



## **Assessments of Medicinal Plants Used in Treatment of Various Ailments in Kano City, Nigeria**

**M. Ali<sup>1\*</sup>, S. U. Diso<sup>2</sup>, A. A. Minjibir<sup>2</sup>, J. A. Sani<sup>2</sup>, F. S. Nas<sup>3</sup> and A. Yahaya<sup>4</sup>**

<sup>1</sup>Department of Microbiology, Kano University of Science and Technology, Wudil Kano, Nigeria.

<sup>2</sup>Department of Pharmaceutical Technology, School of Technology, Kano, Nigeria.

<sup>3</sup>Department of Biological Science, Bayero University, Kano, Nigeria.

<sup>4</sup>Department of Biology, Kano University of Science and Technology, Wudil Kano, Nigeria.

### **Authors' contributions**

*This work was carried out in collaboration between all authors. Authors MA, SUD, AAM and JAS designed the study. Author JAS and FSN wrote the protocol and first draft of the manuscript. All the authors participated in the field survey and management of the study. Author MA managed the literature searches. All authors read and approved the final manuscript.*

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### **ABSTRACT**

**Aim:** The aim of this research is to conduct an Ethno botanical assessments of medicinal plants used in the treatment of various ailments in Kano metropolis, Nigeria

**Methodology:** A systematic survey of medicinal plants, used in the treatment of different diseases in Kano metropolis involving 66 participants (30 herbalists, 18 old people with knowledge of traditional medicine, 6 Botanists and 12 traditional medicine users) was conducted from February 2016 to August 2016 using simple structured questionnaire.

**Results:** The result revealed that 79 different plant species belonging to 48 plant families are used for curing various ailments in Kano metropolis. The most frequently used herbs are from the families used as medicinal plant in Kano Metropolis according to this study includes Fabaceae, Moraceae, Combretaceae, Rubiceae and Anacardiaceae. The ailments mostly mentioned in the application of these medicinal plants/preparations included; pile, typhoid fever, pains, cancers,

\*Corresponding author: E-mail: [alimuhd4real@gmail.com](mailto:alimuhd4real@gmail.com);

cough/colds, rheumatism, diabetes and sexual dysfunction. The study of habits & habitats of the materials collection showed that 52% of the medicinal plant species are trees and mostly found in the wild (62%). The survey also revealed that the leaves are the major parts used for herbal preparation accounted for 45%. The main methods of preparation are mostly decoction with occasional administrations of infusions & pounded plant parts.

**Conclusion:** Plants continue to provide a source of hope for novel drug compounds as they have made large contributions to human health and well-being.

**Keywords:** Ethno botanical survey; medicinal plants; Kano; ailment.

## 1. INTRODUCTION

Since ancient times, plants have been indispensable sources of both preventive and curative traditional medicine preparations for human beings and livestock. Historical accounts of traditional medicine depict that different plants were used as early as 5000 - 4000 BC in China and 1600 BC by Syrians, Babylonians, Hebrews and Egyptians [1]. Considerable indigenous knowledge system, from the earliest times, is linked to the use of traditional medicine in different countries [2]. According to the World Health Organization (WHO) approximately 80% of the world's population relies on traditional medicine to fulfill their daily health needs [3]. Sofowora [4] reported that about 60-85% of the population in every country of the developing world has to rely on traditional medicine. The practice of traditional medicine is widespread in China, India, Japan, Pakistan, Sri Lanka and Thailand. In china, about 40% of the total medicinal consumption is attributed to traditional tribal medicines [5].

In Nigeria, traditional medicine is well acknowledged and established as a viable therapeutic alternative [6], and almost all plants seem to have some kind of application in traditional medicine [7]. Searches for substances with antimicrobial activity in plants are frequent, due to their popular use as remedies for many infectious diseases [8]. Plants are rich in different types of secondary metabolites, such as tannins, terpenoids, alkaloids, and flavonoids, which have been found *in vitro* to have antimicrobial properties [9][10].

Consequently, the development of drug resistance in human pathogens against commonly used antibiotics has necessitated a search for new antimicrobial substances from other sources including plants [11]. Today, it is estimated that relatively 50% Western drugs have plant materials [12]. Traditional medical practitioners in Nigeria use herbal preparations to

treat microbial infections such as typhoid and para-typhoid infections and they claimed that the primary benefit of using plant derived medicines is relatively safer than synthetic alternatives, offering profound therapeutic benefits and more affordable treatments.

