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Preliminary survey of medicinal plant species in Gombe metropolitan, Nigeria

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Abstract

The use of locally available plant parts for disease treatment is common among non-industrialized societies, because of its affordability over pharmaceutical products. Most herbal medicines are highly effective than industrial ones aside having less harmful side effect if properly used. Therefore, it is significant to determine the possible medicinal plant species found around the local community of Gombe metropolis. Questionnaire and oral interview were utilized for data collection on plants species, their uses, parts and preparation method. Different respondent used for the study include herbalist, old people, farmers and others were targeted. The data were statistically analyzed using SPSS. The total number of medicinal plants recorded during the study was 33 species under 25 families. Results of the study showed that the various parts of these plants are used for curing different types of diseases including malaria, snake bite and irregular menstruation. Fascinatingly, the leaves gave the highest percentage of 43.5% of the total parts, followed by the bark at 20.5%. In recommendation, government needs to ensure safety and efficiency in the use of those medicinal plants through a strategic plan.

Keywords: Medicinal plant, Plant-Part, Survey, Gombe.

1. Introduction

The use of plant parts directly as medicine to treat diseases is almost universal among non-industrialized societies. This is continuing to increase tremendously over the past decades because it is often more affordable than purchasing expensive modern pharmaceuticals. According to World Health Organization W.H.O (2000), over 4 billion people in the world rely on plant parts as a source of drugs. Such plant materials have been identified and used throughout human history. A large amount of archaeological evidence exists to show how humans used such herbal materials during the Paleolithic period (approximately 60,000 years ago)^[1]. Although, herbal remedies have promising potential and are widely used, however, many of them remain untested and their uses also not monitored ^[2]. Thus, some herbal medicines are more effective than industrial ones and generate less potential harmful side effect if properly used.

The chemical compounds produced by such medicinal plants during usual metabolic processes are called 'Phytochemicals' which are considered the source of medication of the plant and serve in killing diseases ^[3]. These chemical compounds are referred to as 'secondary metabolites and are of different classes. The plant species possessing such compounds can be either tree, herb, shrub or grasses. The phytochemicals are found in the species leaves, bark, seeds, roots or other constituents having therapeutic or pharmacological activities when administered. The plants are used directly as tea, add in food, an extract or an agent in the synthesis of drugs. As we reported earlier ^[4, 5], there is an upsurge interest in the application of plant material as natural drug, their potency is responsible for providing the medical effect, preventing or delaying oxidation of products by free radicals scavenging and reducing oxidative stress.

It has been estimated that over 80% of the Nigeria populist are depending on herbal medicine ^[6, 7], whereas most treatment in this traditional medicine has no specific tool to assess the efficiency and safety of the botanical product^[8]. As the global use of the plant materials as medicinal products continues to grow more precisely in developing nations, it will be of immense significant to identify such materials around the local communities for further scientific investigation and to provide a proper guideline on their usage without causing harm. Therefore, this study was undertaken to survey the possible plant species and their medicinal application in local community of Gombe metropolis.

2. Materials and Methods

2.1 Study area

Gombe is located in the northeastern part of Nigeria with a population of 261,536 people (2006 census). It has an area of about 52 km² and situated between longitude 8° 45' and 11° 45' E and latitude 9° 30' and 12° 30' N of the Greenwich meridian. It has two distinct climates; the dry season (November-March) and the rainy season (April–October) with an average rainfall of 850 mm^[9, 10].

2.2 Sample Size

A total of about twenty-seven individuals represent 33% of population of farmers, seventy represent 20% of the population of civil servant, nineteen represent 23% population of herbalist and eighteen represent the 22% of the population of others. It is believed that the total percentage would provide the suitable representative of the general population. The justification for selecting this sample is for the researcher to get a representative sample.

2.3 Method of Data collection

The researcher employed both primary and laboratory data collection instrument. For primary data; Questionnaires in this respect are designed to include both close and open-ended questions which offered a respondent's opportunity to express their views. The questionnaires designed are to be administered on the sampled population of the individual in Gombe metropolis. The questionnaire is designed to elicit all information covering this research. The key elements of the questionnaire include group meeting, sample collection and interview with key important persons that knows more on medicinal plants such as herbalist

2.4 Determination of Medicinal Plants and Part Uses

The plant samples were collected and traditionally identified at the field by herbalist, old men and women. The information on the sample was filled in the questionnaire and/or by oral interview. The samples were taken to the herbarium of Department of Biological Sciences, Gombe State University (GSU) Nigeria for scientific identification and further analysis. Each sample of leaf, stem, bark, root or fruit were given voucher number and kept as reference specimen for future use.

