

Ethno-medicinal survey of plants used by the indigenes of Akwa Ibom State in the prevention of Covid-19 symptoms

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ABSTRACT

Background: This study was designed to gather information on local plants used by the indigenes of Akwa Ibom State to prevent covid-19.

Method: Information was collated through the administration of a semi-structured questionnaire to 100 Traditional Medicine Practitioners (TMPs). Thereafter, upon completion of the questionnaires, the sex of TMPs, age of TMPs, local and common names of plants used, parts of plants and methods of preparation were collected and statistically analyzed.

Results: The results of the study revealed 30 medicinal plants from 26 families. The nature of the medicinal plants used were herb, tree and shrub; while the age range of greater than 50 years (48%) accounted for the larger number of TMPs who were interviewed with male TMPs making up 69% of the study population. The study also showed the parts of the plants used to include the leaf (53%), seed (12.5%), stem bark, bulb/rhizome and fruits (9% each) while root and whole plant accounted for 3% each. The methods of preparation used were decoction, infusion, maceration, squeezing and chewing while 55% of medicinal plants used have established antiviral properties.

Conclusion: The result from this study supports the use of medicinal plants in the prevention and management covid-19 symptoms and may provide information to researchers for further studies.

Keywords: Medicinal plants, covid-19, symptoms, prevention and TMPs

1.0 INTRODUCTION

The use of natural products in complementary and alternative medicine practice to treat diseases is as old as human existence. Natural products such as plants extracts, animal materials and minerals have been used in many traditional systems of medicine in the world to treat human diseases ranging from the very common illnesses (e.g. cold) to the complicated ones (e.g. diabetes) [3]. These natural products have been formulated into many dosage forms such as liquids, powders, capsules and tablets thereby improving their acceptability. The use of these products is increasing day by day owing to the emerging and re-emerging infections that are threatening human race, increasing resistance of microorganisms to available drugs and the “cure all” claim of these products by TMPs [25]. About one quarter of the commonly used medicines are reported to contain compounds isolated from plants making them one of the valuable ingredients in medicine [46]. Medicinal plants have been known to possess antiviral properties. For example, *Geranium sanguineum* (Geraniaceae) a perennial herb and *Carissa edulis* (Apocynaceae), a plant with glossy foliage are proven antiviral remedies [50, 57]. Viruses have complicated human conditions by their involvement in many human disease

pathogeneses such as cancer, Alzheimer's disease, type 1 diabetes and hepatocellular carcinoma [22, 8, 37]. In addition, globalization due to increased movement of people from one place to another is making the outbreaks of viral infections/diseases a concern for public health which needs urgent global attention. Some examples of these viral infections are measles, influenza, dengue, severe acute respiratory syndrome (SARS) and the recently, covid-19 of the coronavirus strain that is presently ravaging the world as wildfire with high mortality in all age categories. While some of these viral diseases have been curbed with the use of vaccines, some are without vaccines and patients are only managed based on symptoms and the boosting of immune system to help the body clear these viruses [19, 61]. Akwa Ibom State is one of the States in the Southern part of Nigeria and 156 cases of covid-19 were reported in two weeks hence the need for this study [45]. Traditionally, viral infections are seen to be manifested with cold symptoms whose magnitude varies from one person to another. Cold symptoms may manifest as sneezing, headache, fatigue, chills, sore throat, rhinitis with discharge among other many manifestations [31]. Traditional remedies such as steam inhalations of local herbs, hot herbal teas, rubbing traditional oils on the nasal area and drinking of herbal concoction are usually employed in the management of viral flu in this area [4]. In view of these incidences of covid-19 reported, future anticipation of more lethal viral infections, non-availability of vaccines/drugs, the role of natural products in drug discovery and the anticipated role of plants in drug development, this study becomes very necessary to collate and identify plants used by the indigenes of Akwa Ibom State in the south-southern part of Nigeria to prevent covid-19 symptoms.