Several workers have conducted ethnobotanical surveys among various tribes of the African continent and some other parts of the world [13] in search of plants with antibacterial, antiviral and antifungal properties. The medicinal values of these plants lie in some chemical substances which produce a definite physiological action on the human body [11]. Ethno botanical surveys are important in order to understand the social-cultural and economic factors influencing ideas and actions concerning health and illness and to get information on type of diseases and health problems prevalent among the people of a particular locality. Such studies, as suggested by Lawal *et al.* [14], may help to provide the basic health care services needed to improve health challenges of the rural population. The potentials of the plants are far from being tapped. The aim of this survey is to document some herbal species used in the treatment of various ailment in Kano metropolis.

## 2. MATERIALS AND METHODS

### 2.1 Study Area

Kano State is a state located in North-Western Nigeria and the largest State of the Nigerian Federation, Created on May 27, 1967 from part of the Northern Region. Kano state is bordered by Katsina state to the North-West, Jigawa state to the north-east, Bauchi state to the south-east and Kaduna state to the south-west. Kano is located on 12° N and 8°30'E. It has a total area of 20,131 km<sup>2</sup>. The urban area covers 137km<sup>2</sup> and comprises of six LGAs - Kano municipal, Fagge, Dala, Gwale, Tarauni and Nassarawa with population of 2,163,25 as at 2006 [15]. Climate of the study areas have been described

as 'AW' type as identified by Koppen's climatic classification [16]. The vegetation is a Savanna type simply described as closed grass or other predominantly herbaceous vegetation with scattered or widely spaced woody plants. Vegetation types in the state are the northern Guinea savanna and Sudan savanna. Northern Guinea Savanna is open woodland with grasses shorter than in the southern guinea where grasses are 1.5 to 3m tall. The Sudan Savanna has scattered trees in open grassland with grasses under 1.2m tall. The vegetation has been largely cleared for cultivation to form cultivated parkland. Parkland has scattered protected trees at some distance apart in open cultivated land [16].

## 2.2 Population and Sampling Procedure

The study is a survey research in which a total of 66 participants (30 herbalists, 18 old people with knowledge of traditional medicine, 6 Botanist and 12 tradition medicine users) in six local governments (Kano municipal, Fagge, Dala, Gwale, Tarauni and Nassarawa) that makes up the metropolitan Kano were used. Using the purposive technique, 5 herbalists, 3 old people, 1 botanists and 2 traditional medicine users were selected from each Local Government as

respondents. The herbalists were identified during drug sales in some markets in the study area.

## 2.3 Data Collection Procedure

The survey was conducted from February 2016 to August 2016 covering 6 six local governments (Kano municipal, Fagge, Dala, Gwale, Tarauni and Nassarawa) that makes up Kano metropolis. A semi-structured questionnaire is used for data collection. Enquired items include; Indigenous names of herbal medicinal, medicinal use, part of plant used, location from where plants were collected, and method of preparation of the herbal medicine.

## 2.4 Data Analysis

A checklist of all recorded species of medicinal value was compiled, including scientific names, medicinal uses, the place of occurrence & wild or cultivated'. Methods of preparation & modes of administration are also recorded according to the information collected. Data was also presented in terms of the methods of preparation and administration to patients All the lists generated by the different key informants were presented inform of a table.

**Table 1. Herbal selling points from the study area and number of respondents**

Local Government	Herbal Selling Point	Herbalist	Botanist	Aged people	Herb users
Kano Municipal	Kurmi Market	5	1	3	2
Fagge	Fagge Social Welfare	5	1	3	2
Tarauni	Tarauni Central Market	5	1	3	2
Dala	Kukar idaw, Gwammaja	5	1	3	2
Gwale	Mandawari	5	1	3	2
Nassarawa	Gama Market	5	1	3	2
<b>Total</b>		<b>30</b>	<b>6</b>	<b>18</b>	<b>12</b>





**Plate 1. Some traditional medicine selling points in Kano Metropolis**

### **3. RESULTS**

The results of survey of medicinal plants used in the treatment of various ailments in Kano metropolis are presented in Table 2. Total of 79 species belonging to 48 different families were reported.

Table 3 the medicinal purpose, methods of preparation and plant parts used, were presented in Table 3. Leaves are the most common part used for medicinal purpose according to the study.

