



RESEARCH ARTICLE

Ethnobotanical inventory and medicinal applications of plants traded in Northern Nigeria

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Abstract

Plants possessing medical properties have emerged as a prominent avenue for exploration, garnering increasing acceptance and acknowledgment at the global level. Documenting medicinal plants will contribute to the development of more potent, harmless medications. Kaduna State is the heartland of Nigeria's northern region because of its cultural diversity and consistency. There is no documentation available for medicinal plants sold in the major traditional markets called Kasuwan Monday, Kawo market, and Kasuwan Magani market. The current study intends to investigate the medicinal plants marketed in a local market in Kaduna state using an extensive questionnaire as a guide the research findings unveiled a total of 51 medicinal plant taxa, which fell under 27 distinct families. Fabaceae (21.57%) has the highest number of recorded species, followed by Anacardiaceae (9.8%), Asteraceae and Myrtaceae (7.8% each). Leaves are the most employed component of plants, accounting for 36.73%. The present study found a significant understanding of traditional medicine and its utilization for the treatment of various ailments through the extraction of plant-based substances by the local people.

Keywords

fabaceae; kaduna; leaves; Nigeria traditional

Introduction

Medical and therapeutic usage of plants is practically universal across cultures and can be traced back to the earliest records of human history (1). Diversity in human populations, linguistic traditions, and cultural practices, as well as geographically distinct ecosystems, all contribute to traditional medicine's wealth of novel plant applications and specialized understanding (2). Traditional cultures revere medicinal plants because of their efficacy in treating a wide range of illnesses (3, 4).

These plants have shaped local medical knowledge systems, which have been documented from a variety of perspectives going back to antiquity, with some scholars praising the empirical knowledge while others have denigrated or even demonized its use (3). Based on the report of the World Health Organization (WHO), ca. 80 percent of individuals residing in underdeveloped nations primarily rely on traditional medicine as a means

of addressing their health concerns (5). The reliance on therapeutic cures derived from plants holds significant significance in underdeveloped nations, where the presence of modern medicine is sometimes lacking or financially inaccessible (6, 7). Those who live in rural or forest areas where medicinal plants thrive may rely heavily on them, both for their traditional medicinal uses and as a valuable commodity to transport to metropolitan centers where they are not readily available for purchase (8). The economic depreciation experienced by emerging nations increases pharmaceutical prices, hence making medicinal herbs and traditional medicine comparatively more appealing. Moreover, several individuals exhibit a preference for traditional medicine due to factors such as familiarity, adherence to cultural customs, and a perceived sense of safety.

Ethnobotanical studies regularly produce new information that greatly expands on what was previously known about the many plant species utilized as traditional medicine (1). Even though many unexplored plants have been introduced from other new localities and integrated into our traditional medical systems, new data show that medicinal plants that have been used for at least six centuries are still employed in the present (3). Local markets serve as the primary trading centers for products and services, as well as sources of medicinal plants for both traditional medicine practitioners and local people. These markets act as a concentration and dissemination point for empirical knowledge about plant resources, which aids in the preservation of local knowledge about medicinal plants (9). The local markets offer a glimpse into the plant biodiversity present in each location (10). Market surveys have become an essential component in comprehending the supply and demand dynamics of medicinal plants, playing a crucial role in identifying species that necessitate prioritized resource management strategies (11). Market surveys are an effective means of

gathering data about the consumption patterns and conservation status of medicinal plant species within a certain geographic area (10). At some point in time, ethnobotanical studies of a certain community are essential for conservational studies.

Despite the advancements in modern medicine observed in developing countries, including Nigeria, there remains a continued reliance on traditional herbal medicine for the treatment of various ailments (8). Documenting medicinal plants will contribute to the development of more potent, harmless medications. Kaduna is considered Nigeria's heartland because of its cultural diversity and consistency. Even though Kaduna State is in northern Nigeria's core. There is no documentation available for medicinal plants sold in the major traditional markets called Kasuwan Monday, Kawo Market, and Kasuwan Magani. The current study intends to investigate the medicinal plants marketed in a local market in Kaduna State, Nigeria.

Materials and Methods

Study area

The study was carried out in Kaduna State, located in Nigeria, and coordinates 10° 35" N longitudes and 7° 19" E latitudes. The vegetation found in the study area is known to be the Sudan savannah, primarily comprised of tropical plants and grasses that are sparsely distributed throughout the area. Kaduna State is home to around 59 to 63 different ethnic groups, with the Hausa, Fulani, and Yaroba being the most prevalent. In Kaduna, the dry season is hot and partly cloudy, and the rainy season is hot, humid, and cloudy. The average annual temperature is between 28 to 30 °C respectively. The population comprises individuals from diverse international backgrounds, including civil servants, merchants, traders, and farmers (Figure 1).

