Potentials medicinal plants used in the treatment of Covid-19 symptoms

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Abstract

Plants still form the bases of traditional medicine system and that plant-based systems continue to play an essential role in healthcare for over 80% of the world population. An ethnomedicinal survey was conducted to document the use of medicinal plants in the treatment of COVID-19 symptoms in the Northern-Senatorial district of Kano. Information was generated from 26-traditional medicine practitioners, 50 herb sellers and 20-elderly people. The information collected were divided based on the symptoms treated by the medicinal plants. A total of 36-plant species belonging to 22 families were reported to be used in the treatment of COVID-19 symptoms. Plants from Poaceae, Myrtaceae Liliaceae, Lamiaceae and Combretaceae family had the highest number of species being used in the symptoms treatment. Leaves were reported to be the most frequent plant part used followed by bark, corn, bulb, whole plant and rhizomes. The survey revealed that the most prominent method of preparation used are decoction and infusion. Traditional medicine encourage prevention of symptoms and enhanced self-immunity against host of infections, hence the survey had documented information on medicinal plants, method of their prepations by the native people, traditional practitioners, herbalist of North-Senatorial district Kano, for treatment of COVID-19 symptoms.

Keywords: Medicinal Plants, COVID-19 Symptoms, Indigenous knowledge, Food as Medicine and Survey.

Introduction

All over the world, different cultures have evolved different forms of indigenous healing methods that are captured under the broad concept of TM. Well known examples include the Indian Ayurveda[1,2] the Arabian

Unani[3] the traditional Chinese Medicine[4] (TCM) and African Traditional medicine[5] (ATM). In remote settlements of developing countries, traditional medicine is still the first line of contact for diseases management and treatment. Many of these countries, have now become aware of the value of the biodiversity within their borders and have developed systems for exploration as well as preservation[6]. Prior to the introduction of the cosmopolitan medicine, TM used to be the dominant medical system available to millions of people in Africa in both rural and urban communities. Indeed, it was the only source of medical care for a greater proportion of the population[7]. There are strong indications that traditional health care systems are still in use by the majority of the people not only in Africa but across the world.

Although traditional medicine could involve different practices depending on culture, it has been extensively documented that plants still form the bases of traditional medicine system[8,9] and that plant-based systems continue to play an essential role in healthcare for over 80% of the world population[10]. Modern medicine has benefited enormously from plants used in traditional medicine as sources of natural products[11,12,13] .Some of the earliest drugs successfully developed from plant include Digitoxin, the principal cardiac glycoside constituent of foxglove (*Digitalis purpurea*. L), Reserpine, from *Rauwolfia serpentina.* Benth, used as antihypertensive drugs. Other drugs that were introduced into western medicine include cardioactive glycoside Ouoabain, and its aglycone Strophanthidin[13], from *Strophanthus gratus*. (Hook.) Franch and *S. kombe* Oliv, antimalarial Quinine, from the back of *Cinchona succirubra* Pav. Klotzsch. Pain relievers Morphine from *Papaver somniferum* L. and Salicin from the bark of Salix *alba* L. More recently, vinblastine and vincristine isolated as antineoplastic agents from *Catharantus roseus.* (L) G. Don and artemisinin isolated from *Artemisia annua*[14] L.

Coronaviruses are a large family of viruses which may cause illness in animals and humans. In humans, several Coronaviruses are known to cause respiratory infection ranging from common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). The most recently discovered Coronavirus diseases (COVID-19). This new virus and diseases were unknown before the outbreak began in Wuhan, China, in December 2019. COVID-

19 is now pandemic affecting Countries globally. The most common symptoms of COVID-19 are fever, dry cough, and tiredness. Other symptoms that are less common and may affect some patients include aches and pains, nasal congestion, headache, conjunctivitis, sore throat, diarrhea, loss of taste or smell or a rash on skin or discoloration of fingers or toes. These symptoms are usually mild and begin gradually. Some people become infected but only have mild symptoms.

