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A SURVEY OF PLANTS USED IN THE TREATMENT OF DIABETES AND HYPERTENSION IN AWKA METROPOLIS, NIGERIA.

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ABSTRACT

The use of plants for food, medicine, cosmetics and constructions has widely been practiced amongst community members, but little information has been documented on the types of plant species used, availability of the species, location of the plant in question and the forms of application. This study is aimed at looking into the commonly used plants for the treatment of diabetes and hypertension in Amawbia community in Awka South LGA of Anambra state. Ethno-study on the indigenous plants used for the treatment of diabetes and hypertension in Awka metropolis, was carried out through oral interview and use of questionnaire for data collection. Plant samples with their leaves, fruits, flowers, stem barks and roots were collected and were used for the interview. The highest number of questionnaires; sixty (60) was retrieved from Ifite and the least 44 was obtained from Okpuno village. The highest age bracket of respondents who have indigenous knowledge of plants used for the treatment of diabetes and hypertension was obtained in Amaenyi, 31 - 40 years old with 43.63% respondents while the least occurred in Okpuno, 71 - 80 years having 3.41%. It was clearly observed in Amenyi, age categories of respondents between 71-80 years old did not

provide information about the plants relevant in the treatment of diabetes and hypertension, which they use. The respondents showed that they have access to information on the plant species used for the treatment of diabetes and hypertension through apprenticeship (83.3%) and some were informed by listening to folklore (68.3%), while newspapers and the internet were the least sources of information about plant species relevant in the treatment of diabetes and hypertension. The mode of preparation of plant species for the treatment of diabetes and hypertension was ascertained among the rural dwellers in the study area. The findings showed that the most notable mode of preparation of herbal medicine for treatment of these ailments were extractions, decoctions and gruels. For the treatment of diabetes and hypertension, the respondents showed that the frequently used plants are *Musa paradisiaca* (87.5%), *Gongronema latifolium* (80.8%), *Pterocapus mildbraedii* (87.5%) and *Pterocapus soyaxii* (87.2%) amongst others. The respondents interviewed provided vital information on the indigenous uses of these plants; the parts used, mode of preparation, method of administration and their dosages.

Keywords: Treatment, Respondents, Hypertension, Diabetes, Plant species, Preparation.

INTRODUCTION

The basic instinct of human from time immemorial is to avoid pain and embrace pleasure. In pursuit of a healthy life, people design food, medicine, cosmetics, and entertainment products for themselves. Ethnographic studies show that virtually every aspect of human life is associated with plants. In essence, humans and plants are inseparable. People eat when hungry, beat drums and gongs when dancing, and use herbal medicine if they are sick. Ethnomedical practice is an important part of the primary health care delivery system in most parts of the developing countries, and according to the World Health Organization, an estimated 3.5 billion rural dwellers in the developing world depend on medicinal plants as part of their primary health care (Idu and Onyibe, 2007). According to Ajaiyeoba *et al*. (2003), only 8–25% of people with malaria in indigenous African communities visit modern health services. This has necessitated the investigation into African ethnobotany and ethnomedicine. If we look critically into the things that keep human satisfied daily, we will discover that plant is a necessity. As believed in most cultures of the world, good health and happiness are the things plant brings. Narrowing down to Nigeria and Awka in particular, there is a common belief that food is medicine. As what, how, and when we eat is deeply rooted in our cultural practices (Receveur, 1997). In 2005, Kaiser Permanente in the US implemented its community health initiative called healthy eating and active living in order to check the widespread of chronic conditions such as obesity and diabetes in youths (Dietz *et al*., 2015). Kuhnlein and Receveur (1996) wrote a review on dietary change and traditional food systems of indigenous people, they quoted the Ngoni people in Asia, in which they stated that the change of diet is the chief cause of their smaller stature today and the prevalence of various illnesses. The survival of man has been dependent on his innate curiosity to examine by trial and error all aspects of his environment (Aniama.2016). An attempt to promote rural development that reconciles improvement in the

quality of life and conservation of natural resources have had more success when based on the local knowledge and current patterns of resource use within the involved communities (IES, 1995). Studies on indigenous uses of plants in several parts of the world have been documented (Umaru, 2020; Lone, 2015; Idu *et al.*, 2007).