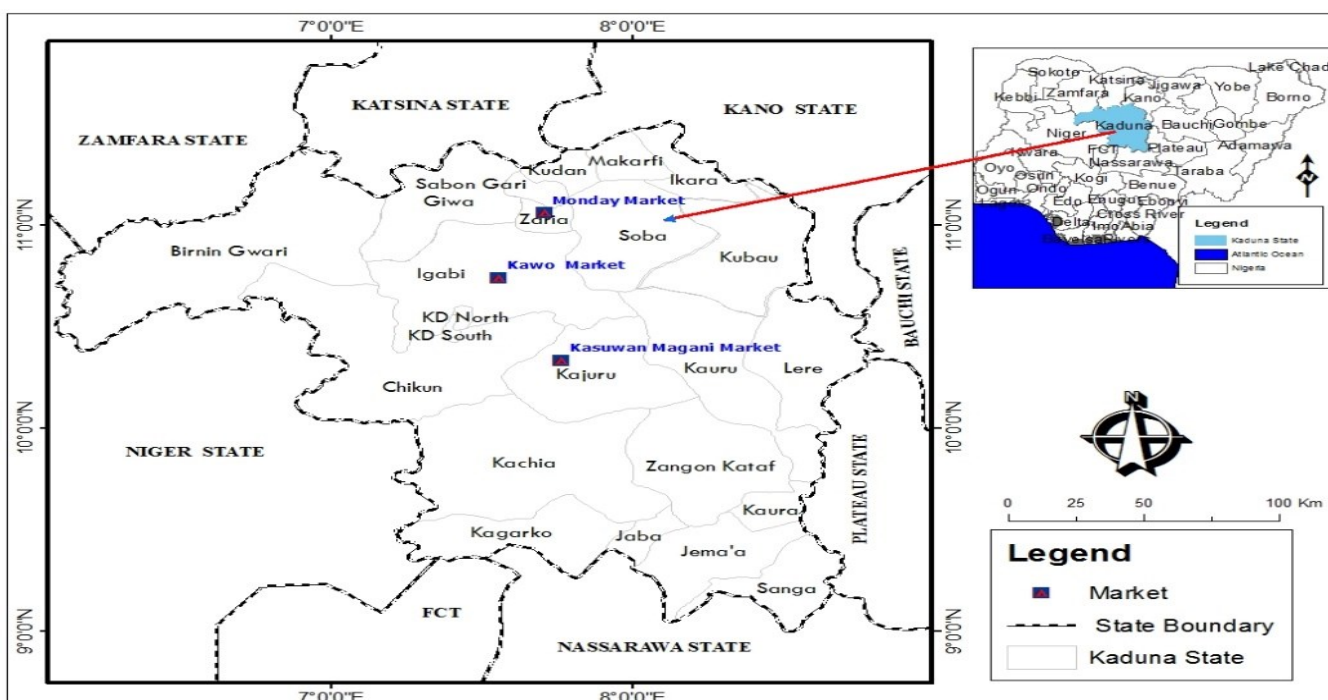


Fig. 1 Study Area with Sampling Locations

Sampling method and data collection

In Kaduna State, there are three (3) primary marketplaces where traditional medicinal herbs are sold: *Kasuwan Monday*, *Kawo Market*, and *Kasuwan Magani Market*. Before conducting research in the market, the market leathers were told about the nature, scope, and purpose of the study and gave their informed consent. Following disclosure of the research's goal, all participants were advised of their rights to deny participation or to participate willingly through an informed consent process. Only after receiving the participants' prior informed consent (PIC), interviews were conducted. The expert sampling method was employed in this study. A situation where only participants with prior knowledge of the use of medicinal plants were interviewed (12). Using an extensive questionnaire as a guide, the interview was done in the native languages. The study was carried out from June 2022 to June 2023 (Dry windy season and the Rainy (wet) Seasons).

Collection of Plants and Specimen Deposition in Herbarium

The plant species documented during the interview were manually gathered in the field using the participants as assistants. Avoidance was given to plants whose local names varied. A certified botanist (Usman Shitu) from the Department of Botany at Ahmadu Bello University (ABU) in Zaria, Kaduna State, Nigeria, identified the plant specimens that were gathered. The plant species that were identified were subsequently archived in the herbarium of the department. Species names were validated from the World Flora Online (WFO) <https://www.worldfloraonline.org/>.

