

Traditional Healing Methods: Focus on the Medicinal Plants Against Coronavirus (COVID-19) Infection

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To cite this article:

Yusuf-Babatunde Moruf Ademola, Quadri Jelili Akorede, Solaja Olatunde Odutola, Kuku Mukaila Akorede. Traditional Healing Methods: Focus on the Medicinal Plants Against Coronavirus (COVID-19) Infection. *Journal of Diseases and Medicinal Plants*.

Vol. 7, No. 1, 2021, pp. 6-13. doi: 10.11648/j.jdmp.20210701.12

Received: December 23, 2020; **Accepted:** January 8, 2021; **Published:** February 9, 2021

Abstract: Background: In African health care system, medicinal plants are major components and most assorted of all therapeutic systems. In major parts of rural Africa, traditional healers prescribing medicinal plants are the most easily accessible and affordable health resource available to the local community and at times the only therapy that subsists. Coronavirus diseases (COVID-19) is an acute virus (SARs-coV-2) which has caused a global pandemic. This paper aims to emphasize the importance of herbal medicine as a possible alternative and effective immune system booster against coronavirus disease in Ogun state, Nigeria. Materials and Methods: Ethnobotanical survey was carried out using 80 randomly selected respondents among the villagers, herbalists, herb sellers, traditional medical practitioners, students, community leaders, by oral interviews and semi-structured questionnaire. The data were analyzed using frequency counts and percentages. Results: A total of 81 plant species from 35 families which were mostly represented by Euphorbiaceae, Moraceae, Apocynaceae and Rubiaceae, and 61 botanicals were used singly while 21 other botanicals were combination of two or more plants in a single herbal preparations reported in the study area are used for management and alternative therapy against ailments such as fever, cough, body pain, flu, cold and shortness of breath that are associated to symptoms of COVID-19. Conclusion: Herbal medicines provide an alternative therapy for boosting immunity system to help fight coronavirus. Traditional healers are still very relevant to African healthcare system.

Keywords: Traditional Healing, Medicinal Plants, Coronavirus, Infection, Ethnobotanical Survey

1. Introduction

In Africa and other parts of the World, herbal medicines have been in forefront of primary health care system. Household preparations in the forms of infusion and decoction were used to treat common ailments. Herbs are taken on diet to diagnose, prevent or treat diseases locally. Based on the Ethno-botanical studies, several active compounds have been discovered from plants and are used directly as potential in the production of synthetic drugs [1]. Due to the use and importance of African herbal plants,

many developing countries intensified efforts on documentation of ethno-botanical data of herbal plants, as most traditional herbalists keep inadequate records and their information is passed on, mainly through verbal, from generation to generation [2]. In Nigeria, indigenous population have been using herbal medicines for a long time for the treatment of many diseases [3]. The novel coronavirus known as SARS-COV-2 (Severe Acute Respiratory Syndrome Coronavirus 2) outbreak was

recorded for the first time in Wuhan City and Hubei Province, China on December 8, 2019 [4]. Generally, the statistics of symptoms of COVID-19 were fever in 83% to 98% of patients, dry cough in 76% to 82%, and fatigue in 11% to 44%. Other reported symptoms are sore throat, headache, diarrhoea and abdominal pain [4]. The global outbreak of COVID-19 presents different challenges to develop and developing countries. Most developing countries have weak health system coupled with inadequate epidemic response capacity. So far, Nigeria has successfully dealt with individual cases, the country reported 54,905 recorded cases, 1,054 deaths and 42,922 discharged cases from coronavirus infection as of September 5th, 2020 [5]. In Nigeria, herbs are used to treat and manage infections and diseases as part of their tradition and custom. The indigenous knowledge could be inherited

or learnt in traditional religion. The dependency on botanicals has been attributed to the availability of a diversity of medicinal plants in the lowland rain forest vegetation, presumed efficacy of herbal remedies in regimens with little or low side effect and affordability [4]. COVID-19 is a viral infection, therefore, use of antiviral herbal medicines might be useful in its prevention and management. Considering COVID-19 infection symptoms - fever, body pain, cough, flu, cold and shortness of breath, plants with antimalarial effect, cough remedy, analgesic properties and a plausible therapeutic effect in respiratory tract infections could be useful to prevent infection due to COVID-19 [6]. The objective of this paper is to document ethnomedicinal plants in Ogun state that can be used to boost immunity thereby prevent the coronavirus infection.