Medicinal plants have demonstrated incontestable antiviral, immune boosting, and antioxidant activities, were as in some cultures these plants are commonly consumed as daily food. In our interest to have good understanding between these plant and symptoms of COVID-19 we carried out an ethnomedicinal survey in Kano North Senatorial District.

Structural Methodology

The survey methodologies used was interview of traditional medicine practitioners, Herb sellers and other elderly people using questionnaire (Table 1.)

Data collection

Data presented in this article was collected from Hausa/Fulani herbalists and rural settlers in the North Central Kano. The study area falls within the latitude 12, 0000 N and longitude 8.516667 E. It is bounded by Kankia Local Government Katsina State. Adopting the method of Jovel *et al*., 1996. Information was compiled through general conversation with the informants and questionnaire were used to obtain additional information about the method of treatment. The information obtained included local names of the plants used, their local uses, part of the plant used, the mode of preparation and forms of administration of the medicinal plants, age group and gender of the person interviewed.

Table1: A questionnaire used during an ethnobotanical survey

Parameters	**Information/questions**
Informant Details	Name…….. Gender……. Age…… Occupation……. Education…… Residence……..
Questions	For how long have you been a traditional healer medicine/ seller? Which plants or plant have you used for medicinal purpose? What ailment do you use for? Which part of the plant do you use? How it is used? (dried or fresh) How do you prepare it for used? (tea, infusion, topical application) Describe in detail how do you prepare for each ailment How long is the preparation administered? For how long do you have to take the preparation?