2.5 Data analysis

The information generated was analysed using Statistical Package for the Social Sciences (SPSS version 18)

3. Results and Discussion

3.1 Respondent Distribution and Identification of Medicinal Plants

Medicinal plants contains substance known to modern and ancient civilization for their healing properties^[11]. Until the development of modern chemistry and particularly of the synthesis of organic compound in the past centuries. Medicinal plants (either tree, herbs or shrubs) are the sole source of active principle capable caring of man's ailment and would continue to be important to people that do not have access to modern medicines. Besides, modern pharmaceuticals heavily rely on the same bio-active properties from the plants for drug production^[12]. In the present study, diverse number of respondents responded to the interview and data on the medicinal plants around Gombe

metropolis and their uses, as well as the specific parts of the plant was collected. Table 1 showed the total respondents, their age distribution among the various occupations and sexes. Majority of the respondent were male with 62%, farmers constituting about 29% and less young generation which mostly civil servants all from the community.

The different occupational distribution of the respondents indicated that farmers (commonly herbalist) were the highest users of traditional medicine with 35.7%. This class of people are more aware of the frequency of the plants and their numerous merits to the surrounding environments. Such includes their accessibility, cheapness, reliability, effectiveness (as believe by most traditional herbalist) and the kind of sickness cured by the plant(s). The age group between 50-70 years is the set who engage effectively in the usage of identified plants for curing of diseases. While, age group between 31-50 years are usually the working-class majority which are rarely using those plants due to the availability of the packaged and preserved industrial pharmaceutical products. Therefore, information on the usage of these plants for medicinal purposes are easy to obtain from the former class because of their long-term experience, though, they are few in the society. In addition, such account of the practices is equally being used by others within or outside the metropolis for treatment.

3.2 Medicinal Plants and Their Uses

The number of different medicinal plants recorded during the period of the present survey has been confirmed to be 33 plant species under 25 families. The species are being used for curing different diseases including dysentery and increase breast milk for pregnant women. In some plant, the whole tree/shrub/herb is considered, while in others it is parts of the plants that are used especially for treating disease (table 3). Among the plants species discovered during the analysis; 5 are used for stomach ache, 5 for dysentery, 5 species for fever, 4 species for blood increase, 3 species for skin infection, 3 species to balanced blood sugar level, 3 species for liver function, 3 species for malaria, 2 species for anemia, 2 species for hypertension, 2 species for typhoid, 2 species are anti-diabetic and 2 species for growth and development of baby.

In addition, 2 species are for animal bite, 1 species for arrow poison, 2 species for bilharzia, 2 species for cough, 2 species for diarrhea, 1 species for eye problem, 1 species for irregular menstruation, 2 species for cold, 1 species for snake bite, 1 species for kidney problem, 1 species for healing wound, 1 species for vomit, 1 species for fertility improvement, 1 species for jaundice, 1 species for skin cancer, 1 species for virginal discharge, 1 species for liver detoxification, 1 species for worms, 1 species for bronchitis, 1 species for blood purification, 1 species for piles lower sugar content, 1 species for leprosy, 1 species as antibiotic and 1 species for sore throat. Interestingly, the plant parts that make much impact includes; the leaves which gave the highest percentage 43.5% of the total parts using, the bark was the second highest at 20.5%, the fruits gave 15.3%, the roots gave 12.8%, the bulb gave 5.1% and seeds at 2.6% (table 4.3). This survey reveals that quite a number of people have much knowledge on the type of plants around and their uses for curing disease. The individual persons used several methods to prepare the plant product from local materials traditionally^[2, 12-14]. Equally, repetition of answers were avoided.

Table 1: The age's distribution, sex major and occupation of the respondents interviewed.

Age	Class of respondents					
	Male	Female	Farmers	Civil servant	Herbalist	Others
10-20	3	1	2	0	3	0
21-30	6	6	6	2	0	2
31-40	9	9	4	4	6	3
41-50	13	13	7	6	4	5
51-60	12	12	4	4	1	6
61-70	5	5	3	1	4	2
Above 70	4	4	1	0	1	0
Total	52	50	27	17	19	18

The information on identified number of plant species including their family names, botanical names, English and vernacular name were presented in table 2. The name was identified base on scientific marker.