2. Materials and Methods

2.1. Study Area

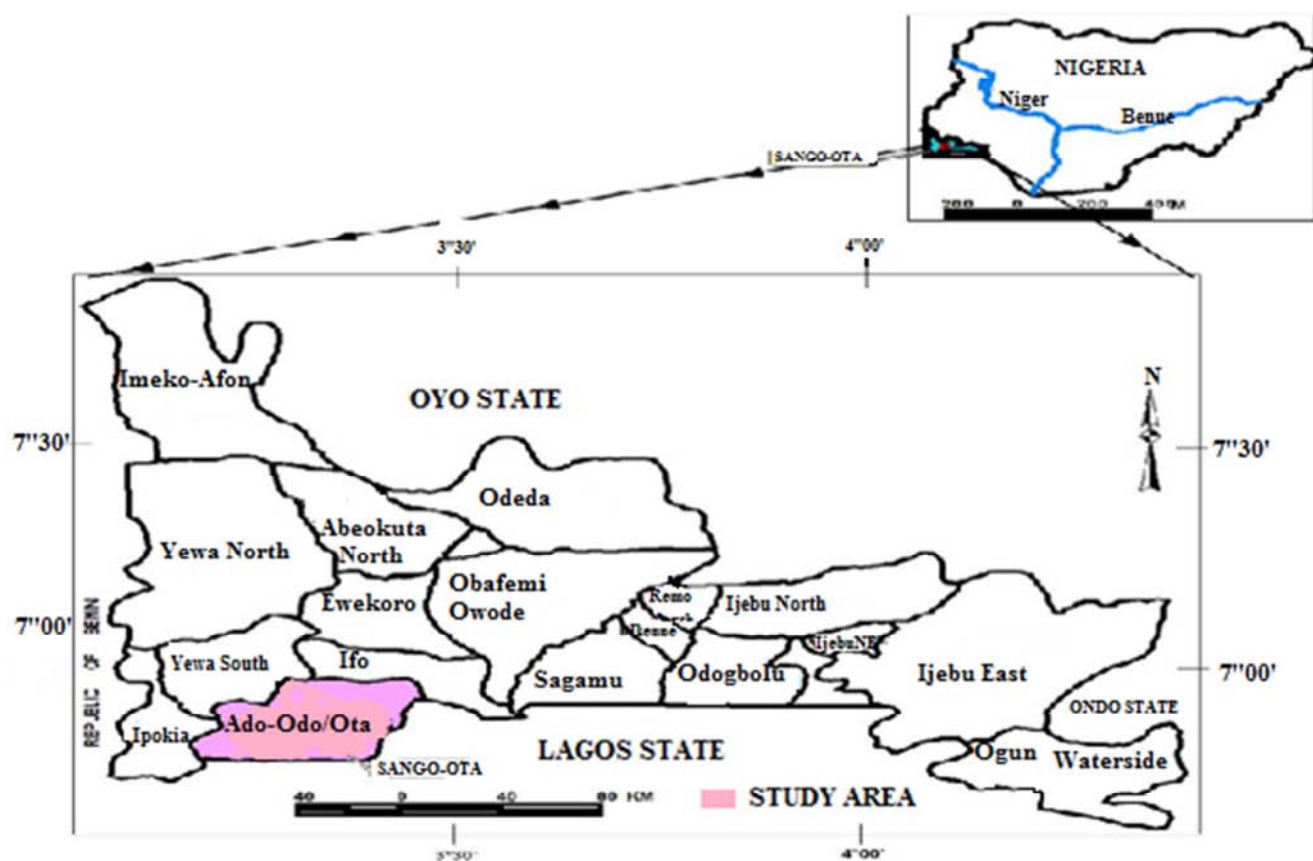


Figure 1. Areas in Ogun State, Nigeria Surveyed for the Use of Plant/Herbal Preparations to boost immunity against coronavirus.

The study area covers Ota, Sango-Ota, Ado-Odo, Agbara, Iju-Ota, Itele, Igbesa, Owode-Ijako and Koko-Ebiye in Ado-Odo/Ota Local Government Area in Ogun State, Nigeria. The ethnic composition is Yoruba with sub-groups of Awori, Yewa, Egba, Ijebu and Remo. Ado-Odo/Ota Local Government Area covers approximately 16,762 km² area with a total population of 3,751,140 residents from 2006

census [7]. It borders Lagos State to the south, Ondo State to the east, Osun State to the north and Republic of Benin to the west (Figure 1). It was created in May 19, 1989, when Ota was merged with the defunct Ifo/Ota Local Government with Ado-Odo/Igbesa Areas of Yewa South Local Government and the second most populated Local Government in Ogun State. It's headquarter is Ota at 6°41'00"N 3°41'00"E to the

north of the Area (Figure 1). It's an agrarian in nature, produces cash and food crops such as cocoa, kola, coffee, palm oil, nut, cassava, maize, timber and vegetables [8].