Analysis of data

Based on the following details, the study used a straightforward descriptive analysis to ascertain the frequencies and percentages of the ethnobotanical data that were gathered:

1. The socio demographic data of the participants.
2. Information on plant names, growth form, preparation of drug, and mode of administration.
3. These indices served as the basis for the computation of quantitative data.
 - a. The popularity of medicinal plant species was assessed by employing the relative frequency of citation (RFC) metric (13, 14).

RFC is calculated as follows: F_c/N , where N is the total number of respondents questioned and F_c is the number of persons who mentioned a specific plant species (15, 16).

Results and Discussion

Demographics Profile of the Respondents

The present exploration study was conducted through interviews with a sample size of 112 informants. Of these, 59.8% (67) identified as male, while the remaining 40.2% (45) identified as female (Table 1). In the African context,

the field of traditional medicine is predominantly male-dominated (13, 14). In this study, the informants that were predominantly questioned had an average age range of 25-35, constituting 33% (37) of the total sample size (Table 1). This was closely followed by 36-45, accounting for 31.3% (35) of the sample. Conversely, the age group with the lowest representation among the interviewed informants was 56-65, comprising only 9.8% (11) of the total (Table 1). A possible reason for the least representation of the old people was that they were not in their active stages, and many of them were not willing to participate in the study. because they believed it was high time for the younger generation to take over. The age distribution among individuals in Northern Nigeria is indicative of the level of knowledge possessed by the population regarding traditional herbal medicine. Those between the ages of 25-45 predominate because, being in the prime of their lives, they can devote more time, energy, and attention to the project, particularly in the field. Of the informant population, 40.2% (45) did not receive any kind of Western education, while 27.7% (31) only received primary, 17.9% (20) received secondary, and just 14.3% received post-level education (Diploma and Degree) (Table 1). Previous research in Nigeria has also found similar results (2, 5). The informant claimed that their parents had taught them about traditional medicine.

Table 1 Demographics profile of the respondents

Biodata	Frequency	Percentage (%)
Sex		
Male	67	59.8
Female	45	40.2
Age		
25-35	37	33
36-45	35	31.3
46-55	12	10.7
56-65	11	9.8
66->	17	15.2
Education		
None	45	40.2
Primary	31	27.7
Secondary	20	17.9
Tertiary	16	14.3

Plant identification and diversity

The research findings unveiled a total of 51 species of medicinal plants, which were categorized into 27 distinct families (Figure 2). To prevent any misidentification, specimens sharing a common local name were deliberately excluded from the collection process. The prevalence of plant families in the flora was determined as follows: Fabaceae (21.6%), Anacardiaceae (9.8%), Asteraceae and Myrtaceae (7.8%), Combretaceae (5.9%), Burseraceae and Euphorbiaceae (4 % each), with the remaining families each accounting for (2 %). The region encompasses three distinct categories of valuable flora,

namely trees, shrubs, and herbs (Table 2). Despite the adverse impacts of the decline in traditional cultural practices, natural resource depletion, and global climate change, the study reveals that the region exhibits a significant abundance of diverse wild plant species. The Fabaceae family is widely recognized for its remarkable diversity and several benefits in the realm of plant biology. They are cultivated in both aquatic and terrestrial environments. There have already been reports on the high proposal of medicinal species in the Fabaceae family. More species are known to exist in the Fabaceae family than in any other plant family in the world (15). The utilization of quantitative ethnobotany enhances the likelihood of identifying plants within a community that possess pharmacologically relevant properties. Relative frequency citations can serve as a reliable measure for assessing the utility and efficacy of plant species within a certain ecological community (17-19). All 51 medicinal plants that were reported were determined to be popular, as seen in Table 3. Plants possessing an RFC rating of 0.9 exhibit the highest level of popularity. This suggests that this species is the most well-known plant in the area because almost every informant has mentioned it. Additionally, these species have the widest range of applications due to their greatest value.

The findings of the manuscripts should be presented with appropriate evidence in a single heading or may be presented in separate headings depending on the requirement and need of the author(s). Results and discussion can also be given together under the heading 'Results and Discussion' (Table 1).

Plant part-wise Use

Leaves are the most employed component of plants, accounting for 36.73% of usage. Following leaves, the bark is utilized to a lesser extent, accounting for 17.35% of usage. Conversely, the parts of plants that are least utilized in therapy are gum and rhizome, each accounting for 1.020% of usage, respectively (Figure 3). The understanding of the metabolic properties of these plants among healers is limited. Traditional healers commonly employ various sections of plants in their practice, despite their little understanding of the specific constituents present in these plant parts. According to the literature search, the plant's leaves were most used in Africa and other regions of the world (2, 20-23). The reason leaves are utilized may also have to do with the fact that they are more readily available and numerous in nature than other plant parts. Furthermore, because secondary metabolites are mostly created before being transferred to other regions of the plant, they were previously reported to be more effective (20).