Fieldwork in tribal areas and the analysis of different tribal history are effective methods by which ethnobotanical research can be conducted (Gary, 2004).

Medicinal plants constitute an effective source of both traditional and modern medicine. These plants have been shown to have genuine utility and about 80% of the rural population depends on them as primary health care (Akinyemi, 2000; Monier, et al. 2016). Plants have been used as sources of remedies for the treatment of many diseases since ancient times and people of all continents especially Africa have this old tradition. Despite the remarkable progress in synthetic organic medicinal products of the twentieth century, over 25% of prescribed medicines in industrialized countries are derived directly or indirectly from plants (Newman *et al*., 2000; Okogun, 2002). However, plants used in traditional medicine are still understudied (Kirby, 1996). In developing countries, notably in West Africa, new drugs are not often affordable. Thus, up to 80% of the population uses medicinal plants as remedies (Kirby, 1996; Hostellmann and Marston, 2002). Traditional medicine might also be considered as a solid amalgamation of dynamic medical known-how and ancestral experience. In Africa, traditional healers and remedies made from plants play an important role in the health of millions of people. Traditional medicine has been described by the WHO as one of the surest means to achieve total health care coverage of the world's population. Numerous medicines have been derived from the knowledge of tropical forest people and clearly there will be more in the future. This alone is reason enough for any and all programs to be concerned with the conservation, development, and protection of tropical forest regions (Hostellmann and Marston, 2002).

It has been estimated that in developed countries such as United States, plant drugs constitute as much as 25% of the total drugs, while in fast developing countries such as China and India, the contribution is as much as 80%. Thus, the economic importance of medicinal plants is much more to countries such as India than to rest of the world. These countries provide two third of the plants used in modern system of medicine and the health care system of rural population depend on indigenous systems of medicine. Of the 2, 500,000 higher plant species on earth, more than 80,000 are medicinal. India is one of the world's 12 biodiversity centres with the presence of over 45000 different plant species (Akinyemi, 2000).

Statement of Problem

Plants and their use by indigenous culture are not only useful for conservation of cultural traditions and biodiversity but also for economic welfare, nutritional value, community healthcare and drug development now and in the future. Considering the yearly loss of forest reserves, one can easily foresee a drastic reduction in the size and quality of this biotope. At this deforestation rate, the luxuriant tropical fauna and flora, including plants with known or potential economic, nutritional and medicinal value, will be decimated and indigenous plant knowledge has little chance to survive. Deforestation and loss of plants

poses a clear threat to human safety. The extinction of valuable plants, presents a more hidden health risk to both developing countries and newly industrialized societies. The documentation of economic and medicinal uses of Nigerian plants is becoming increasingly urgent because of the rapid loss of the natural habitat for some of these plants due to anthropogenic activities.

Aim and Objectives

The use of plants for food, medicine, cosmetics and constructions has widely been practiced amongst community members, but little information has been documented on the types of plant species used, availability of the species, location of the plant in question and the forms of application. This study is aimed at looking into the commonly used plants for the treatment of diabetes and hypertension in Amawbia community in Awka South LGA of Anambra state. The objectives of this study include:

- To identify and document commonly used plant species for treatment of diabetes and hypertension in Amawbia Awka South LGA.
- To record traditional knowledge on the use of these plants.

And

- To collect commonly used plants of the area for proper identification and future reference.

MATERIALS AND METHODS

Location of study area

Awka town is bounded on the north by Awka North LGA, on the east by Oji-River LGA of Enugu State, on the south by Anaocha LGA and on the west by Njikoka LGA. It lies within the coordinates of latitude 6º 09' 60.00"N and longitude 7º 03' 60.00"E.