Table 2: Identified medicinal plants from Gombe metropolitan, Nigeria. The plants family, species, English and vernacular names were determined.

S/N	Family name	Species name	English name	Vernacular Name
1	<i>Amaranthaceae</i>	<i>Amaranthus caudatus</i>	Waterleaf	Alayyafoo
2	<i>Amaranthaceae</i>	<i>Celosia argentea</i>	Plumed cockscomb	Rimi
3	<i>Anacardiaceae</i>	<i>Mangifera indica</i>	Mango	Mangwaro
4	<i>Caesalpinaceae</i>	<i>Tamarindus indica</i>	Tamarine	Tsamiya
5	<i>Caesalpinaceae</i>	<i>Piliostigma reticulatum</i>	Pithonning	Kalgo
6	<i>Caesalpinaceae</i>	<i>Senna occidentalis</i>	Coffee senna	Tafasaa
7	<i>Burseraceae</i>	<i>Boswellia papyrifera</i>	Elephant tree	Ararrabi
8	<i>Combretaceae</i>	<i>Combretum micranthum</i>	-	Geza
9	<i>Combretaceae</i>	<i>Guiera senegalensis</i>	-	Sabara
10	<i>Composite</i>	<i>Vernonia amygdalina</i>	Better leaf	Shuwaka
11	<i>Curcubitaceae</i>	<i>Telfaria occidentalis</i>	Fluled pumpkin	Kabewa
12	<i>Bignoniaceae</i>	<i>Newbouldia laevis</i>	-	Aduruuku
13	<i>Combretaceae</i>	<i>Anogeissus leiocarpus</i>	Chew stick	Markee
14	<i>Moraceae</i>	<i>Ficus polita</i>	-	Durmi
15	<i>Fabaceae</i>	<i>Senna occidentalis</i>	Coffee senna	Tafasa
16	<i>Lilaceae</i>	<i>Allium sativum</i>	Garlic	Tafarnuwa
17	<i>Meliaceae</i>	<i>Azadirachta indica</i>	Neem	Dogon-yaro
18	<i>Meliaceae</i>	<i>Khaya senegalensis</i>	African mahogany	Madaci
19	<i>Melvaceae</i>	<i>Adansonia digitata</i>	Boabab	Kuka
20	<i>Melvaceae</i>	<i>Hibiscus sabdariffa</i>	Roselle calyx	Zobo
21	<i>Moraceae</i>	<i>Ficus thonningii</i>	-	Cediya
22	<i>Moringaceae</i>	<i>Moringa olifera</i>	Horseradish tree	Zogale
23	<i>Mitrosaceae</i>	<i>Parkia biglobosa</i>	Locust bean	Dorawa
24	<i>Mytaceae</i>	<i>Eugenea caryophyllus</i>	Cloves	Kanamfari
25	<i>Mytaceae</i>	<i>Psidium guavas</i>	Guava	Gwaiba
26	<i>Pssoaceae</i>	<i>Dactyloctenium aegyptium</i>	Crowfoot	Gudaguda
27	<i>Rutaceae</i>	<i>Citrus aurentifolia</i>	Lime	Lemu
28	<i>Solanaceae</i>	<i>Solanum melogalensis</i>	Solaam	Gauta
29	<i>Tiliaceae</i>	<i>Corchorus trilocularis</i>	Jute	Lalo
30	<i>Urtacaceae</i>	<i>Ficus platyphll</i>	-	Gamji
31	<i>Verbenaceae</i>	<i>Vitex doniana</i>	Black plum	Dunya
32	<i>Zingiberaceae</i>	<i>Aframomium melegueta</i>	Malaqueta pepper	Citta
33	<i>Zygophyllaceae</i>	<i>Balanitees aegyptiaca</i>	Desert date	Aduuwa

Table 3: List of identified medicinal plant species and their usage.