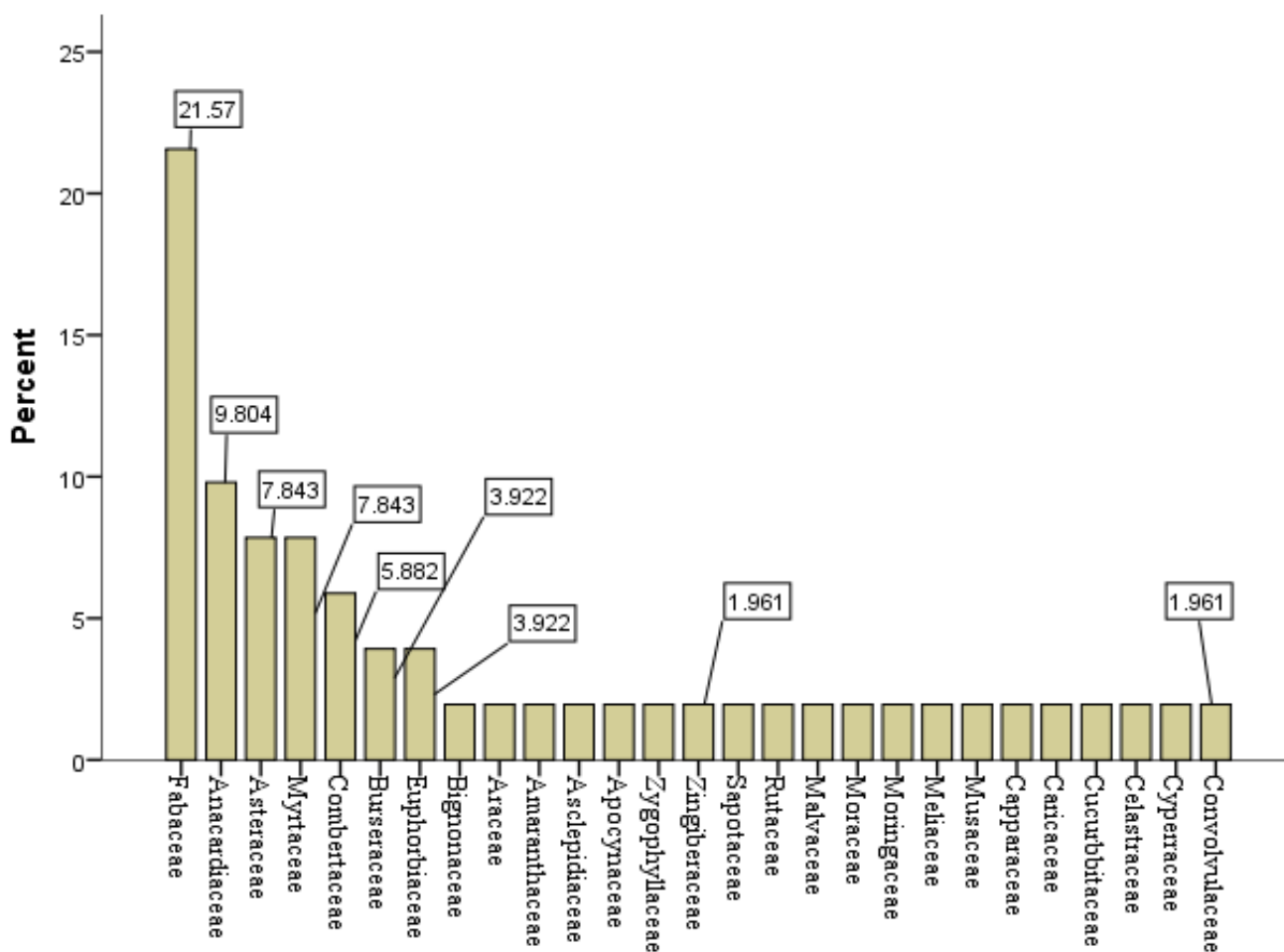


Figure 2: Family distribution of the documented medicinal plants

Table 2: List of species, botanical names, local names, parts used, medicinal uses, and mode of administration.