### **4. DISCUSSION**

The revival of interest in the use and importance of African medicinal plants by many developing countries has led to intensified efforts on the documentation of ethno medicinal data of medicinal plants, since most traditional healers keep scanty records and their information is passed on, mainly verbally, from generation to generation [17]. Although traditional medicines are highly recognized and commonly used both in the rural and urban communities in Nigeria, the

accurate knowledge of these plants and their medicinal properties are known mostly by traditional medicine sellers and only by few individuals in the community especially aged people, Botanists and medicinal plant users. Plants are more easily recognized by their local names in every part of the world. These local names play a vital role in ethno botanical study of a specific tribe or region [18]. In the present study, respondents interviewed gave local names of plants in recipes for treating particular disease(s). Information gathered showed that increasing number of people is turning to herbal remedies for prevention and cure of various diseases.

In this study, Seventy-nine (79) plants from 48 different families were recorded as medicinal plants used in treatment of various illnesses within Kano metropolis. The most mentioned families include: Fabaceae (10 members), Moraceae (5 members), Combretaceae, Rubiceae and Anacardiaceae (4 members each), Amaryllidaceae, Myrtaceae and Caesalpinioidea (3 members each). All plant forms such as trees, shrubs and herbs

represented the medicinal plant species mentioned in this study. Trees were found to be the most used plants which accounted for 52 % followed by herbs 33 % and shrubs accounted for 15 %. Some of the plants revealed in the survey have been cited in the ethno botanical survey of some African countries [19]. The continuous search for natural plant products for use as medicines is encouraged by ethno botanical survey; Igoli *et al.* [20] recognized ethno botanical survey as one of the major approaches for selecting plants for pharmacological screening.

The plant parts mostly used in this study are the leaves with 36 frequencies followed by stem bark and roots with 21 and 12 frequencies respectively. The use of whole plant has 4

entries; fruits had 6 frequencies while seeds and flower had 3 and 1 frequencies each. Therefore, the plant leaves are important ingredient in traditional treatment of various ailments in Kano Metropolis as it is the component that featured most in many herbal preparations which were in agreement with Adekunle [21] and Abdulsalami [22]. The result of this study revealed that administering decoction is the most frequent method, which accounted for over 52% of the methods used. This is followed by infusion and pounding which accounted for 15% and 8% respectively. Pile, Malaria, typhoid fever, pains, cancers, cough/colds, rheumatism, diabetes and sexual dysfunction are the ailments for which the surveyed medicinal plants are used for in the study area.

**Table 2. Botanical, common, local, family and sources of the medicinal plants used in Kano metropolis**

Botanical name	Common name	Local name	Family name	Source
<i>Acacia nilotica</i>	Gum Arabic	Bagaruwa	Fabaceae	Wild
<i>Acacia sebiiana</i>	Paper back acasia	Farar kaya	Fabaceae	Wild
<i>Acacia senegalensis</i>	Gum acacia	Dakwara	Fabaceae	Wild
<i>Adansonia digitata</i>	Baobab	Kuka	Malvaceae	Wild
<i>Allium cepa</i>	Onion	Albasa	Amaryllidaceae	Cultivated
<i>Allium sativa</i>	Gallic	Tafarnuwa	Amaryllidaceae	Cultivated
<i>Anacardium occidentale</i>	Cashew	Kashu	Anacardiaceae	Cultivated
<i>Ananas comosus</i>	Pineapple	Abarba	Bromeliaceae	Cultivated
<i>Annona senegalensis</i>	Custard apple	Gwandar daji	Annonaceae	Wild
<i>Anogeisus leocarpus</i>	Axle wood tree	Marke	Combrataceae	Wild
<i>Artemesia annua</i>	Sweet annie	Tagargade	Arteraceae	Cultivated
<i>Azadirachta indica</i>	Neem	Dogonyaro	Meliaceae	Wild/ cultivated
<i>Balanites aegyptica</i>	Desert date	Aduwa	Balanitaceae	Wild
<i>Boerhavia diffusa</i>	Spreading hog weed	Gadon maciji	Nyetaginaceae	Wild
<i>Boswellia dalzielii</i>	Frankincense tree	Hararrabi	Burseraceae	Wild
<i>Calotropis procera</i>	Sodom apple	Tumfafiya	Asclepidaceae	Wild
<i>Carica papaya</i>	Pawpaw	Gwanda	Caricaceae	Cultivated
<i>Cassia albida</i>	Cassia tree	Gawo	Fabaceae	Wild
<i>Cassia fistula</i>	Golden rain tree	Fulasko	Fabaceae	Wild
<i>Cassia siamea</i>	Kassod tree	Dorawar turawa	Ceasalphinoideae	Wild
<i>Catunaregam nilotica</i>	-	Kwanarya	Rubiaceae	Wild
<i>Ceiba pentendra</i>	Silk cotton	Rimi	Malvaceae	Wild
<i>Citrallus lanatus</i>	Water melon	Kankana	Curcubitaceae	Cultivated
<i>Citrus aurantifolia</i>	Lime	Lemon tsami	Rutaceae	Cultivated
<i>Commiphora Africana</i>	Corkword	Dashi	Burseraceae	Wild
<i>Crinum jagus</i>	Harmattan lily	Gadeli	Amaryllidaceae	Wild
<i>Cymbopogan citrates</i>	Lemon grass	Ciyawar lemon	Poaceae	Cultivated
<i>Cyperus articulate</i>	Jointed flat sedge	Kajiji	Cyperaceae	Wild
<i>Detarium microcarpum</i>	Tallow tree	Taura	Fabaceae	Wild
<i>Diospyros mispiliformis</i>	African ebony	Kanya	Ebenaceae	Wild