S/N	Plant Species	Uses
1	<i>Ficus polita</i>	The leaves are used for stomach wash
2	<i>Senna accidentalis</i>	An infusion leaves are drinking for fever treatment
3	<i>Balanites aegyptiaca</i>	A bark is used as an antidote for arrow poison and for bilharzia. Also, the fruit is use for bilharzia as well.
4	<i>Boswellia papyrifera</i>	The bark is used for curing skin cancer.
5	<i>Mangifera indica</i>	Fruit are consumed to wash stomach.
6	<i>Citrus aurentifolia</i>	A decoration of leaves is drunk to treat malaria, diarrhea and dysentery.
7	<i>Azadirachta indica</i>	All the organs of the tree are used for treating ailment such as yellow fever, stomach problem and worms, skin infection, malaria, improved liver function and balanced blood sugar level.
8	<i>Adansonia digitata</i>	The fruit and leaves are consumed to treat fever and help in growth and development of baby.
9	<i>Guiera senegalensis</i>	Fruits and leaves are used to treat stomach problem in children and typhoid fever.
10	<i>Combretum micranthum</i>	The leaves are used to treat eye problem.
11	<i>Moringa oleifera</i>	Almost all the part parts are used for medicinal purpose and the plant is called 'Miracle tree'.
12	<i>Parkia biglobosa</i>	Bark is consumed for irregular menstruation.
13	<i>Psidium guajavas</i>	The species leaves are drinking after boiling for dysentery and typhoid fever.

14	<i>Newbouldia laevis</i>	The leaves are used to treat stomach problems
15	<i>Ficus platyphll</i>	Bark is consumed to increase blood.
16	<i>Vernonia amygdalina</i>	Leaves are used to treat cough and pile lower sugar content.
17	<i>Allium sativum</i>	Leaves are for treatment of snake bite, used as anti-diabetic, as antibiotic and anti-hypertension and also as reliever to nausea.
18	<i>Khaya senegalensis</i>	Roots are used for stomach problem ache.
19	<i>Solanum melogalensis</i>	Seeds and leaves are used to treat kidney problem
20	<i>Telfaria occidentalis</i>	An infusion leaves are used as anti-anemic or as blood tonic
21	<i>Ficus thonningii</i>	An infusion roots are used to stop vomiting and the bark is used to treat colds, sore throat and dysentery.
22	<i>Vitex doniana</i>	It leaves are used for baby growth and development and fruits are used to treat anemia, jaundice, leprosy, dysentery and to improve fertility.
23	<i>Tamarindus indica</i>	Fruit are consumed to treat teeth animal bite.
24	<i>Hibiscus sabdariffa</i>	The species leaves are used to increase blood.
25	<i>Celosia argentea</i>	The barks is consumed to treat dysentery.
26	<i>Anogeissus leiocarpus</i>	Bark is consumed as cough reliever.
27	<i>Amaranthus caudatus</i>	The plant leaves are consumed to increase body blood.
28	<i>Eugenea caryophllus</i>	Species fruits are consumed to treat teeth disorder, animal bite and to clear virginal discharge.
29	<i>Aframomium melegueta</i>	It bulbs are used to detoxify liver and bronchitis.
30	<i>Corchorus trilocularis</i>	The plant leaves are used for blood purification.

4. Conclusion

The preliminary survey of the medicinal plant species was successfully conducted in Gombe Metropolitan. Results of this study showed that various plant materials have potency for medicinal application. The important of these various plant materials for their medicinal application cannot be over-emphasized, considering the immense benefit highlighted. Because this plant species are easily accessible at residential area, farm-land and herbalist, their usage for the treatment of illnesses become affordable to the less privilege individuals who cannot afford pharmaceutical drugs. It is worth considering that, the proper use of traditional medicine made from plant materials can be as effective as the pharmaceutical drugs or even better since it does have fewer side effects. Hence, the information gathered here towards determining those medicinal plants is important to the studied area and world at large in terms of exploiting the medicinal potency of plant species. This will reduce the over dependence on pharmaceutical drugs which are attributed to many side effects. The structured interview was designed to be suitable for obtaining answers from the different class of peoples and also to select the most appropriate answer from the given alternatives. Therefore, it is recommended that government need to ensure safety and efficient use of those medicinal plants for remedies. There is also need to provide an adequate control measures for their usage, these include substantial effort in proportional education, public awareness and checklist of the specimens and their side effects. Nevertheless, other approaches can guide researchers in their collaboration with local communities in identifying plants, their usage, as well as their values.

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