2.2. Collection of Information

Ethno-medicinal information was gathered from herbalists, herb sellers, villagers and other residents using semi-structured questionnaire and oral interviews as described by Jovel *et al.*, (1996) [7], Yusuf-Babatunde and Solaja (2019) [8]. For the purpose of this study, Eighty (80) questionnaires were administered to respondents and they provided local names of the herbal plants being used to boost immunity against coronavirus infection. The questionnaire was divided into three sections: section one furnished demography data, section two was about awareness, prevention and treatment of coronavirus infection and section three dealt with plants/recipes used in the prevention and management of coronavirus infection. Botanical names of the plants were authenticated by comparison with appropriate voucher specimen at herbarium in Forestry Research Institute of Nigeria (FRI) Ibadan; (where herbarium specimens are kept)

and by reference to standard botanical classifications and nomenclature [10, 11]. Identification was also confirmed at Herbarium of Faculty of Pharmacy, Olabisi Onabanjo University, Sagamu [11]. The socio-economic characteristics of the respondents revealed 46 females and 34 males. Seventy-three percent of the respondent had primary to secondary formal education. The respondents were between 30 to 70 years old. Eighty-seven percent of the respondents were trade specialists (i.e., herbalists/herb sellers) and the rest did not have any specialized training in traditional medicine but claimed experience to ancestral traditions (Table 1).

3. Results and Discussion

The results of the survey of botanicals to boost immunity and prevent Coronavirus disease are presented and the plants are listed in Tables 1 and 2. Each plant is identified by a voucher specimen number, and pharmacognostic elements such as botanical name, common and local name, parts used, and method of preparation are provided.

Table 1. Demographic Characteristics of Respondents.

Variables	Respondents	N	(%)
Gender	Male	34	42.5
	Female	46	57.5
Total		80	100
Age	30-40	10	12.5
	41-50	18	22.5
	51-60	31	38.75
	61-70	21	26.25
Total		80	100
Educational status	Primary	68	85
	Secondary	12	15
	Tertiary	---	---
Total		80	100
Occupation	Farmer	11	13.75
	Herbalist	36	45
	Herb seller	33	41.25
Total		80	100
Religion	Islam	32	40
	Christian	27	33.75
	Others	21	26.25
Total		80	100

Table 2. List of Botanicals used to boost immunity against fever associated diseases in Ado-Odo/Ota Local Government Area of Ogun State in Ogun State, Nigeria.

S/N	Botanical Name	Local Name	Common Name	Families	Morph. Part used	Method of preparation
1.	<i>Morinda lucida</i> Benth	Oruwo	Brimstone tree	Rubiaceae	Leaves, Root	Infusion
2.	<i>Cymbopogon citratus</i>	Ewe lemon	Lemon grass	Poaceae	Leaves	Decoction
3.	<i>Azadirachta indica</i> , Juss	Dongoyaro	Neem Tree	Meliaceae	Leaves, Bark	Decoction
4.	<i>Citrus aurantifolia</i> chrism	Osan wewe	Lime orange	Rutaceae	Leaves	Decoction
5.	<i>Citrus aurantium bergamia</i>	Osan jaganyin	bergamot orange	Rutaceae	Fruit juice	Infusion
6.	<i>Terminalia catappa</i>	Igi-furuntu	Umbrella tree	Combretaceae	Leaves	Decoction
7.	<i>Croton lobatus</i> L.	Arorososo	Rush foil	Euphorbiaceae	Fruit	Decoction
8.	<i>Lawsonia inermis</i> Linn	Laa-li	Henna Tree	Lythraceae	Leaves	Decoction
9.	<i>Khaya senegalensis</i>	Oganwo	African mahogany	Meliaceae	Bark	Infusion
10.	<i>Jatropha curcas</i> L.	Lapalapa	Physical nut or purging nut	Euphorbiaceae	Leaves	Decoction
11.	<i>Newbouldia laevis</i>	Akoko	Boundary tree	Bigoniaceae	Root	Decoction
12.	<i>Momordica charantia</i> Linn	Ejirin wewe	Bitter mellon	Cucurbitaceae	Leaves, Bark	Decoction
13.	<i>Mangifera indica</i>	Mangoro	Mango tree	Anacardiaceae	Leaves	Decoction