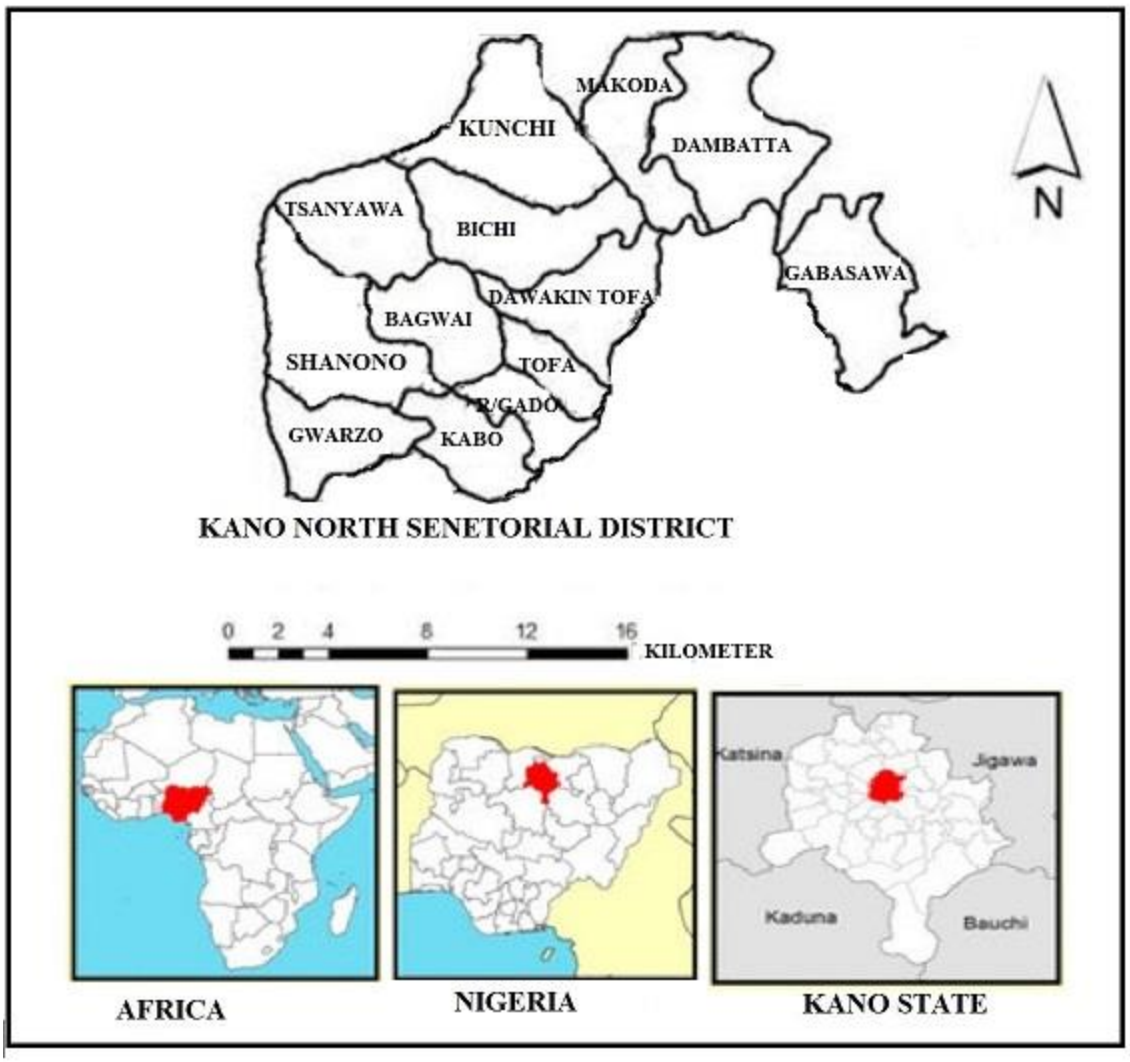

Fig.1: Map of Kano North Senatorial District.

Results

A total of 9 plant species distributed in 7-families were found used traditionally in treat in treatment of common cold/cough, also 7 plant species found in 6 families were locally used to treat diarrhea, similarly 9 species belongs to 8 families were found to treat typhoid/malaria, 12 plant species found in 10 families were found to be used as immune boosters and lastly 3 plant species distributed in 3 families were found locally to treat skin rashes The plant names are arranged followed by local or traditional names and morphological part(s) used and their methods of preparation. The result are summarized in table 2. The Anacardiaceae, Poaceae, Fabaceae and Myrtaceae was represented by 3 plants species followed by Combretaceae,

Lamiaceae and Liliaceae (2 species each) while other families (1 species each) were found to be used medicinally by the local communities, of these plants 9 (29.03%) different plants were indicated to be used for treating cough/common cold, 8 (25.80 %) plants were implicated only in diarrhea treatment, these plants include: *Guiera senegalensis, Detarium senegalensis, Ipoamoea batata, Zay mays, Oryza sativa, Parkia bigbolosa and Sclerocarya birrea*, in addition, 9 (29.03%) plant were used to treat typhoid/malaria, similarly 12 (38.70%) plants were implicated in boosting immune system and lastly 3 (9.6 %) plants were found to treat skin rashes. 5 (16.12%) plants were used to treat cough/common cold along with boosting immune system, these plant: *Garcinia kola, Zingiber officinale, Allium cepa, Allium sativum and Cymbopogon citratus*. 1(3.2%) plant specie was found to treat cough along with typhoid/malaria. This plant is *Eucalyptus globulus*.

Locally, many plants were given different names and these eventually lead to more than one local name for many plants. These plants are prepared and administered orally except *Cadaba farinose, Mitracarpus hirtus* and *Lannea microcapa* that have topical application in their preparation for medicinal usage. Whole plant as well as various parts of each plant species were either used singly or combined form. Leaves constituted the majority of use (58.06 %), whole plant (12.90 %), Seed (12.90%), buld (9.67 %), bark (6.45 %), rhizome (5 %) and flower (2.5 %). Decoction and infusion are the most frequent method of preparation though three plants (*Garcinia kola*, *Allium sativum* and *Allium cepa*) to be chewed, one (*Guira senegalensis*) to be taken with pap, three species (*Momordica balsamina*, *Moringa oleifera* and *Vernonia amygdalina*) to be sprinkled in food and three (*Cadaba farinose*, *Mitracarpus hirtus* and *Lannea microcapa*) have topical application.

