaya*. 1 full cup once daily	Reduce fat
50.	*Musaceae*	*Musa paradisiaca*	Plantain-banana fruit	Ogede oyinbo	Root	The root is grinded and added to black soap. Add topically.	Cure hemoparasite.
51.	*Lythraceae*	*Lawsomia inermis*	Heena leaves	Laali	Root	The root is peeled and washed; it is pounded with black soap	1.Rob 2.Pimple 3.Skin disease
52.	*Moraceae*	*Ficus exasperata*	Fig tree	Opoto	Bark	The bark is wash and boiled together with citrus lemon and unripe *ananas comosus* to prepare decoction	Reduced blood in the system
53.	*Phyllanthaceae*	*Hymenocardia acida*	French digbe	Ewe orupa	Leave	The leaves are dried, and it serve as food	Malaria and hypertension
54.	*Combretaceae*	*Anogeissus leiocarpa*	African birch, Bambara	Igi ayin	Bark	The dry bark is boiled with small potash.	Hemoparasite
55.	*Annonaceae*	*Enantia chlorantha*	African yellow wood	Dokita Igbo	Leave	The dry leaves are grinded into powdery form soaked with 7 up in a container. Small glass cup to be taken every day	Typhoid in children.
56.	*Anacardiaceae*	*Mangifera indica*	Mango	Mongoro	Bark	The fresh bark is peeled and dried. It is grinded to powdery form, soak. The supernatant is removed, sediment is collected and mixed with milk.	Typhoid fever
57.	*Rubiaceae*	*Borreria verticillata*	Girdle pod	Ewe irawo ile	Leave	The leaves are squeezed and applied on the affected area.	Skin disease like eczema.
58.	*Malvaceae*	*Gossypium arboretum*	Cotton leaf	Ewe owu	Leaves	The leaves are squeezed with lime, and it is taken orally in small quantity	Fever
59.	*Malvaceae*	*Corchorus olitorius*	Jute plant	Ewe abiwere (ewedu)	Whole plant	The whole plant is squeezed with water, given to a pregnant woman to drink.	Easy delivery
60.	*Fabaceae*	*Senna alata (L.) Roxb*	Ringworm plant	Ewe Ajarere	Leaves	The leaves with black pepper burnt together. Add palm oil and it is taken orally with small teaspoon.	Reduce baby body temperature
61.	*Chenopodiaceae*	*Chenopodium ambrosioides*	Mexican tea	Ewe casin	Leaves	Decoction	Head problem (Oka ori omode)

(*Contd...*)

Table 2: *(Continued)*

S. No.	Family	Botanical name	Common name	Local name Y=Yoruba, H=Hausa	Plant part	Method of preparation	Use
62.	*Cucurbitaceae*	*Telfairia occidentalis*	Pumpkin	Ewe ugu	Leaves	The leaves are squeezed and then milk is added to the mixture, and it is taken orally.	Blood supply
63.	*Liliaceae*	*Allium ascalonicum*	Shalt spring	Alubosa elewe	Leave	The leave is grinded with and applied topically	Romantism

Table 3: Showing medicinal part frequency.

Medicinal part	Frequency	Percentage (%)
Leaves	40	63.5
Bark	11	17.5
Root	3	4.8
Fruit	3	4.8
Seed	2	3.2
Sap	2	3.2
Whole plant	1	1.6
Nut	1	1.6

have experience within 5 years and 4 (8.7%) are <1 year of experience.

A majority of the informants, 45 (97.8%), were members of the Yoruba tribe, which dominates these five locations, while 1 (2.2%) were Fulani.

The leaf is the most common plant part used (69.5%), followed by bark (17.5%), fruit (4.8%), root (4.8%), seed (3.2%), sap (3.2%), whole plant (1.6%), and nut (1.6%). This is because the plant leaves are a store of many phytochemicals which may be biologically active as seen in Table 3 and Figure 2. Furthermore, the leaves form an important ingredient in the traditional treatment of various diseases, as it features as a component in many herbal preparations. Other researchers agree with these findings.[14,15]

It is important to note that some of the plant species were used to treat more than one ailment; for example, *Senna occidentalis* is effective against piles and stomach pain, *Ocimum gratissimum* may be effective against hemoparasite and skin diseases, while *Vernonia amygdalina* is effective against measles, stomach pain, and skin diseases. Furthermore, *Bridelia ferruginea* was recorded to be used in the treatment of typhoid fever and chronic pile as seen in Table 2.

Decoction and infusion are the most common methods of preparation, similar to the work of Ogundajo *et al.*[16] Our findings revealed that the practitioners may prescribe a

Figure 1: The map of Nigeria showing Kwara State as the red colored inset.