2. 0 MATERIALS AND METHODS

Study Area: Akwa Ibom State is one of the states in Nigeria and it is located in the coastal southern part of the country and lying between latitudes 4°32'N and 5°33'N and longitudes 7°25'E and 8°25'E (Figure 1). It is bounded on the east by Cross River State; west by Rivers State and Abia State and on the south by Atlantic Ocean and Southern Cross River State. Politically, the State is located in the south-south geopolitical zone and has thirty-one (31) Local Government Areas delineated into ten (10) federal constituencies for electoral purposes. An ethno medicinal survey was carried out between July and September, 2020 covering one Local Government Area in each of the federal constituencies, and the Local Government Areas covered were Abak, Etinan, Mkpato Enin, Nsit Atai, Ikono, Ikot Ekpene, Ibiono Ibom, Oruk Anam, Okobo and Uyo (Figure 2). Interviewer administered questionnaires were administered to ten (10) Traditional Medicine Practitioners (TMPs) in each of these council areas which summed up to one hundred (100) respondents. The TMPs were those residents in the study areas and offering alternative healthcare through the use of medicinal plants and other natural substances. The questionnaire was designed to gather information on the gender of the TMPs, age, plant names, local names, plant parts used and methods of preparation. Data collected were also analyzed quantitatively by calculating the frequency of citation (FC) and relative frequency of citation (RFC). The FC was taken as the number of TMPs that mentioned a particular species of plant; while the RFC was calculated as a percentage by dividing FC by the total number of TMPs that were interviewed (N= 100).



Figure 1: Map of Nigeria highlighting Akwa Ibom State



Figure 2: Map of Akwa Ibom State highlighting the Local Areas of research

3.0 RESULTS AND DISCUSSION

The result from this study revealed 30 medicinal plants from 26 plant families used in the prevention and management of symptoms of covid-19 with two plants each from the Amaryllidaceae, Euphorbiaceae and Zingiberaceae families (Table 1). Most of the plants were herbs (55%) while others were trees (24%) and shrubs (21%) (Figure 3). This reflects the fact that most of the plants used are herbaceous in nature and are usually domesticated within living environments. This assertion agrees with the fact that humans have been using herbs from time immemorial within their habitat for both preventive and curative purposes [15]. On the age grades of the respondents (TMPs), the result revealed that 22% of them were in the range of 25-35 years while the age range of 36-51 years accounted for 30% and those greater than 50 years made up the remaining 48% (Figure 2). This suggested that the knowledge of the use of plants and herbal products in providing alternative health care in Akwa Ibom States ethno-medicine cuts across all adult age range with practitioners above 50 years of age dominating the practice. The result also indicated that the male TMPs made up of 69 % while 31 % were female (Figure 3). This finding was at variance with an earlier report [1] where women were the majority of the TMPs (81.4%) in Ekiti and Ondo states of Nigeria. The pattern of plants parts used revealed the leaf (53%) as the most used part, followed by seed (12.5%), stem bark, bulb/rhizome, fruits (9% each) while root and whole plant accounted for 3% each (Figure 4). The wide use of the leaf in this study may be as a result of the ease of collection and preparation which agrees with the widely reported data from other places both within and outside Nigeria [54, 17, 23, 4]. Another reason for the leaf as the most used part may be due to the fact that its collection guarantees continuous harvesting and less harm to the plants [59]. Many methods were employed in the preparation of these herbal regimens. The result showed the methods to include decoction, infusion, maceration, squeezing and chewing which are basic methods used in the preparation of herbal remedies [11]. Also, decoction was reported as the most applied method of preparation amongst all the methods. On the antiviral pharmacology of these plants from literature review, the data showed that 55% of the plants reported have established antiviral properties (Table 2) which may go to support their use in the prevention of covid-19 symptoms by the indigenes of Akwa Ibom State [41, 43, 21]. The use of quantitative techniques such as FC and RFC in ethno medicinal survey to assess the medicinal values of plants is an important aspect of ethno-medicinal study [26]. From the study, the most cited plants for the prevention of covid-19 in this area in descending order of citation were *Allium sativum* (FC= 21 and RFC= 0.21), *Zingiber officinale* (FC= 18 and RFC= 0.18), *Azadirachta indica* (FC= 14 and RFC= 0.14), *Carica papaya* (FC= 11 and RFC= 0.11) and *Garcinia kola* (RC= 10 and RFC= 0.10).

Allium sativum, a bulb is usually used as ingredient in most delicacies of the area to spice food with benefits ranging from weight loss, improved blood circulation, mitigation of cough and catarrh. It is also reported to be used for the management of respiratory infections, asthma, bronchitis, influenza, cold, hypotensive, diaphoretic and as a vermifuge. *A. sativum* is rich in sulfur containing compounds which are precursors for the synthesis of glutathione, a natural antioxidant [52].