<b>Botanical name</b>	<b>Common name</b>	<b>Local name</b>	<b>Family name</b>	<b>Source</b>
<i>Dodonaea viscosa</i>	Hop bush	Fil fil	Sapindaceae	Wild/ Cultivat
<i>Erythrina senegalesis</i>	Senegal coral tree	Minjirya	Papilionoidea	Wild
<i>Eucalyptus camadulensis</i>	River red gum	Turare	Myrtaceae	Wild/ Cultivat.
<i>Fiscus congensis</i>	-	Baure	Moraceae	Wild
<i>Fiscus iteophylla</i>	-	Shirinya	Moraceae	Wild
<i>Fiscus platyphylla</i>	Flake rubber tree	Gamji	Moraceae	Wild
<i>Fiscus thoningii</i>	Strangler fig	Chediya	Moraceae	Wild
<i>Garcinia kola</i>	Bitter kola	Namijin goro	Clusiaceae	Cultivated
<i>Gardenia aqualla</i>	-	Gaude	Rubiaceae	Wild
<i>Gossypium hirsutum</i>	Cotton plant	Auduga	Malvacea	Cultivated
<i>Guiera senegalensis</i>	Guiera	Sabara	Combrataceae	Wild
<i>Gynandropsis gynandra</i>	Cat's whiskers	Gasaya	Cleomaceae	Wild
<i>Hibiscus sabradifa</i>	Roselle	Zobo	Malvaceae	Cultivated
<i>Hyphaena thebaica</i>	Doum palm	Coruba	Aracaceae	Wild
<i>Jatropha curcas</i>	Physics nut	Binidazugu	Euphorbiaceae	Wild
<i>Khaya senegalensis</i>	Mahogany	Madaci	Meliaceae	Wild/ Cultivat.
<i>Leptadenia hastate</i>	Tears	Yadiya	Apocynaceae	Wild
<i>Lowsonia inermis</i>	Henna plant	Lalle	Lythraceae	Wild
<i>Mangifera indica</i>	Mango tree	Mangwaro	Anacardiaceae	Cultivated
<i>Mentha piperita</i>	Pepper mint	Na'a na'a	Lamiaceae	Cultivated
<i>Mitracarpus hiartus</i>	Girdle pod	Goga masu	Rubiaceae	Wild
<i>Momardica balsamina</i>	Balsam apple	Garahuni	Curcubitaceae	Wild
<i>Moringa oleifera</i>	Moringa	Zogale	Moringaceae	Cultivated
<i>Nauclea diderrichii</i>	Box wood	Tafashiya	Rubiaceae	Wild
<i>Nigella satila</i>	Black cumin	Bakin algarif	Ranunculaceae	Cultivated
<i>Ocimum gratissimum</i>	Tea bush	Doddoya	Lamiaceae	Cultivated
<i>Olea eupopeen</i>	Olive tree	Zaitun	Oleaceae	Cultivated
<i>Parkia biglobosa</i>	African locust bean	Dorawa	Fabaceae	Wild
<i>Piliotigma thonningii</i>	Monkey bread	Kalgo	Caesalphinoideae	Wild
<i>Pistia stratiotes</i>	Water cabbage	Kainuwa	Araceae	Wild
<i>Piper nigrum</i>	Black pepper	masoro	Piperaceae	Cultivated
<i>Plumeria rubra</i>	Temple tree		Apocynaceae	Wild
<i>Psidium guajava</i>	Guava	Goba	Myrtaceae	Cultivated
<i>Proposis Africana</i>	Iron tree	Kirya	Fabaceae	Wild
<i>Sclerocarya birrea</i>	Marula	Danya	Anacardiaceae	Wild
<i>Securidaca longependulata</i>	Violet tree	Sanya	Polygalaceae	Wild
<i>Sienna obtusifolia</i>	Sickle pod	Tafasa	Fabaceae	Wild/ cultivat
<i>Senna occidentalis</i>	Negro coffee	Rai dore	Caesalphinoideae	Wild/ Cultivat.
<i>Senna singuena</i>	Wild cassia	Runhu	Fabaceae	Wild
<i>Sorghum bicolor</i>	Guinea corn	Dawa	Poaceae	Cultivated
<i>Strychnos spinosa</i>	Monkey orange	Kokiya	Loganiaceae	Wild
<i>Syzygium aromaticum</i>	Clove	kanumfari	Myrtaceae	Cultivated
<i>Terminalia avicennioides</i>	Black limba	Baushe	Combrataceae	Wild
<i>Vernonia amygdalina</i>	Bitter leaf	Shuwaka	Asteraceae	Cultivated
<i>Vitex doniana</i>	Black plum	Dinya	Verbaceae	Wild
<i>Ximenia Americana</i>	Wild olive	Tsada	Olacaceae	Wild
<i>Zingiber officinale</i>	Ginger	Citta	Zingebareaceae	Cultivated
<i>Zizipus mauritiana</i>	Indian plum	Magarya	Rhamnaceae	Wild
<i>Zizipus mucoronata</i>	Buffalo thorn	Magaryar kura	Rhamnaceae	Wild