S/N	Botanical Name	Local Name	Common Name	Families	Morph. Part used	Method of preparation
14.	<i>Enantia chlorantha</i> Oliver	Baka	African yellow wood	Annonaceae	Leaves, Stem bark and Roots	Decoction
15.	<i>Psidium guajava</i> ,	Guafa	Guava Tree	Myristaceae	Leaves	Decoction
16.	<i>Chromolaena odorata</i>	Akintola-ta-ku	Baby bush	Compositae	Leaves	Decoction
17.	<i>Macaranga barteri</i> ,	Ohaha	Macaranga	Euphorbiaceae	Leaves, Stem bark	Decoction
18.	<i>Cajanus cajan</i> L.	Otili	Pigeon pea	Fabaceae	Leaves	Decoction
19.	<i>Ficus capensis</i>	Opoto	Bush fig	Moraceae	Leaves	Decoction
20.	<i>Alchornea cordifolia</i> (Schum and Thern) mil.	Ewe-epa	Christmas bush	Euphorbiaceae	Leaves	Decoction
21.	<i>Massularia acuminata</i>	Pako/Orin ijebe	Chewing stick tree	Rubiaceae	Stem, Root & Leaves	Chewing stick, Decoction
22.	<i>Ageratum conyzoides</i>	Imi-eshu	Goatweed/Chickweed	Compositae	Leaves & Root	Infusion, Decoction
23.	<i>Zingiber officinale</i> Roscoe	Atale	Ginger	Zingiberaceae	Rhizome	Maceration
24.	<i>Ocimum gratissimum</i>	Efirin	African Basil	Lamiaceae	Leaves	Infusion
25.	<i>Canna indica</i> L.		Arrow root	Cannaceae	Leaves	Decoction
26.	<i>Vernonia amygdalina</i>	Ewuro	Bitter leaf	Asteraceae	Leaves	Infusion
27.	<i>Carica papaya</i> L.	Ibepe	Pawpaw	Caricaceae	Fruit	Decoction
28.	<i>Ficus asperifolia</i> L.	Eepin	Sand paper	Moraceae	Root, Leaves	Decoction
29.	<i>Alstonia boonei</i>	Awun	Stool wood	Apocynaceae	Root	Infusion
30.	<i>Capsicum annum</i>	Ata wewe	Red pepper	Solanaceae	Fruit	Ground fruit
31.	<i>Sarcocephalus latifolius</i>	Egbesi	African peach	Rubiaceae	Fruit, Leaves, Root	Infusion

Table 3. List of Botanicals used to boost immunity against Cough associated with respiratory diseases in Ado-Odo/Ota Local Government Area of Ogun State, Nigeria.

S/N	Botanical Name	Local Name	Common Name	Families	Morph. Part used	Method of preparation
1.	<i>Abrus precatorius</i> L.	Ojuologbo	Rosary pea	Fabaceae	Leaves	Maceration
2.	<i>Aframomum melegueta</i> K. Schum.	Ataare	Alligator pepper	Zingiberaceae	Dry seed	Infusion
3.	<i>Cissampelos owariensis</i> P. Beauv.	Jokoje/Jenjokoo	Damargaji	Menispermaceae	Leaves	Decoction
4.	<i>Allium ascalonicum</i> L.	Alubosa elewe	Onion	Amaryllidaceae	Leaves	Decoction
5.	<i>Allium sativum</i> L.	Ayu	Garlic	Amaryllidaceae	Bulb	Decoction
6.	<i>Alstonia boonei</i> De Wild.	Awun/doctor igbo	Stool wood	Apocynaceae	Root	Infusion
7.	<i>Anacardium occidentale</i> L.	Kasu	Cashew	Anacardiaceae	Leaves	Decoction
8.	<i>Cocos nucifera</i> L.	Agbon	Coconut	Aracaceae	Fruit	Fruit juice
9.	<i>Garcinia kola</i> Heckel	Orogbo	Bitter cola	Clusiaceae	Fruit	Decoction
10.	<i>Asparagus africanus</i> Lam.	Aluki	Bush asparagus	Asparagaceae	Leaves, Shoots, underground stem, i.e. Whole plant	Decoction
11.	<i>Ocimum americanum</i> L. (<i>Ocimum canum</i>)	Efirin wewe	Hairy Basil	Lamiaceae	Leaves	Infusion
12.	<i>Sarcocephalus latifolius</i> (Sm.) E. A. Bruce	Egbesi	African peach	Rubiaceae	Leaves	Decoction
13.	<i>Zea mays</i> L.	Agbado	Corn	Poaceae	Seed	Decoction
14.	<i>Kigelia africana</i> (Lam.) Benth.	Pandoro	Suasage tree	Bignoniaceae	Bark	Decoction
15.	<i>Ficus exasperata</i> Vahl	Eepin	Sand paper	Moraceae	Root	Decoction
16.	<i>Crinum jagus</i> (J. Thomps.) Dandy	Ogede Odo	Banana	Amaryllidaceae	Fruit	Fruit juice+honey
17.	<i>Calotropis procera</i> (Aiton) Dryand	Bomu-Bomu	Apple of Sodom	Apocynaceae	Leaves	Decoction

Table 4. Respondents knowledge on the synergistic effect on the combined use of plants to treat body pain, fatigue and loss of appetite in Ado-Odo/Ota Local Government Area of Ogun State, Nigeria.