Table 1: Result of mentioned plants, parts used, common/local names, methods of preparation, frequency of citation and relative frequency of citation

S/No	Botanical Name	Common/Local Names	Family/Habit	Method(s) of preparation	Frequency of citation (FC)	Relative Frequency of citation (RFC)
1	<i>Aframomum melegueta</i> K. Schum. (Seed)	Alligator pepper, Grain of paradise (Ntuen-ibok)	Zingiberaceae (Herb)	Chewing	3	0.03
2.	<i>Allium cepa</i> L. (Bulb)	Onion (Ayim, Ajim)	Amaryllidaceae (Herb)	Chewing	5	0.05
3.	<i>Allium sativum</i> L. (Rhizome)	Garlic (Etebe-owo-inua)	Amaryllidaceae (Herb)	Chewing, Infusion, Decoction	21	0.21
4.	<i>Andrographis paniculata</i> (Burm. f.) Nees (Leaf)	King of bitters (Vinika)	Acanthaceae (Herb)	Infusion	3	0.03
5.	<i>Anthocleista djalensis</i> A. Chev. (Leaf)	Cabbage tree (Ibu)	Gentianaceae (Tree)	Decoction	3	0.03
6.	<i>Annona muricata</i> L. (fruit/leaf)	Sour sop (Sawa-sawa)	Annonaceae (Tree)	Chewing	2	0.02
7.	<i>Aspillia africana</i> (Pers) C. D. Adams (leaf)	Haemorrhage plant, wild marigold, compost weed (Edemerong)	Asteraceae (Herb)	Marceration	5	0.05
8.	<i>Azadirachta indica</i> A. Juss (Leaf/Stembark)	Neem, Margosa (Dogonyaro)	Meliaceae (Tree)	Decoction	14	0.14
9.	<i>Bryophyllum pinnatum</i> (Lam.) Oken (Leaf)	Air plant, Life plant, Resurrection plant (Ndodob)	Crassulaceae (Herb)	Squeezing	6	0.06
10.	<i>Buchholzia coriacea</i> (Seed)	Wonderful kola	Capparaceae (Tree)	Marceration	3	0.03
11.	<i>Cannabis sativa</i> L. (Leaf)	(Ikong ekpo)	Cannabaceae (herb)	Marceration Decoction	5	0.05

12.	<i>Carica papaya</i> L. (leaf)	Pawpaw, Papaya (Okpod, popo)	Caricaceae (Shrub)	Decoction	11	0.11
13.	<i>Citrus aurantifolia</i> (Chistm & Panzer) Swingle (Fruits)	Lime (Nkprisokoro)	Rutaceae (Shrub)	Squeezing, Decoction	8	0.08
14.	<i>Commelina diffusa</i> Burm. f. (Leaf)	Benghal dayflower, tropical spiderwort, wandering jew (Ekpaekpaha ikpa)	Commelinaceae (Herb)	Squeezing	3	0.03
15.	<i>Costus afer</i> Ker- Gawl (Stem)	Bush cane, spiral ginger (Mbritem)	Costaceae (Herb)	Squeezing	4	0.04
16.	<i>Curcuma longa</i> L. (Rhizome)	Tumeric (Adan Unen)	Zingiberaceae (Herb)	Infusion	8	0.08
17.	<i>Cymbopogon citratu</i> s (DC) Stapf. (leaf)	Lemon grass (Ebana)	Poaceae (Herb)	Decoction, Infusion	9	0.09
18.	<i>Garcinia kola</i> Heckel (Seed)	Bitter kola (Efiat, Efiari)	Clusiaceae (Tree)	Chewing, Infusion, Maceration	10	0.10
19.	<i>Gongronema latifolium</i> Endfl. Decne (Leaf)	(Utasi)	Apocynaceae (Herb)	Decoction, chewing	5	0.05
20.	<i>Jatropha tanjorensis</i> Ellis & Saroja (Leaf)	Hospital too far, catholic vegetable (Ibok Iyip)	Euphorbiaceae (Shrub)	Squeezing, Decoction	9	0.09
21.	<i>Mangifera indica</i> L. (Stem bark)	Mango (Manko)	Anacardaceae (Tree)	Infusion, Decoction	5	0.05
22.	<i>Moringa oleifera</i> Lam. (Leaf/Seed)	Worse-radish tree (Morinka)	Moringaceae (Shrub)	Chewing, Infusion	9	0.09
23.	<i>Nauclea latifolia</i> (Leaf/Root)	Guinea peach, African peach, Negro peach (Mbom-ibon)	Rubiaceae (Shrub)	Decoction, Maceration	3	0.03
24.	<i>Ocimum gratissimum</i> L. (Leaf)	Clove basil, African basil	Lamiaceae (Herb)	Infusion, Decoction	4	0.04
25.	<i>Psidium guajava</i> L. (Leaf)	Quaver (Woba)	Myrtaceae (Shrub)	Infusion	5	0.05
26.	<i>Selaginella myosurus</i> (Sw.)	Spike mosses, Sweet plant	Selaginellaceae (Herb)	Maceration	2	0.02