**Table 3. Medicinal purpose, method of preparation, habit and plant parts used for medicinal purpose**

<b>Botanical name</b>	<b>Habit</b>	<b>Part used</b>	<b>Medicinal purpose</b>	<b>Method of preparation</b>
<i>Acacia nilotica</i>	Tree	Fruit	File	Decoction
<i>Acacia sebriana</i>	Tree	Leaves/stem bark	Pain reliever and wound healing	Pounded and crushed
<i>Acacia senegalensis</i>	Tree	Stem bark	Soothes cough and sore throats	Pounded and crushed
<i>Adansonia digitata</i>	Tree	Leaves	Cancer, inflammation, cardiovascular diseases	Powder leaf eaten as soup
<i>Allium cepa</i>	Herb	Bulb	Cancer, lower cholesterol and improve immunity	Bulb taken in food as condiment
<i>Allium sativa</i>	Herb	Bulb	Cold	Bulb taken in food or orally
<i>Anacardium occidentale</i>	Tree	Leaves/stem bark	Diarrhea and thrush	Decoction
<i>Ananas comosus</i>	Shrub	Fruit	Laxative	Taken orally
<i>Annona senegalensis</i>	Shrub	Leaves/stem bark	Cancer and pile	Decoction
<i>Anogeisus leocarpus</i>	Tree	Stem bark	Pile and cough	Soak in water/infusion
<i>Artemesia annua</i>	Herb	Leaves	Yellow fever and vomiting	Infusion
<i>Azadirachta indica</i>	Tree	Leaves/stem bark	Typhoid, malaria and yellow fever	Pounded and taken orally
<i>Balanites aegyptica</i>	Tree	Fruits/leaves	Intestinal worm, leucoderma and psychiatric disorder	Decoction
<i>Boerhavia diffusa</i>	Herb	Leaves/root	Stomach ache and pain reliever	Infusion
<i>Boswellia dalzielii</i>	Tree	Stem bark	Pile and body heat	Decoction
<i>Calotropis procera</i>	Shrub	Leaves	Cancer	Pounded and apply to infected area
<i>Carica papaya</i>	Tree	Leaves	Antimicrobial and Gastrointestinal disorder	Decoction
<i>Cassia albida</i>	Tree	Stem bark	Body pain	Decoction
<i>Cassia fistula</i>	Tree	Leaves	Diarrhea, antimicrobial agent	Decoction
<i>Cassia siameae</i>	Tree	Leaves	Rheumatism	Decoction
<i>Catunaregam nilotica</i>	Tree	Root	Snake bite, Genital disorder	Applied powdered root
<i>Ceiba pentendra</i>	Tree	Leaves	Gastrointestinal disorder	Infusion
<i>Citrallus lanatus</i>	Herb	Fruit	Laxative	Fruit taken orally
<i>Citrus aurantifolia</i>	Shrub	Leaves/fruit	Cold and body rashes	Taken orally
<i>Commiphora Africana</i>	Shrub	Leaves	Malaria and ulcer	Decoction
<i>Crinum jagus</i>	Herb	Bulb	Anti-oxidant, diabetes	Bulb taken orally
<i>Cymbopogan citrates</i>	Herb	Leaves	Malaria, convulsion and anti bacterial	Decoction
<i>Cyperus articulate</i>	Herb	Root	Cold	Decoction with potash
<i>Detarium microcarpum</i>	Tree	Fruit	Pile, tuberculosis, meningitis and diarrhea	Decoction or taken orally
<i>Diospyros mispiliformis</i>	Tree	Leaves	Pile	Decoction