S/N	Botanical Names	Local Name	Families
1	<i>Anacardium occidentale</i> ; <i>Mangifera indica</i> and <i>Spondia mombin</i> .	Kasu, Mangoro, Iyeye.	Anacardiaceae
2	<i>Acanthus montanus</i>	Alligator plant /Mountain thistle	Acanthaceae
3	<i>Alstonia boonei</i> , <i>Rauvolfia vomitoria</i>	Awun, Osan-wewe	Apocynaceae
4	<i>Anchomanes difformis</i> and <i>Culcasia lancifolia</i>	Langbodo, Maraka	Aracaceae
5	<i>Tithonia diversifolia</i> , <i>Chromolaena odorata</i> , <i>Vernonia amygdalina</i> , <i>Ageratum conyzoides</i>	Mexican sunflower, Akintola, Ewuro, Imi-eshu.	Asteraceae
6	<i>Newboulda laevis</i>	Akoko	Bignoniaceae
7	<i>Carica papaya</i>	Ibepe	Caricaceae
8	<i>Byrsocarpus coccineus</i>	Amuje wewe	Cannaraceae
9	<i>Luffa cylindrical</i> , <i>Momordica charantia</i>	Loofa, Tagiri	Cucurbitaceae
10	<i>Diospyros monbutensis</i>	Kalwa	Ebenaceae
11	<i>Alchornea cordifolia</i> , <i>Phyllanthus muellerianus</i> , <i>Euphorbia heterophylla</i> ,	Ewe-epa, Egun eja, Egele, Opoto	Euphorbiaceae

S/N	Botanical Names	Local Name	Families
12	<i>Alchornea laxiflora</i>	Koko	Malvaceae
13	<i>Theobroma cacao</i>	Ujuju, Eepin.	Moraceae
14	<i>Myrianthus arboreus</i> P. Beauv., <i>Ficus exasperate</i>	Moringa	<i>Moringaceae.</i>
15	<i>Moringa oleifera</i>	Guafa, African Nutmeg	Myristaceae
16	<i>Psidium guajava</i> , <i>Pycnanthus angolensis</i>	Ewe Ogbo	Periplocaceae
17	<i>Parquetina nigrescens</i>	Egbes	Rubiaceae
18	<i>Sarchocephalus latifolius</i>	Akee	Sapindaceae
19	<i>Blighia sapida</i>	Iyan origi/ Iyan-orere	Thelypteridiaceae
20	<i>Pneumatopteris afra</i>	Mbarambaram	Tiliaceae
21	<i>Glyphaea brevis</i> (Spreng) Monachino	Black Plum	Lamiaceae

Table 4. Continued.