Plant collection and Identification

Surveys were carried out for plants used in the treatment of diabetes and hypertension in four (4) villages in Awka, Anambra state: Amansea, Ifite, Okpuno and Amaenyi. Some useful plants for diabetes and hypertension treatment in these villages were recorded. Photograph of plant samples were taken and fresh samples were collected. Plant samples with their leaves, fruits, flowers, stem barks and roots were collected and were used for the interview. All plant samples collected in the field were properly identified by Mr. Wisdum Anyanele a Lecturer in the Department of Botany, Nnamdi Azikiwe University Awka, Nigeria. Voucher specimens were kept in the University herbarium and numbers were assigned to them.

Data Collection and Analysis

A survey was conducted in the four (4) villages making up Awka town. Oral interview was conducted and interviewees were chosen without distinction of gender after seeking the consent from each respondent.

Field trips were made to four villages within the study area between. A total of 100 willing respondents comprising of elderly men and women, family heads,

house wives, young farmers, herbalists, settlement heads and young people were interviewed in each of the 4 villages in Awka. Information regarding the plants used for the treatment of diabetes and hypertension was sort. Also, the common and vernacular names of the described species were also of interest.

Corroboration of any ethnobotanical information by at least two independent sources was considered to enhance fidelity and thus documented. The

respondents assisted in the collection of plant samples from home gardens, grass lands, farms and forests within the study area. Standard literatures were then consulted for their proper identification (Ayensu 1978; Olorode 1984; Keays 1989; Gill, 1992; Akobundu and Agyakwa 1998).

Statistical Analysis

Data collected were presented in tables and were analyzed by percentage using SPSS version 21 package.

RESULTS

Table 1: Age range of respondents from Four Villages in Awka

Village	Questionnaire Retrieved	≤30	31-40	41-50	51-60	61-70	71-80
		(%)	(%)	(%)	(%)	(%)	(%)
Amansea	57	15.79	2.28	21.06	40.35	5.26	5.26
Ifite	60	21.67	21.67	23.33	13.33	11.67	8.34
Okpuno	44	22.73	22.73	29.55	10.23	6.82	3.41
Amaenyi	55	12.75	43.63	29.09	5.45	9.09	0

The highest number of questionnaires sixty (60) was retrieved from Ifite and the least, 44 was obtained from Okpuno village (Table 1). The highest age bracket of respondents who have indigenous knowledge of plants used for the treatment of diabetes and hypertension was obtained in Amaenyi, 31 - 40 years old with 43.63% respondents while the least occurred in Okpuno, 71 - 80 years having 3.41% (Table 1). It was clearly observed that in Amaenyi, age categories of respondents between 71 - 80 years old did not provide information about the plants relevant in the treatment of diabetes and hypertension, which they use (Table 1).

Table 2: Percentage Distribution of Respondents on their Source of Knowledge Uses Plants in Awka

Source of knowledge	Response (%)	Frequency of access (%)		Preference (%)
	Yes	Regular	Occasional	Most preferred
Radio	40.8	25.8	42.5	35.8
Apprenticeship	83.3	56.7	36.6	84.2
Folklore	68.3	38.3	22.5	50.8
Friends/Relatives	45.8	28.3	17.5	-
Television/Video	34.2	8.3	35.9	28.3
Newspaper/Pamphlets	4.2	9.2	4.2	6.7
Internet	29.2	21.7	7.5	35.8

Table 2 shows that the respondents have access to information on the plants species used for the treatment of diabetes and hypertension. Those who get their knowledge through apprenticeship were 83.3%. Those who were informed by listening to folklore were 68.3% while newspapers and the internet were the least sources of information about plant species relevant in the treatment of diabetes and hypertension.