Family	Botanical name(s)	Local name(s)	Part(s) used	Medicinal uses	Mode of administration
Anacardiaceae	<i>Spondias mombin</i> L.	Kirfi, tsadarmasar	Bark, roots, leaves, flowers, fruits.	Stomach ache, yellow fever, cholera, skin disease	Oral (Drink once daily). Apply dermal for the skin infection.
	<i>Mangifera Indica</i> L.	Mangworo	Leaves	Fever, conjunctivitis of the eye, pile	Oral (Once in 3 days) For the conjunctivitis of the eye birthing with the extract daily.
	<i>Semecarpus anacardium</i> L.f.	Yazawa	Bark, roots, leaves, flowers, fruits.	Stomach ache, yellow fever, cholera, skin disease	Oral (Eaten the raw fruit, all other parts are taken orally once a week)
	<i>Anacardium occidentale</i> L.	Yazawa	Bark, leaves	Stomach ache, malaria, toothache, gum problems, diarrhea, Pile	Oral (Drink three times a day, right after meals)
	<i>Lannea acida</i> A.Rich.	Faru	Leaves	Pile, diarrhea, pain relief, inflammation	Oral (Powdered are mixed in yogurt and consumed in the night)
Asteraceae	<i>Centaurea senegalensis</i> DC	Badayi, dayi	Fruit, root, seeds	Tumors, corns, thickened skin	Dermal (Wash body with the extract twice daily)
	<i>Acanthospermum hispidum</i> DC.	Yawo	Whole plant	Hepatitis, jaundice, skin diseases, ulcer	Oral (Make a decoction from the leaves, drink it, and apply the powder to your body).
	<i>Gymnanthemum amygdalinum</i> (Delile) Sch.Bip.	Shuwaka	Leaves	Dry throat, cough, appetizer, postpartum	Oral (Squeeze the extract from the leaves and make 3 drops in the mouth)
Apocynaceae	<i>Vernoniastrum ambiguum</i> (Kotschy & Peyr.) H.Rob.	Tattaba	Whole plant	Malaria, diabetes, fever	Oral (Twice daily)
	<i>Anisopus manni</i> N.E.Br.	Sakayau	Whole plant	Diabetes, ease of labor, malaria, wound healing	Oral (Take extract daily before meal)
Asclepiadiaceae	<i>Calotropis procera</i> (Aiton) Dryand.	Tumfafiya	Leaves	Antiseptic, malaria, diabetes, toothache	Oral (Take extract from leaves decoction, once a week)
Amaranthaceae	<i>Amaranthus tricolor</i> L.	Alaiyahu	Leaves	Nourishment of the body	Oral (Steamed and eaten daily)
Araceae	<i>Anchomanes difformis</i> (Blume) Engl.	Hantsargada	Root	Breast milk improvement	Oral (mix a teaspoon of the powdered form in yogurt and drink once)
Burseraceae	<i>Commiphora hildebrandtii</i> Engl.	Dashi	Leaves	General wellbeing, wound healing, pain reliever, stomach wellbeing	Oral, dermal(once daily and for the wound healing applying the powdered form on the affected area)
Bignoniaceae	<i>Boswellia dalzielii</i> Hutch.	Arrarrabi	Leaves, roots, bark	Children's improvement, malaria, stomach ache, diarrhea, pile	Oral (Mixed teaspoon daily in <i>kunu</i> and take in the morning)
	<i>Newbouldia laevis</i> (P.Beauv.) Seem.	Aduruku	Leaves	High fever and pneumonia	Oral (daily twice morning and evening)
Combretaceae	<i>Combretum pisoniiflorum</i> (Klotzsch) Engl.	Gogendamo, Wuyandamo	Leaves, stem and root	Toothache, diarrhoea, fever	Oral (Mixed the powdered with yogurt, for the toothache, apply the poultice on the affected area)
	<i>Combretum collinum</i> Fresen.	Talauniya, kattakara	Fruit, root, seeds,	Cancer, tumors, corns, thickened skin	Dermal (Birthing daily)
	<i>Terminalia leiocarpa</i> (DC.) Baill.	Marke	Bark	Fever, Dry throat, cough, postpartum	Oral (Teaspoon mixed in honey once daily)