	Alston (Whole plant)	(Mkpatat, Mkpatatat)				
27.	<i>Telfairia occidentalis</i> Hook. f. (Leaf)	Fluted pumpkin (Ubon, Ikong ubon)	Curcubitaceae (Herb)	Squeezing, Decoction	3	0.03
28	<i>Tetrapleura tetraptera</i> (Schum & Thonn) Taub.	Aidan tree/Aidon tree (Uyayak)	Fabaceae (Tree)	Decoction	3	0.03
29.	<i>Zingiber officinale</i> Roscoe (Rhizome)	Ginger	Zingiberaceae (Herb)	Chewing, Infusion, maceration	18	0.18
30	<i>Xylopiya aethiopica</i> (Dunal) A. Rich (fruit/leaf)	African pepper, Guinea pepper, Ethiopian pepper (Ata)	Annonaceae (Tree)	Maceration	4	0.04

Zingiber officinale is also used as spice in many food preparations alongside other spices with benefits similar to that of *A. sativum*. Among several of its constituents, is gingerol with powerful antioxidant and anti-inflammatory effects [35].

Azadirachta indica found many uses in ethno medicinal practices of this region and very prominent for the treatment of fever associated with malaria [4]. *A. indica* has been established to have antiulcer, antidiabetic, antitumor, antimicrobial, antinociceptive and antioxidant properties [20]. Azadirachtin and nimbolide are two constituents reported to be responsible for its antimalarial effects [24].

Carica papaya leaf and matured unripe fruits are usually cooked with lemon grass, mango bark and administered orally or as bathing preparation to treat malaria and jaundice. It is known to contain oleic and hexadecanoic acids [5, 40]. The fruit of *C. papaya* is a powerful store house of nutrients, vitamins (Vitamins A, C and E) and also, has papain, a powerful digestive enzyme [51]

Garcinia kola ethnomedicinally, has many uses. For example, the seed is usually chewed or macerated with water/alcohol for the treatment of cough, liver diseases, gastric problems, gonorrhoea and for its astringent taste [40, 55, 44]. *Garcinia kola* seed is also used as antidote to poisoning, detoxification, for repelling evil spirits and a powerful aphrodisiac [32]. Seed extract was reported to stop Ebola growth in the laboratory, reputed for many alkaloidal compounds and kolaviron, a biflavonoid was reported as an antioxidant constituent [32, 36].

The use of plant-based regimens in preventing illnesses is based on the fact that they contained varied phytochemicals which are metabolites produced by plants that have many medicinal benefits to humans in the management of many illnesses [53]. These plant chemicals are varied in forms and most times in herbal formulations, they work together by providing essential nutrients needed by the body to strengthen the immune responses in fighting influx of extraneous poisonous substances and metabolic processes that are involved in many diseases' pathogenesis thereby preventing their manifestations [13]. In preventing and managing covid-19 disease, some regions recommend the use of medicinal plant products since there are no known drugs for this condition [48]. Accordingly, this study supports the practice of using medicinal plants to prevent and manage covid-19 in Akwa Ibom State ethno-medicine.