Discussion

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV2), the source of the (Corona Virus Disease 2019) COVID-19, is first reported in Wuhan of China in December 2019 and now emerged as a disease of the century with a high transmission rate[16]. World health organization (WHO) declared this disease as a public health emergency pandemic[17]. As the COVID-19 pandemic continues to spread across the world, it infected 4 million peoples as of 05 February 2021. However, there is no specific treatment and cure available[18]. At present, the SARS-CoV-2 treatment can

alleviate the symptoms, such as trouble in breathing, chest anxiety, fever, body yaks, etc. Available drugs may not directly act on viruses due to non-specificity but providing relief to infected people by reducing the difficulties

The World Health Organization (WHO) assessed that 80% of the populations of emerging countries rely on traditional medicines, mostly plant drugs for their foremost health care needs[19]. The traditional healer are found within a short distance and are familiar with the patient's culture while the environment and the costs associated with treatments are negligible[20]. While the loss of valuable medicinal plants due to population pressure, agricultural expansion and deforestation have been widely reported[21,22]. Documenting indigenous knowledge becomes essential to preserve the traditional knowledge and valuable information passed verbally from generation to generation and can be lost whenever a traditional medical practitioner passes without conveying his knowledge about traditional medicinal plants.

In this study, the number of indicated medicinal plants and their potential applications in the treatment of COVID-19 infections reflect the rich ethnomedicinal knowledge in the Kano North senatorial district. Here, traditional medicine remains the main resource of herbalism for a large majority of the people, these could be attributed to cultural acceptability, efficacy, physical accessibility and economic affordability. The results revealed that the people of North Central district Kano are utilizing medicinal plants for treatment of COVID-19 symptoms even though they are not familiar with COVID-19 as a disease but it is symptoms are well known and managed or cured. For instance 25% of the mentioned plants were used in the treatment of common cold, malaria/typhoid and immune booster each, while 17% for diarrhea and 8% for skin rashes. Even though there are overlaps in plants used in treating symptoms. The occurrences of the use of leaves for the preparation of traditional herbal remedies as shown in this study corresponds with earlier reports in other studies[23,24,25,26]. While the use of more than one plant or plants parts in herbal preparations could be attributed to the additive or synergistic effect that extracts from the different plants are thought to have during treatment[27].

The methods of preparing these medicinal plants vary, decoction and infusion methods are highly reputed and valued by traditional healers in Kano North Central district and

native population for its curative and palliative effects in the treatments of diseases. The active compounds in preparation that are applied topically are adsorbed by the skin. Decoction of a part or combination of different parts could be more effective as more active phytochemicals are likely to be extracted by boiling. There is a lack of standardization and quality control in orally administered traditional medicine. These parameters, oral dosages are estimated using lids, spoons, cups, pinches and handfuls while most preparations are often prescribed through estimation in term of a full, half or one-fourth of a cup, depending on the age, physical condition of the patient being treated, severity and type of infection[28,29].

In addition scientific proof have indicated that, the choice of these plants have been attributed to immune system stimulation, cough suppressant, carminative, anti-bacterial, anti-inflammatory and astringent properties. These activities may be due to the presence of flavonoids, alkaloids, tannins, terpenoids, glycosides present in these plants.

Conclusion

Plants have been serving as sources of drugs and pharmaceuticals for man and other animals since time immemorial, many of these plants possess therapeutic and pharmaceutical properties. According to a recent survey by the United Nations Commission for Trade and Development (UNCTAD), more than 33 percent of modern drugs and medicinal products are derived from plants. In this study 36 plant species consisting of 22 families were used for treatment of COVID-19 symptoms/infections in Kano Senatorial district, Kano-Nigeria. These plants boost immune, treat cough, diarrhea and fever. Most of the mentioned plants there safety have been established from their long usage and as suggested by WHO that, any plant(s) that have been used for eight or ten years without any report of it toxic effect such plant(s) is said to be safe, so encouraging people to patronized these plants will boost our agriculture, reduced unemployment and create wealth and more importantly produced a health-challenge free nation.