Convolvulaceae	<i>Ipomoea asarifolia</i> Roem. &Schult.	Damunkada	Whole plant	Fever Dry throat, cough, postpartum, diabetes	Oral (Boiled and drink the extract once in a day)
Cyperaceae	<i>Cyperus articulatus</i> L.	Kajiji	Root	Cough, cold, general wellbeing	Oral (boiled to take as tea with or without sugar)
Celastraceae	<i>Gymnosporia senegalensis</i> Loes.	Madachi	Roots, flowers, leaves, fruits, stem bark	Abdominal pain, intestinal worms, bacterial and fungal infection	Oral (Take the extract once in a week)
Cucurbitaceae	<i>Citrullus lanatus</i> (Thunb.) Matsum. &Nakai	Agushi	Leaves	Constipation	Oral (Teaspoon mixed in honey once daily)
Caricaceae	<i>Carica papaya</i> L.	Gwanda	Leaves	Malaria, typhoid	Oral (Take the extract twice in a week)
Capparaceae	<i>Crateva adansonii</i> DC.	Ungududu	Leaves	hepatitis	Oral (Teaspoon mixed in honey twice daily)
Euphorbiaceae	<i>Jatropha curcas</i> L.	Bindazugu, zurman	Leaves, fruits	Yellow fever, skin disease, pain relief, postpartum	Dermal (Birthing daily)
	<i>Euphorbia balsamifera</i> Aiton	Aliyara	Leaves	hepatitis	Oral (Teaspoon mixed in honey and taken for one week)
	<i>Senna occidentalis</i> L.	Fararalbasa	Leaves	Convulsion and hypertension	Oral (Boiled and eat the leaves)
	<i>Vachellia sieberiana</i> (DC.) Kyal. &Boatwr.	Kaya	Leaves	Cough	Oral (Tablespoon of extract twice daily, just after eating)
	<i>Detarium microcarpum</i> Guill. & Perr.	Taura	Bark	Pile	Dermal (Boiled and make a sitz bath)
	<i>Parkia timoriana</i> (DC.) Merr.	Dorawa	Bark	Stomachache, fever, typhoid	Oral (Teaspoon mixed in honey once daily)
	<i>Vachellia nilotica</i> (L.) P.J.H.Hurter&Mabb.	Bagaruwa	Seeds	Womenswellbeing, Malaria, hepatitis	Oral (Take the extract twice a week), dermal (Boiled and make a sitz bath)
Fabaceae	<i>Prosopis africana</i> (Guill. & Perr.) Taub.	Kirya	Bark	Malaria	Oral (Take the extract twice a week)
	<i>Senna singueana</i> (Delile) Lock	Runhu	Bark, roots, leaves, flowers, fruits.	Stomach ache, yellow fever, cholera, skin disease	Oral (Take the extract twice/daily and for the skin diseases birthing twice daily)
	<i>Piliostigma thonningii</i> (Schumacher.) Milne-Redh.	Kalgo	Leaves, bark	stomach pain	Oral (Mixed half of a teaspoon in holy water (Zam-zam) and take daily)
	<i>Senna alata</i> (L.) Roxb.	Zali	Leaves, roots	Body pain and fever	Dermal (Birthing daily with the extract)
	<i>Senna siamea</i> (Lam.) H.S.Irwin&Barneby	Labadiya	Leaves, bark stem	Pain relief, anxiety, bacterial infection, malaria	Oral (Mixed tea <i>kunu</i> and taken daily)
	<i>Tamarindus indica</i> L.	Tsamiya	Leaves, gum, stem	Cough, diarrhea	Oral (Boiled and take the extract daily)

	<i>Eucalyptus camaldulensis</i> Dehnh.	Turare, sandal	Bark, leaves, stem, roots.	Stomach ache, malaria, fever,	Oral (Boiled and take the extract daily)
	<i>Psidium guajava</i> L.	Gwaiba	Bark, stem, leaves.	Inflammation, general wellbeing, cancer, malaria	Oral (Take the extract twice in a week)
Myrtaceae	<i>Corymbia citriodora</i> (Hook.) K.D.Hill&L.A.S.Johnson	Turare	Leaves	Catarrh and fever	Oral (Boiled and take the extract daily)
	<i>Melaleuca comosa</i> A.R.Bean	Danli	Leaves	Cough and catarrh	Oral (steaming with the boiled extract twice daily)
Musaceae	<i>Musa paradisiaca</i> L.	Ayaba	Leaves, fruits	Yellow fever, aphrodisiac	Oral (Boil the leaves and take daily, for aphrodisiac take the fruit daily)
Meliaceae	<i>Azadirachta indica</i> A.Juss.	Dogonyaro, bedi, delbejiya	Leaves, fruits	Yellow fever, postpartum, general well-being, skin infection	Dermal (Boiled and birthing with the extract daily twice)
Moringaceae	<i>Moringa oleifera</i> L.	Zogale	Leaves, seeds	Blood pressure and diabetics	Oral (Boiled and take the extract daily)
Moraceae	<i>Ficus sycomorus</i> L.	Baure	Leaves, bark	Ringworm	Oral (Mixed half a teaspoon in a yogurt and take with an empty stomach)
Malvaceae	<i>Adansonia digitata</i> L.	Kuka	Leaves	Diarrhea, cancer,	Oral, dermal (take as vegetables thrice a week and bathing every with the extract)
Rutaceae	<i>Citrus limon</i> (L.) Osbeck	Limuntsami	Fruits, leaves, bark	Scurvy, cold, flu, malaria, bacterial and fungal infection	Oral (Chew the leaves five times a day for five minutes)
Sapotaceae	<i>Vitellaria paradoxa</i> C.F.Gaertn.	Kadanya	Bark, leaves, root	Stomach ache, wound healing	Oral, dermal (Take the extract daily while for wound healing mix the powdered with honey and apply on the infected area)
Zingiberaceae	<i>Zingiber officinale</i> Roscoe	Citta	Rhizome	Cough, cold, general well-being	Oral (Boiled and taken as part of a tea without sugar).
Zygophyllaceae	<i>Balanites aegyptiaca</i> (L.) Delile	Aduwa	Leaves, fruits	Stomach ache, malaria	Oral (Boiled and take the leaves da