S/N	Symptoms	Method of Preparation
1	Severe fatigue, abdominal pain, bloody stool, nosebleeds, weakness, muscle aches	(a) Stem bark powdered of <i>Anarcadium occidentale</i> and <i>Mangifera indica</i> is mixed with the powdered leaves of <i>Spondia mombin</i> and given in pap and drink in abdominal pain and weaknesses. (b) Powdered leaves of the three is mixed with hot pap and drink against Runny or stuffy nose, Cough and Fever.
2	High temperature, lymph nodes may become swollen.	Leaves extract is given to suppress high body temperature and body fatigue.
3	Severe fatigue, abdominal pain, bloody stool, nosebleeds, weakness, muscle aches	Leaves concoction of the two plants used to treat Severe fatigue, abdominal pain, bloody stool, nosebleeds, weakness, muscle aches, severe headaches and breathing difficulty.
4	Frequent urination excessive thirst, increased hunger, weight loss, tiredness, slow healing of wounds	Leaves decoction of the two plants used to treat frequent urination, excessive thirst, increased hunger, weight loss, tiredness and slow healing of wounds
5	Severe fatigue, abdominal pain, bloody stool, nosebleeds, weakness, muscle aches	Leaves decoction of the four plants used to treat severe fatigue, abdominal pain, bloody stool, nosebleeds, weakness, muscle aches, frequent urination, excessive thirst, increased hunger, weight loss, tiredness. Leaves paste to heal wounds/cut.
6	Severe fatigue, abdominal pain, bloody stool, nosebleeds, weakness, muscle aches	Stem bark decoction on severe body fatigue, pains, body weakness and muscle aches.
7	Itchy scalp, sore, patchy hair loss	Dry Leaves and fruit decoction is used to treat Typhoid fever; Fruits juice applied on itchy scalp, sore and patchy hair loss.
8	Abdominal pain, high temperature, loss of appetite, fatigue, vomiting and weight loss	Leaves decoction used on Abdominal pain, high temperature, loss of appetite, fatigue, vomiting and weight loss
9	High temperature, fatigue, vomiting, frequent urination excessive thirst, increased hunger, weight loss, tiredness, slow healing of wounds	Leaves decoction of the two plants used to reduce high temperature, fatigue, vomiting, frequent urination, excessive thirst, reduced appetite, weight loss and tiredness.
10	High temperature, stomach upset, swollen lymph nodes, headaches.	Leaves juice used to reduce high temperature, stomach upset, swollen lymph nodes and headaches.
11	Watery stooling, vomiting, abdominal pain,, high temperature, loss of appetite, fatigue, vomiting and weight loss, Severe fatigue, abdominal pain, bloody stool, nosebleeds, weakness, muscle aches	Leaves juice of all the plants used stop watery stooling, vomiting, and abdominal pain. Leaf decoction to treat abdominal pain, reduce high temperature, boost of appetite, fatigue, vomiting and weight loss.
12	Watery stooling, vomiting, abdominal pain, Severe fatigue, bloody stool, nosebleeds, weakness, muscle aches	Leaves decoction used to stop watery stooling, vomiting and abdominal pain.
13	Severe fatigue, high temperature, abdominal pain, weakness, muscle aches	Root/Bark infusion in lime juice for muscle aches. Leaves juice of the two plants rub on the body to reduce severe fatigue, reduce high temperature, abdominal pain and malaria. Bark scraped and cooked in palm oil to relieve sore throat
14	Severe fatigue, high temperature, abdominal pain, weakness, muscle aches	Leaves decoction used to treat severe fatigue, high temperature, abdominal pain, weakness, and muscle aches
15	Abdominal pain, high temperature, loss of appetite, fatigue, vomiting and weight loss	Leaves decoction of the two plants used to treat abdominal pain, reduce high body temperature, loss of appetite, fatigue, vomiting and weight loss
16	Watery stooling, vomiting, abdominal pain	Leaves juice used to stop watery stooling, vomiting and abdominal pain
17	Swelling, fatigue, joint pains, high temperature and stiffness	Leaves concoction taken three times daily.
18	Runny or stuffy nose, hoarseness, High temperature, weakness.	Leaves juice of the plants applied on the nose and taken orally.
19	Abdominal pain, high temperature, loss of appetite, fatigue, vomiting and weight loss	Leaves decoction taken three times daily.
20	Fatigue, restlessness and lack of concentration, loss of energy, movement changes.	Leaves concoction to be taken twice daily.
21	Abdominal pain, high temperature, loss of appetite, fatigue, vomiting and weight loss	Fruit pulp used as sweetener, leaves decoction to treat fever and respiratory diseases, stem bark decoction to treat dysentery and other gastro-enteric infections, diarrhoea.