Table 3: Percentage Distribution of Respondents on Most Efficient Mode of Preparation of Herbal Drugs in Treatment of Diabetes

Mode of preparation	Yes (%)	No (%)
Extractions	79.2	20.8
Decoction	65.8	34.2
Infusions	70.5	29.5
Tinctures	62.5	31.7
Gruels	79.0	21.0

The mode of preparation of plant species for the treatment of diabetes was ascertained among the rural dwellers in the study area. The result showed in table 3 above that the most notable mode of preparation of herbal medicine for treatment of diabetes was extractions and gruels (79.2%) and (79.0%) respectively.

Table 4: Percentage Distribution of Respondents on Most Efficient Mode of Preparation of Herbal Drugs in Treatment of Hypertention

Mode of Preparation	Yes (%)	No (%)
Extractions	59.2	41.8
Decoction	79.8	21.2
Infusions	67.8	32.2
Tinctures	39.6	62.4
Mixtures	89.0	11.0

The mode of preparation of plant species for the treatment of hypertension was ascertained among the respondents in the study area. The result showed in table 3 above that the most notable mode of preparation of herbal medicine for treatment of hypertension was extractions and gruels (89.0%) and (79.8%) respectively.

Table 5: Percentage Distribution of Respondents on Plants used for the Treatment of Diabetes in Awka

List of Plants Used	Local name in Igbo	Usage (%)		
		Frequently used	Rarely used	Never Used
Bridelia ferruginea	Ola	44.2	42.5	
Garcinia kola	Aki inu	36.7	41.7	21.6
Irvingia gabonensis	Ugiri	71.7	2.5	5.8
Musa paradisiacal	Ugede	87.5	9.2	-
Cucurbita pepo	Anyu	52.5	10.0	36.7
Chromolena odorata	Abali di egwu	57.5	29.2	-
Annona muricata	shawashopu	44.2	9.2	27.5
Psidium guajava	Gova	51.6	32.5	-
Agaricus bisporus	Ero	74.1	24.2	-
Ocimum gratissimum	Nchanwu	61	37.3	1.7
Phaseolus lanatus	Akidi okpokpo	57.5	34.1	4.2
Dioscorea bulbifera	Adu, Abana ofia	80	9.5	5.5
Peltophorum africanum	Ujuju	44.8	40.2	15
Vernonia amygdalina	Onugbu	53.3	24.2	22.5
Gongronema latifolium	Utazi	80.8	19.2	-

Table 4 shows some of the plant species used for the treatment of diabetes in the study area. The frequently used plant is *Musa paradisiaca* (87.5%) and *Gongronema latifolium* (80.8%).

Table 6: Percentage Distribution of Respondents on Plants used for the Treatment of Hypertension in Awka

List of Plants Used	Local name in Igbo	Usage (%)		
		Frequently used	Rarely used	Never Used
Bryophyllum pinnatum	Odaa opue	54.2	52.5	
Lantana camara	Anya nnunu	46.7	31.7	21.6
Persea Americana	Ube bekee	81.7	2.5	5.8
Hibiscus sabdariffa	Zobo	85.5	9.2	-

Terminalia catapa	Ukwu Furut	62.5	20.0	36.7
Pterocapus mildbraedii	Oha ojii	87.5	29.2	-
Pterocapus soyaxii	Oha ocha	87.2	19.2	27.5
Mistletoe	-	51.6	32.5	-
Ricinus communis	Ogili-isi	75.1	24.2	-
Securidaca longipendiculata	Atumaka	51	37.3	1.7
Lycopodium cernum	-	47.5	34.1	4.2
Talinum triangulare	Mgbolodi	80.8	19.2	-

Table 4 shows some of the plant species used for the treatment of diabetes in the study area. The frequently used plant is *Pterocapus mildbraedii* (87.5%) and *Pterocapus soyaxii* (87.2%).