<b>Botanical name</b>	<b>Habit</b>	<b>Part used</b>	<b>Medicinal purpose</b>	<b>Method of preparation</b>
<i>Dodonaea viscosa</i>	Shrub	Leaves	Typhoid fever	Decoction
<i>Erythrina senegalensis</i>	Tree	Leaves/stem bark	Dysentery	Infusion or taken in pap
<i>Eucalyptus camadulensis</i>	Tree	Leaves	Fever, cold and stomach upset	Infusion
<i>Fiscus congensis</i>	Tree	Root	Arthritis	Apply to infected part
<i>Fiscus iteophylla</i>	Tree	Leaves	Blood clotting	Apply powder to infected part
<i>Fiscus platyphylla</i>	Tree	Leaves/stem bark	Malaria and convulsion	Infusion or decoction
<i>Fiscus thoningii</i>	Tree	Stem bark	Yellow fever, UTI and diarrhea	Taken orally in beverages or pap
<i>Gardenia aqualla</i>	Shrub	Leaves/root	Sedative, laxative, diabetes and liver diseases	Decoction
<i>Gossypium hirsutum</i>	Herb	Leaves	Skin problems	Decoction
<i>Guiera senegalensis</i>	Shrub	Leaves, root	Pile, body heat	Decoction
<i>Gynandropsis gynandra</i>	Herb	Leaves	Anemia and blood loss	Eaten as vegetable
<i>Hibiscus sabradifa</i>	Herb	Flower	Blood tonic and hypertension	Boil in water and taken as beverage
<i>Hyphaena thebaica</i>	Tree	Fruit	Pile and stomach upset	Decoction or eaten orally
<i>Jatropha curcas</i>	Herb	Whole plant	Body pain	Decoction
<i>Khaya senegalensis</i>	Tree	Leaves/stem bark	Pain, inflammation and diarrhea	Decoction
<i>Leptadenia hastate</i>	Herb	Root	Yellow fever	Decoction
<i>Lowsonia inermis</i>	Shrub	Root	Cancer and anti inflammatory	Boil powdered root
<i>Mangifera indica</i>	Tree	Leaves/stem bark	Malaria, typhoid, jaundice in children	Decoction
<i>Mentha piperita</i>	Herb	Leaves	Anti cancer, oxidant and anti plasmodic	Decoction
<i>Mitracarpus hiartus</i>	Herb	Whole plant	Eczema	Applied to infected part
<i>Momardica balsamina</i>	Herb	Whole plant	Fertility in women	Decoction
<i>Moringa oleifera</i>	Tree	Leaves	Blood tonic	Cooked and taken as food
<i>Nauclea diderrichii</i>	Tree	Stem bark	Ulcer	Decoction
<i>Nigella satila</i>	Herb	Seeds	Diabetes and cancer	Eating in food as condiment
<i>Ocimum gratissimum</i>	Herb	Leaves	Antibiotics, diabetes, pain killer	Decoction
<i>Olea eupopeen</i>	Shrub	Leaves/seeds	Heart and kidney diseases, arthritis	Decoction
<i>Parkia biglobosa</i>	Tree	Fruits	Dysentery	Taken orally
<i>Piliotigma thonningii</i>	Shrub	Leaves/root	Pile	Infusion with red potash
<i>Pistia stratiotes</i>	Herb	Whole plant	Mental illness	Burning in charcoal fire
<i>Piper nigrum</i>	Herb	Seeds	Constipation and anti inflammatory agent	Grounded and use as spices
<i>Plumeria rubra</i>	Tree	Leaves/flower	Fever, dysentery and pertusis	Infusion
<i>Psidium guajava</i>	Shrub	Leaves/stem bark	Dysentery and gastrointestinal disorder	Decoction