Conflict of interest

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Table 2. Ethnomedicinal plants use in Kano-North for treatment of COVID-19 Symptoms

Scientific name	**Common name (Hausa)**	**Morphological part used**	**Uses**	**Method of preparation and administration**
Guttiferae *Garcinia kola*	Namijin goro	Seed	Common cold, Immune booster	A medium size seed is chewed two times a day
Zingiberaceae *Zingiber officinale*	Chitta	Rhizome	Common cold, Immune booster	Dried rhizome are ground boiled and the decoction (1 cup) is taken orally three times a day
Poaceae *Cymbopogon citratus*	Ciyawar tsabri	Leaf	Common cold	Leaf is boiled and the decoction (1 cup) is taken orally three times a day
Liliaceae *Allium sativum*	Tafarnuwa	Buld	Common cold, Immune booster	Buld is chewed four times day
Myrtaceae *Syzigium aromaticum*	Kanunfari	Flower	Common cold	Cloves are soaked keep overnight (1 cup) is taken three times a day
Combretaceae *Anogeissus leicarpus*	Marke	Bark	Common cold	Bark are boiled and the decoction (1 cup) is taken orally three times a day
Lamiaceae *Mintha piperintha*	Na'ana'a	Whole plant	Common cold	Whole plant are boiled in water and cupful of decoction is

				taken three times a day
Myrtaceae *Eucalyptus globulus*	Tutare	Leaf/bark	Common cold	Leaves are boiled and the decoction (1 cup) is taken orally three times a day Bark are boiled and the decoction (1 cup) is taken orally three times a day
Liliaceae *Allium cepa*	Albasa	Buld	Common cold, Immune booster	Three bulds is chewed daily
Combretaceae *Guiera senegalensis*	Sabara	Leaf	Diarrhea	Dried leaf ground to fine powder taken with pap (1 tea spon ful) three times a day
Caesalpinioidaceae *Detarium senegalense*	Taura	Seed	Diarrhea	Dried seed is chewed, one can chewed as many as he/she can
Convolvulaceae *Ipoemoea batata*	Dankalin hausa	Buld	Diarrhea	A medium size buld is crushed to obtained cool infusion (1 cup) is taken orally three times a day
Poaceae *Zay mays*	Masara	Seed	Diarrhea	1 kg of dried seed is soaked overnight blended to obtained cool infusion (1 cup) is taken orally three time a day

Poaceae *Oryza sativa*	Shinkafa	Seed	Diarrhea	1 kg of dried seed is soaked overnight blended to obtained cool infusion (1 cup) is taken orally three time a day
Fabaceae *Parkia biglobosa*	Dorawa	Fruit-powder	Diarrhea	1 kg is soaked in 1 ltr of water (1 cup) is taken four times a day
Anacardiaceae *Sclerocarya birrea*	Daniya	leaf	Diarrhea	The leaf is boiled to obtained decoction (1 cup) is taken two a day
Meliaceae *Azadirachta indica*	Dogoon yaro	leaf	Malarial/Typhoid	Fresh leaves are boiled and the decoction (1 cup) is taken orally three times a day
Fabaceae *Senna occidentalis*	Rai-Rai	Whole plant	Malarial/Typhoid	Fresh whole plant is boiled and the decoction (1 cup) is taken orally three times a day
Caricaceae *Carica papaya*	Gwanda	leaf	Malarial/Typhoid	Fresh leaf (one medium size) is boiled and the decoction (1 cup) is taken orally a day
Rutaceae *Citrus aurantifolia*	Lemun tsami/yami	leaf	Malarial/Typhoid	Fresh leaves are boiled and the

				decoction (1 cup) is taken orally three times a day
Myrtaceae *Eucalyptus globulus*	Turare	Leaf	Malarial/Typhoid	Fresh leaves are boiled and the decoction (1 cup) is taken orally three times a day
Myrtaceae *Psidium guajava*	Gwaba	leaf	Malarial/Typhoid	younger leaves are boiled and the decoction (1 cup) is taken orally three times a day
Anacardiaceae *Anacardium occidentale*	Kashuu	leaf	Malarial/Typhoid	Fresh leaves are boiled and the decoction (1 cup) is taken orally three times a day
Asteraceae *Vernonia amygdalina*	Shuwaaka	leaf	Malarial/Typhoid	Three fresh leaves are crushed/blend washed two to three time, then prepare a soup with the washed leave
Combretaceae Anogeissus leiocarpus	Marke	Bark	Malarial/Typhoid	The bark is boiled and the decoction (1 cup) is taken orally three times a day
Cucurbitaceae *Momordica balsamina*	Garafuni	Aerial part	Immune booster	The powdered aerial part is applied in food taken as spices