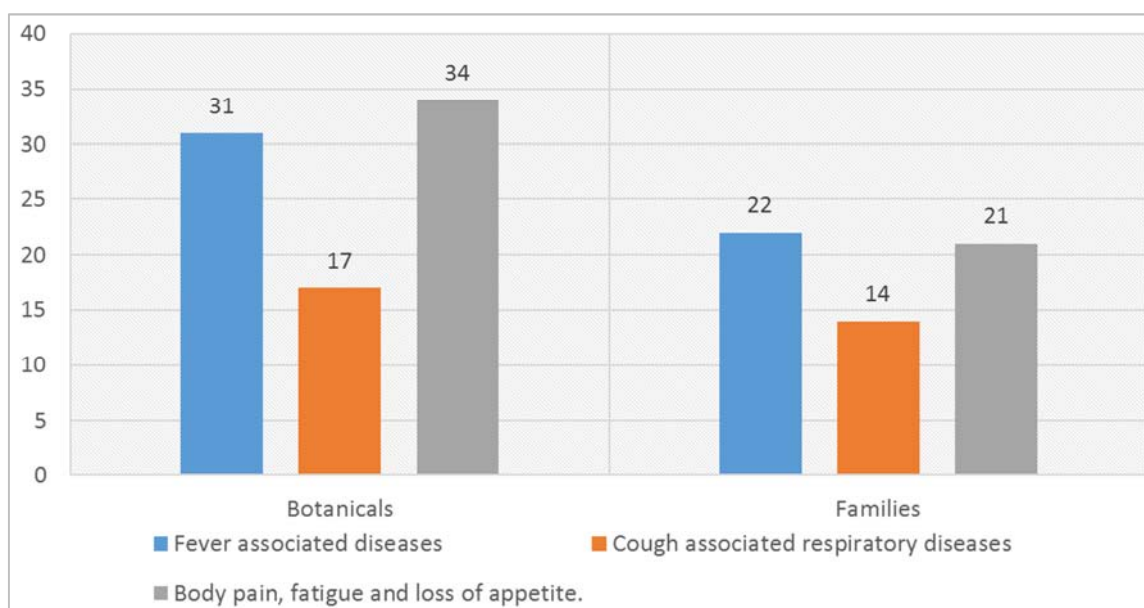


Figure 2. Botanicals and Families of Medicinal Plants against symptoms associated with coronavirus.

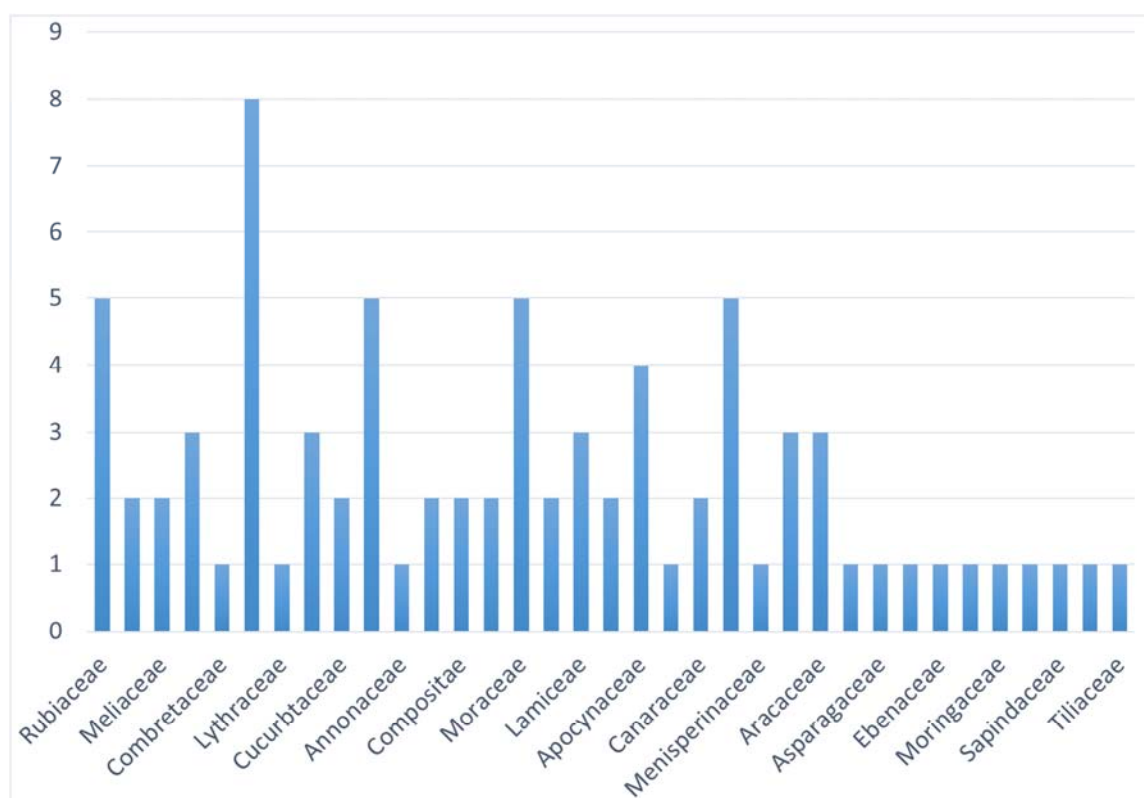


Figure 3. Botanicals and Families of Medicinal Plants to boost immunity against Coronavirus.