<b>Botanical name</b>	<b>Habit</b>	<b>Part used</b>	<b>Medicinal purpose</b>	<b>Method of preparation</b>
<i>Proposis Africana</i>	Tree	Stem bark	Pile and fire burn	Decoction or applied to infected part
<i>Sclerecarya birrea</i>	Tree	Leaves/stem bark	Antibacterial	Decoction
<i>Securidaca longependulata</i>	Tree	Leaves/stem/root	Burn	Applied to infected part
<i>Sienna obtusifolia</i>	Herb	Stem bark/seed	Eye disorder and conjunctivitis	Pounded
<i>Senna occidentalis</i>	Herb	Leaves	Malaria, Fever	Decoction
<i>Senna singuena</i>	Herb	Leaves	Malaria, fever and wound infection	Decoction/infusion
<i>Sorghum bicolor</i>	Grass	Leaves	Immune modulator	Decoction
<i>Strychnos spinosa</i>	Tree	Leaves/root and fruit	Snake bite, purgative, analgesic	Decoction
<i>Syzygium aromaticum</i>	Herb	Seeds	Cough and catarrh	Decoction/ used in food as spices
<i>Terminalia avicennioides</i>	Tree	Leaves	Pain killer, diarrhea, dysentery and wound	Decoction
<i>Vernonia amygdalina</i>	Herb	Leaves	Fever, typhoid fever	Cooked and eaten as soup
<i>Vitex doniana</i>	Tree	Leaves/stem bark	Gastrointestinal disorder	Infusion/decoction
<i>Ximenia Americana</i>	Tree	Leaves/ stem/root	Fever, cold, dysentery, used as laxative	Decoction
<i>Zingiber officinale</i>	Stem	Rhizomes	Cold and catarrh	Decoction/ used in food as spices
<i>Zizipus mauritiana</i>	Tree	Leaves/root	Malaria, stomach upset, spiritual problems	Decoction
<i>Zizipus mucoronata</i>	Tree	Stem bark/root	Pain killer, respiratory ailment	Pounded/decoction

Out of the 79 plants recorded, 49 plants are wild, from gardens and farms while 6 from both wild and gardens. This result is in conformity with the study of Muhammad et al. [16](2015) who found that 72% of the medicinal plants used in Kano metropolis are sourced from wild. In a study conducted on medicinal plants by Mesfin *et al.* [23], it is found that 58% of all medicinal species in Ethiopia are sourced from the wild while only 6.4% are cultivated.

## 5. CONCLUSION

The present study has established a data bank for some medicinal plants that are used in the management of various ailments in Kano Metropolis. The results of the study revealed that there is high diversity of medicinal plants and traditional knowledge about the use, preparation, and application, which is still maintained among local people of metropolitan Kano. It has found that 79 Species of plants covering 48 families are available as medicinal plants used in Kano metropolis. According to this study the most mentioned plant families used in Kano Metropolis include Fabaceae, Moraceae, Combrataceae, Rubiceae and Anacardiaceae. Pile, Malaria, typhoid fever, pains, cancers, cough/colds, rheumatism, diabetes and sexual dysfunction are the ailments for which the surveyed medicinal plants are used for in the study area.

From this survey it is now known that the plant parts mostly used for herbal preparations found in Kano Metropolis are the leaves, stem bark, and roots in that order followed by whole plants and fruits and least seeds and flower. Therefore, based on the present study, plants continue to provide a source of hope for novel drug compounds as they have made large contributions to human health and well-being. It is recommended that further research on the screening of the secondary metabolites of these medicinal plants for biological and pharmacological studies will be necessary as well as the isolation of active compounds and their structural elucidation for the maximal use of the medicinal plants.

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## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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