Moringaceae *Moringa oleifera*	Zoogale	Leaf	Immune booster	The leaves powdered is applied in food taking as spices or it can be taken as infusion
Fabaceae *Cassia tora*	Tafasa	Leaf	Immune booster	The powdered leaves is cooked together with some spices taken as a soup
Malvaceae *Adansonia digitata*	Kuuka	Leaf	Immune booster	The powdered leaves is cooked together with some spices taken as a soup
Asteraceae *Vernonia amygdalina*	Shuwaka	Leaf	Immune booster	The powdered leaves part is sprinkled in food taken as spices
Lamiaceae *Ocimun gratissimum*	Doddoya	Leaf	Immune booster	The leaves fresh or dried is cooked as a spices
Lamiaceae *Mintha piperitha*	Na'ana'a	Whole plant	Immune booster	The leaves fresh or dried is boiled and the decoction (1 cup) is taken three times in a day
Poaceae *Cymbopogon citratus*	Ciyawar tsabri mai turare	Leaf	Immune booster	Fresh or dried leaf is boiled and the decoction is taken three time a day
Capparaceae *Cadaba farinosa*	Bagayi	Leaf	Skin rashes	The dried powdered leave is mixed with sheer butter and

				applied to the affected places
Rubiaceae Mitracarpus hirtus	Googamasu	Leaf	Skin rashes	The dried powdered leave is mixed with Vaseline (oil) and applied to the affected places
Anacardiaceae Lannea microcapa	Faru	Leaf	Skin rashes	The dried powdered leave is mixed with Vaseline (oil) and applied to the affected places

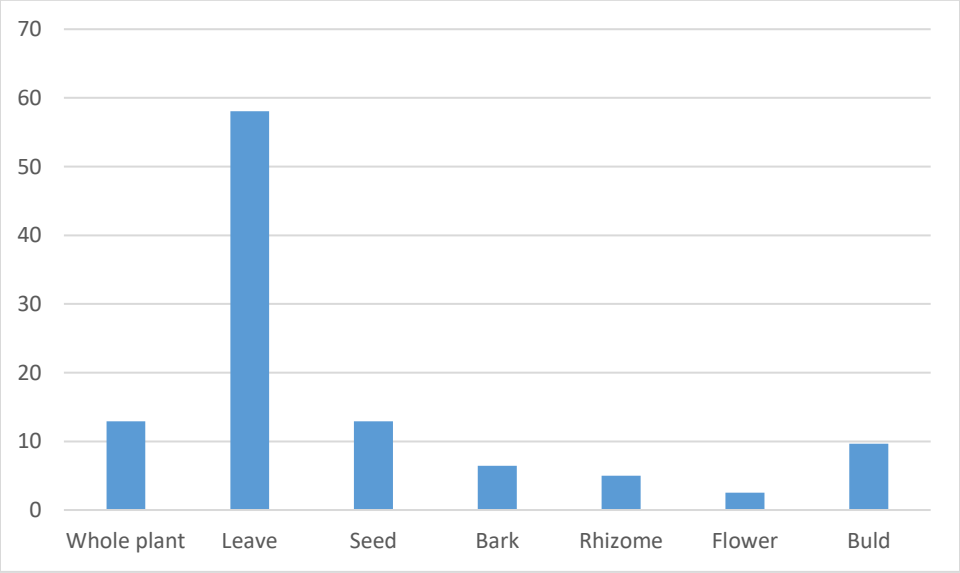

Fig.2: Frequency of plant parts used for treating COVID-19 symptoms