Table 2: Some used plants and their established antiviral effects

S/No	Name of Plant	Established Antiviral Activity
1.	<i>Aframomum melegueta</i> K. Schum	Measles and Yellow fever [41].
2.	<i>Allium cepa</i> L.	New Castle Disease Virus [21].
3.	<i>Allium sativum</i> L.	Infectious bronchitis virus, New Castle Disease [52, 21].
4.	<i>Andrographis paniculata</i> (Burm. f.) Nees	HIV, Chikungunya Virus, Influenza Virus, Hepatitis B virus, Hepatitis C virus, Herpes simplex virus, Epstein-Barr virus and Human papillomavirus [14,20].
5.	<i>Anthocleista djalonensis</i> A. Chev.	HIV [42].
6.	<i>Azadirachta indica</i> A. Juss	Herpes simplex virus, New castle disease virus [56, 10, 39]
7.	<i>Cannabis sativa</i> L.	Herpes simplex virus, Influenza virus, HIV and Hepatitis C virus [47].
8.	<i>Carica papaya</i> L.	Dengue virus [51, 49].
9.	<i>Annona muricata</i> L.	Dengue virus [56].
10.	<i>Commelina diffusa</i> Burm.f. (Leaf)	Dengue virus [9].
11.	<i>Curcuma longa</i> L. (Rhizome)	Dengue virus [28].
12.	<i>Garcinia kola</i> Heckel	Epidermic haemorrhagic keratoconjunctivitis (EHKC) and Epidermic keratoconjunctivitis [32, 2, 27]
13.	<i>Mangifera indica</i> L.	Influenza virus, Herpes simplex virus and HIV [60, 18, 6]
14.	<i>Moringa oleifera</i> Lam.	HIV, HBV, Influenza virus, Foot and mouth virus, Herpes zoster, New castle disease [30,7,38,16,29]
15.	<i>Xylopiya aethiopica</i> (Dunal) A. Rich (fruit)	Measle virus [43]
16.	<i>Zingiber officinale</i> Roscoe	Human respiratory syncytial virus (HRSV) [12,34]