In this study area a total number of 31 botanicals belonging to 22 families were frequently used for the treatment of fever associated diseases (Table 2). The different families, largely represented by Euphorbiaceae (12.9%), Rubiaceae (9.68%), Maliaceae=Rutaceae=Compositae=Moraceae (6.45%). Leaves had the highest frequency of use (70.10%) followed by root (25.81%). Decoction is the most preferred method of preparation of the botanicals (67%), this is in agreement with

the previous ethnomedicinal survey of (Adeyemi *et al*, (2010) [12]. Most anti-fever herbal recipes were administered orally, and this is in agreement with previous survey results [13, 14]. However, the majority of the respondents (65%–72%) preferred herbal preparations to modern drugs for the treatment and prevention of fevers. Most of these herbal anti-fever recipes have been scientifically justified [15, 16]. According to the study of Igoli *et al* (2005) [17], some of these recipes were for combination therapy of more than one

kind of fever, anti-typhoid and anti-malarial herbal recipes were also reported in the survey conducted in the northern part of Nigeria.

To manage cough associated respiratory diseases, 17 locally used herbal plant species from 14 families were documented from the study area (Table 3). Cough remains common symptoms that made people to visit health center/hospital in developed countries [18]. The studies on cough epidemiology are currently scanty in sub-Saharan Africa [19], but it's one of the conditions that are treated with African herbal plants [20-22], an example is a study of about 930 households sampled in Akwa Ibom State, Nigeria, cough ranked 5th among the 10 diseases treated with herbal plants [23]. In South Africa, cough is 2nd to tuberculosis in which herbal plants are used to mitigate by herbalists [24]. In other continents beyond Africa, herbal medicines are used for treating cough, such as India [25], Spain [26], Greece [27], and Yemen [28]. There is continuous and widespread use of herbal plants for mitigating cough as a condition and as part of associated symptoms in many diseases affecting the respiratory system.

Botanical pain relievers: *Acanthus montanus* (Alligator pepper) leaves, *Alstonia boonei* (Stool wood) [29], *Rauvolfia vomitoria* (Lime orange) leaves, *Newboulda laevis* (Boundary tree) Stem bark, *Byrsocarpus coccineus* (Huntsman's pepper) leaves, *Sarchocephalus latifolius* (African peach) leaves, *Diospyros monbuttensis* (Yoruba Ebony) leaves, *Theobroma cacao* (Cocoa) leaves are used as singly or in combination to relieve abdominal pains, muscle aches, headaches and general body pains. The herbal medicines are prepared as leaf juice, concoction, decoction for treatment purposes.

Herbs for respiratory tract infections: *Myrianthus arboreus* (Monkey fruit), *Ficus exasperate* (Sand paper), *Spondias mombin* (Yellow mombin), *Garcinia kola* (Bitter kola), *Calotropis procera* (apple of Sodom), *Nymphaea lotus* (White Lotus) and *Abrus precatorius* (Rosary pea) are used for the management and treatment of respiratory tract infections [30]. An example is an infusion of bitter kola and garlic in clean water is used for the management of respiratory tract infections, and this conforms to previous survey results of Gbadamosi, (2019) [31].

Herbal immune boosters: *Anarcadium occidentale* (Cashew tree) and *Mangifera indica* (Mango tree) stem bark [32], *Spondia mombin* (Yellow mombin) leaves, *Tithonia diversifolia* (Mexican sunflower) leaves, *Chromolaena odorata* (Baby bush) leaves, *Vernonia amygdalina* (Bitter leaf) leaves, *Ageratum conyzoides* (Goatweed) leaves, *Psidium guajava* (Guava) leaves, *Pycnanthus angolensis* (African Nutmeg) leaves are immune boosting herbs that can be prepared in powdered form or as a decoction for oral administration. Research has confirmed that eating a small amount of ginger (*Zingiber officinale*) daily for 11 days or more can reduce muscle pain and inflammation, ginger also aids digestion, [3]. Other useful spices are onions (*Allium* species), black pepper (*Piper guineense*), guinea pepper, clove (*Syzygium aromaticum*) and green onions (*Allium ascalonicum*), [4].

4. Conclusion

This study documents the herbal plants used by indigenous population of Ado-Odo/Ota Local Government Area of Ogun State, Nigeria, to boost immunity against coronavirus (COVID-19) infection.

Herbal medicines provide an alternative therapy for the treatment and management of coronavirus and many diseases in the significant number of people, especially in the rural areas, therefore Nigerian Government should make policies on the preservation of indigenous knowledge, documentation of indigenous recipes, prevention of cultural loss and conservation of important plant species for research and medicine. Scientists should collaborate with indigenous people to promote drug discovery via production of herbal remedies, drug precursors, drug prototypes, and active compounds through research.

Conflict of Interest

Authors declare no conflict of interest.

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