Diagnosis, Treatment, and Dosage

The traditional herbalist diagnosed patients presenting with symptoms such as bodily weakness, diarrhea, yellowing of the eyes and certain body parts, and changes in urine color. These observations were reported by the responders, along with other accompanying symptoms. The administration of the recipe primarily involves oral ingestion. The recommended dosage of the recipe is to be administered thrice daily, following a meal. Occasionally, it is combined with honey, milk, or a regional delicacy known as *kohkoh*. The participants often instructed their patients to consume a teacup's worth of the prescribed recipe. The participants did not indicate a specified duration for discontinuing the use of the recipe till all symptoms have resolved. The participant was queried regarding their practice of referring patients to hospitals for the management of complex medical conditions. In response, they indicated that they provide treatment for a wide range of disorders. Additionally, it was said that the respondents were unable to provide information regarding the daily caseload they handled, as indicated in the survey.

Toxicity

The participants interviewed in the current study that all the identified species showed no adverse effects following intake. The patient has not reported any cases of toxicity or complication to them. However, it is widely held among

the researchers that there may exist certain plant materials with hazardous properties that have not been included in the current study.

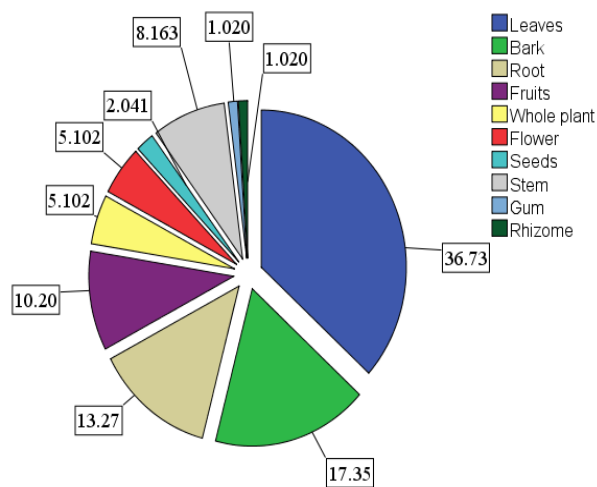


Figure 3. Parts of the plants used for the management of the documented Diseases.

Table 3: Voucher and Relative Frequency Citations (RFC).