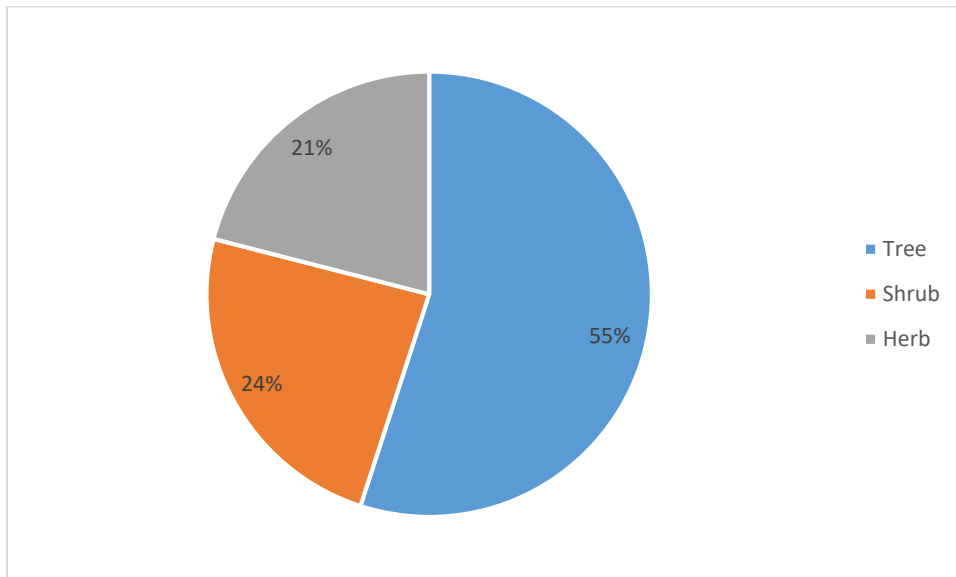


Figure 1: Medicinal Plants Habits

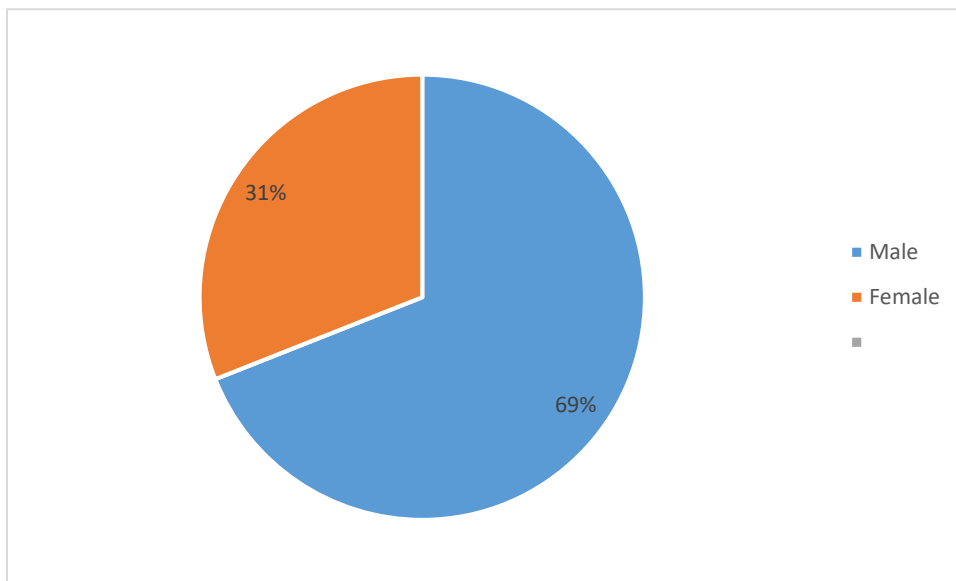


Figure 2: Age grades of TMPs

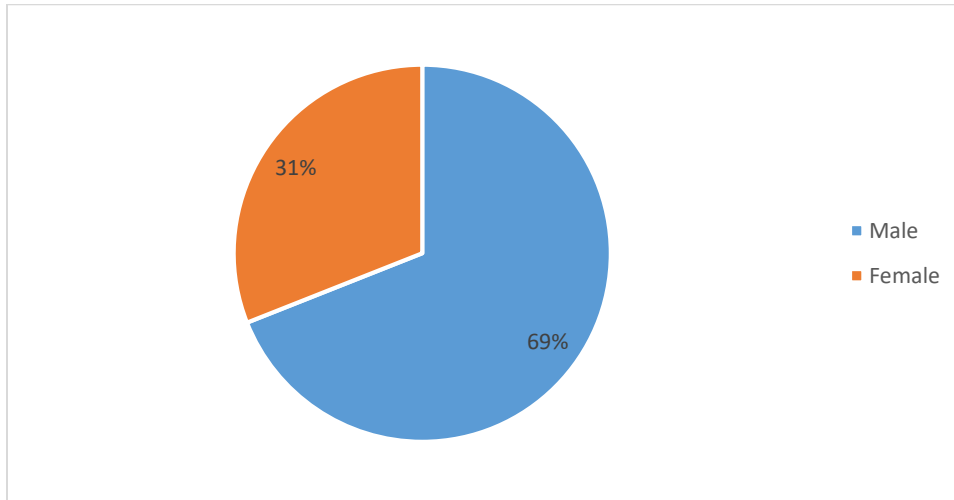


Figure 3: Gender of TMPs

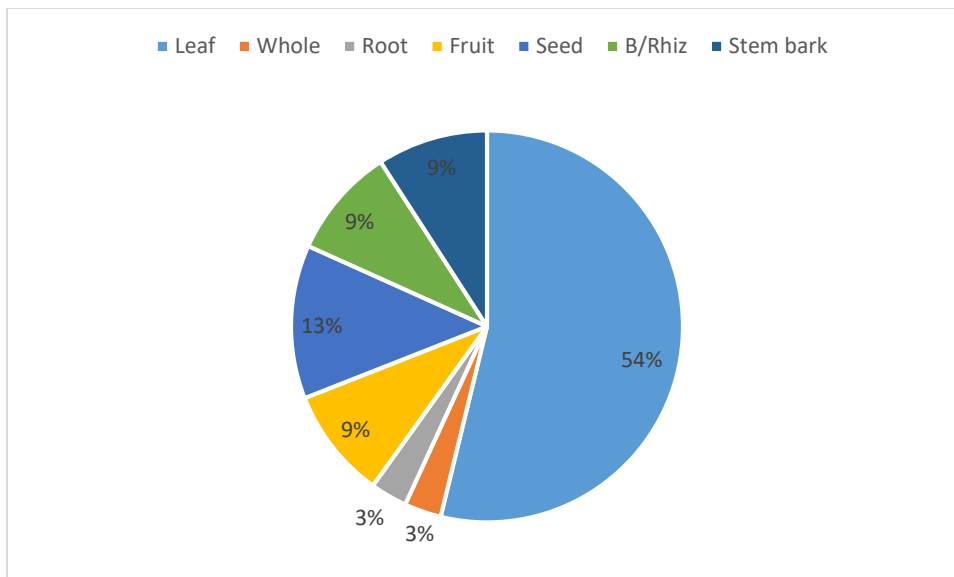


Figure 4: Plant parts used by TMPs

CONCLUSION

The results generated from this study support the use of medicinal plants in the prevention and management of covid-19 symptoms and also produce a data base for further research.

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