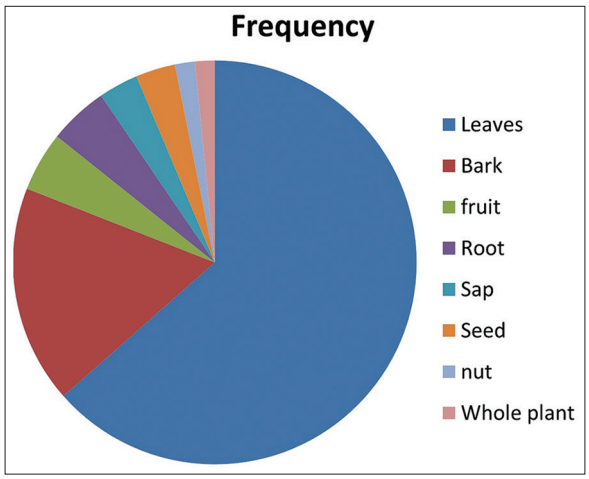

Figure 2: Medicinal plants parts used by the informants.

plant or combination of plants in the treatment of diseases. Examples include the use of *Kalanchoe pinnata* (Lam) pers with *V. amygdalina* and *O. gratissimum* (Mint) to prepare decoction for the treatment of human immune deficiency virus. Furthermore, *Psidium guajava* leaves were boiled together with *Carica papaya* which was used to make decoction for treatment of obesity. The fruits of *Jatropha gossypifolia* L. can be burnt together with alligator pepper and poured into

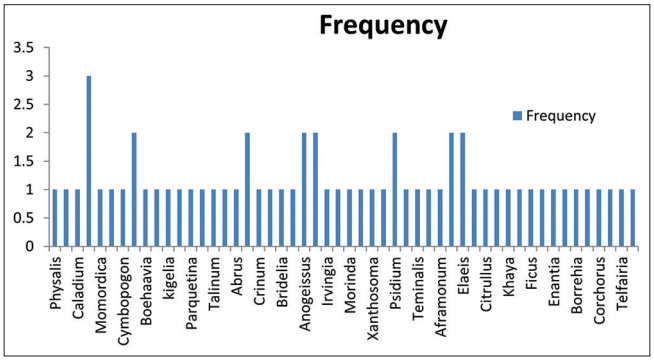

Figure 3: The genera of the identified medicinal plants.

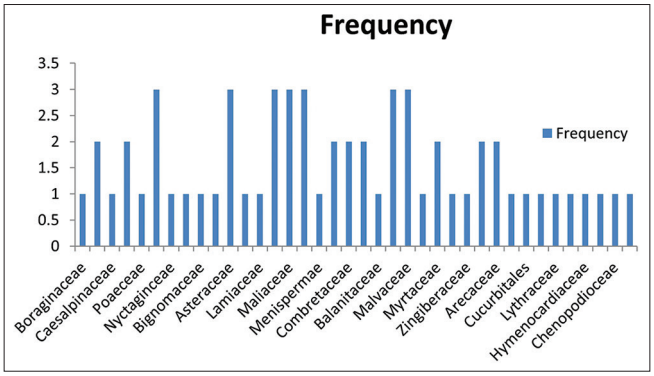

Figure 4: The families of the medicinal plant and their frequency.

palm kernel oil to be applied topically for the treatment of navel diseases. The bark of *C. papaya* in combination with the bark of *Mangifera indica* and *Azadirachta indica* is boiled to make decoction for the treatment of diabetes, typhoid, and yellow fever. These combinations of different plants need more research validation. There is a need for research on the pharmacological and toxicological importance of the combined effect of these medicinal plants.

In treating ailments such as fever, wound, malaria, gonorrhea, asthma, diabetes, measles, and many other diseases, this survey shows that people in these six locations in Ilorin which are Iporin, Oke-Oyi, Gaa-Asibi, Ilota, Ogidi, and Adewole rely on plants that are boiled, ground into a powdery form, burnt, soak in alcohol or water, palm wine, and ground with black soap. They also take these drugs topically; furthermore, taking them with pap, make pastry of the plant materials, and taking as soup, especially those that serve as food for man, such as vegetables. Traditional solvents used include shear butter, honey, palm wine and fermented maize water with sugar, palm kernel oil, and salt.

Some of the plants listed here have been accorded similar use by other people around the world. *V. amygdalina* is used in Uganda[17] and Rwanda[18] for treatment of malaria and diabetes. In Tanzania, *A. indica* is employed as repellent in combating Anopheles mosquitoes causing malaria.[19] Various research carried out on *Telfairia occidentalis* supported its use as blood tonic.[20] In addition, the flowers are used as cosmetic in Iran to improve complexion and medicinally for chest pain.[21] The oily seeds are also believed to have lactating properties and as such are in demand by women with young babies.[21] Moreover, the plant has also been reported for its antioxidative and free radical scavenging properties.[16] Both *J. gossypifolia* and *Jatropha curcas* are recognized in India and Tropical America as having purgative activities.[22]

CONCLUSION

Medicinal plants still play an important role in the management of ailments. This study has revealed important information on medicinal plants used by the people for therapeutic purposes in Kwara state in North Central Nigeria. It also demonstrates the key role that medicinal plants play in the primary health care of these people. Fifty-five plant species belonging to 40 families were used to treat a wide range of ailments, including reproductive system disease, musculoskeletal disorder, skin infection, gastrointestinal disturbances, ulcers, headaches, and infant diseases. This study also showed that the people of Kwara State have advanced knowledge of ethnomedicinal plant practices and rely on them for the treatment of their health conditions.

Authors contributions

The project work was conceptualized and supervised by LAA and the survey work and data analysis were carried out by OA.

Ethical approval

The Institutional Review Board approval is not required as this is a cross-sectional study.

Declaration of patient consent

Patient's consent was not required as there are no patients in this study.

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Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the

writing or editing of the manuscript and no images were manipulated using AI.

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