S/N	Botanical name(s)	Voucher number	FC	RFC
1	<i>Spondias mombin</i> L.	ABU090015	101	0.9
2	<i>Mangifera indica</i> L.	ABU05881	81	0.7
3	<i>Semecarpus anacardium</i> L.f.	ABU02003	101	0.9
4	<i>Anacardium occidentale</i> L.	ABU090151	81	0.7
5	<i>Lannea acida</i> A.Rich.	ABU06311	81	0.7
6	<i>Centaurea senegalensis</i> DC	ABU084311	70	0.6
7	<i>Acanthospermum hispidum</i> DC.	ABU0772	70	0.6
8	<i>Gymnanthemum amygdalinum</i> (Delile) Sch.Bip.	ABU06841	81	0.7
9	<i>Vernoniastrum ambiguum</i> (Kotschy & Peyr.) H.Rob.	ABU090104	81	0.7
10	<i>Anisopus mannii</i> N.E.Br.	ABU03001	70	0.6
11	<i>Calotropis procera</i> (Aiton) Dryand.	ABU08014	81	0.7
12	<i>Amaranthus tricolor</i> L.	ABU06061	70	0.6
13	<i>Anchomanes difformis</i> (Blume) Engl.	ABU07321	70	0.6
14	<i>Commiphora hildebrandtii</i> Engl.	ABU07603	70	0.6
15	<i>Boswellia dalzielii</i> Hutch.	ABU05541	81	0.7
16	<i>Newbouldia laevis</i> (P.Beauv.) Seem.	ABU06045	70	0.6
17	<i>Combretum pisoniiflorum</i> (Klotzsch) Engl.	ABU05107	70	0.6
18	<i>Combretum collinum</i> Fresen.	ABU01645	70	0.6
19	<i>Terminalia leiocarpa</i> (DC.) Baill.	ABU09004	81	0.7
20	<i>Ipomoea asarifolia</i> Roem. &Schult.	ABU09028	70	0.6
21	<i>Cyperus articulatus</i> L.	ABU07661	70	0.6
22	<i>Gymnosporia senegalensis</i> Loes.	ABU01438	81	0.7
23	<i>Citrullus lanatus</i> (Thunb.) Matsum. &Nakai	ABU040061	81	0.7
24	<i>Carica papaya</i> L.	ABU090622	101	0.9
25	<i>Crateva adansonii</i> DC.	ABU08231	70	0.6
26	<i>Jatropha curcas</i> L.	ABU04511	101	0.9
27	<i>Euphorbia balsamifera</i> Aiton	ABU09881	81	0.7
28	<i>Senna occidentalis</i> L.	ABU08410	81	0.7
29	<i>Vachellia sieberiana</i> (DC.) Kyal. &Boatwr.	ABU020081	101	0.9
30	<i>Detarium microcarpum</i> Guill. & Perr.	ABU09045	101	0.9
31	<i>Parkia timoriana</i> (DC.) Merr.	ABU04231	70	0.6
32	<i>Vachellia nilotica</i> (L.) P.J.H.Hurter&Mabb.	ABU02338	81	0.7
33	<i>Prosopis africana</i> (Guill. & Perr.) Taub.	ABU07745	81	0.7
34	<i>Senna singueana</i> (Delile) Lock	ABU0557	70	0.6
35	<i>Piliostigma thonningii</i> (Schumach.) Milne-Redh.	ABU090062	70	0.6
36	<i>Senna alata</i> (L.)Roxb.	ABU080245	70	0.6
37	<i>Senna siamea</i> (Lam.) H.S.Irwin&Barneby	ABU05623	101	0.9
38	<i>Tamarindus indica</i> L.	ABU090021	81	0.7
39	<i>Eucalyptus camaldulensis</i> Dehnh.	ABU09861	101	0.9
40	<i>Psidium guajava</i> L	ABU063668	70	0.6

41	<i>Corymbia citriodora</i> (Hook.) K.D.Hill&L.A.S.Johnson	ABU09775	81	0.7
42	<i>Melaleuca comosa</i> A.R.Bean	ABU086671	70	0.6
43	<i>Musa paradisiaca</i> L.	ABU013302	81	0,7
44	<i>Azadirachta indica</i> A.Juss.	ABU08001	70	0.6
45	<i>Moringa oleifera</i> L.	ABU04451	70	0.6
46	<i>Ficus sycomorus</i> L.	ABU060031	81	0.7
47	<i>Adansonia digitata</i> L.	ABU09028	101	0.9
48	<i>Citrus limon</i> (L.) Osbeck	ABU090241	70	0.6
49	<i>Vitellaria paradoxa</i> C.F.Gaertn.	ABU09668	70	0.6
50	<i>Zingiber officinale</i> Roscoe	ABU04568	81	0.7
51	<i>Balanites aegyptiaca</i> (L.) Delile	ABU09084	81	0.7

Conclusion

The study found that individuals residing in the Northern region of Nigeria, specifically in Kaduna state, possess a significant understanding of traditional medicine and its utilization for the treatment of various ailments through the extraction of plant-based substances. Additionally, it has been seen that elderly individuals serve as custodians of knowledge in conjunction with the process of deforestation for urbanization. Hence, it is imperative to comprehensively record all pertinent data about traditional medicinal knowledge to individually address diverse diseases. In Nigeria, many autonomous communities are unexplored. Elderly individuals in Nigeria serve as the guardians of traditional knowledge. The validation of the described plants has the utmost importance in facilitating subsequent scientific exploration into the medicinal effectiveness of these plants. The conservation of biodiversity in Northern Nigeria is anticipated to be facilitated through the evaluation of phytochemical contents in the leaf component. The study is expected to provide a platform for the establishment of a comprehensive database on medicinal plants in Nigeria. Documenting traditional knowledge helps communities, future generations, and scientific studies into how it might be used to treat different diseases. Traditional information about medicinal plants holds a lot of promise for research and the creation of new medicines to treat illnesses. More scientific study needs to be done on these drugs, such as phytochemical, biological, pre-clinical, and clinical research.

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Authors' contributions

AMD and SWH drafted and analyzed the manuscript, AAM and SN field data collection, YU, SW. B and TKA make corrections and proofread the final version.

Compliance with ethical standards

Conflict of interest: Authors do not have any conflict of interest to declare.

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