Table 7: Responses on Parts Used, Mode of Preparation and Method of Administration of Plants in Treatment of Diabetes

List of Plants	Family	Part of Plant Used	Mode of Preparation	Method of Administration	Dosage
Bridelia ferruginea	Euphorbiaceae	Leaves	Boil for 2-3 hours	Drink as tea	3-4 times daily
Garcinia kola	Clusiaceae	Seed	Cut fruit open to bring out seed then wash	Chewed raw	Chew daily as desired
Irvingia gabonensis	Irvingiaceae	Fruit and seed	Wash fruit, cut open to bring out seed	Eat fruit raw, dry seed then grind and use for soup	Eat daily as desired
Musa paradisiacal	Musaceae	Fruit	Boil, peel and grind then bake with hot water	Eat with soup or oil	Eat daily as desired
Cucurbita pepo	Cucurbitaceae	Fruit, seed, leaves	Fruit is cooked	Eat with oil, stew/soup	Eat as desired
Chromolena odorata	Asteraceae	Leaves	Boiled, soaked	Drank as tea or soup	2-3 times daily
Annona muricata	Annonaceae	Fruit and leaves	Fruit is peeled, leave is boiled	Eaten raw after peeling, drink as tea	Eat fruit as desired, drink a glass of tea 3 times daily

Psidium guajava	Myrtaceae	Leaves	Boiled, ground into powder	Drink as tea, mix powder with food	One glass 3 times daily or 2 teaspoon of powder
Agaricus bisporus	Agaricaceae	Seed	Cooked	Eaten as snack	4-5 seeds daily
Vernonia amygdalina	Asteraceae	Leaves	Squeeze or boil, Ground in to powder	Drink as tea, mix powder with food,	One glass 3 times daily, half tea spoon in food
Ocimum gratissimum	Lamiaceae	Leaves	Cooked, ground into powder	Eaten as soup, drink with spoon or glass	Eat soup as desired, take 1 glass or 3 teaspoons twice daily
Phaseolus lanatus	Fabaceae	Seed	Cooked	Eaten as porridge or with stew	Eat as desired
Dioscorea bulbifera	Dioscoraceae	Tuber	Boiled, cooked with vegetable or oil	Eaten as vegetable in soup	Eat as desired
Peltophorum africanum	Caesalpiniaceae	Leaves	Leaves and bark are dried	Eaten raw, drank as tea	Eat 3-4 fruits twice daily, drink 2 glasses twice daily
Gongronema latifolium	Asclepiadaceae	Leaves	Wash leaves, boil	Chewed as snack, drink as tea, add to food	Chew as desired

Fifteen different plant species used in the treatment of diabetes were identified in this study as the most well-known among the people of Awka (Table 7). They collect and consumed these plants as food or medicine. The respondents interviewed provided vital information on the indigenous uses of these plants; the parts used, mode of preparation, method of administration and their dosages.

Table 8: Responses on Parts Used, Mode of Preparation and Method of Administration of Plants in Treatment of Hypertension

List of Plants	Family	Part of Plant Used	Mode of Preparation	Method of Administration	Dosage
Bryophyllum pinnatum	Crassulaceae	Leaves	Boil for 2-3 hours	Drink as tea	3-4 times daily
Lantana camara	Verbenaceae	Leaves	Boiled or soaked	Drink as tea or beverage	2-3 times daily
Persea Americana	Lauraceae	Leaves	Boiled	Drink as tea	2 glass daily
Hibiscus sabdariffa	Malvaceae	Carlyx	Boiled with water	Drink as beverage	Drink daily as desired
Terminalia catapa	Combretaceae	Leaves	Boiled	Drink as tea	2 times daily
Pterocapus mildbraedii	Fabaceae	Leaves	Boiled, cooked	Drank as tea or soup	2-3 times daily
Pterocapus soyaxii	Fabaceae	Leaves	Cook, boiled	Cooked as soup, drink as tea	Eat soup desired, drink a glass of tea 3 times daily
Mistletoe	Loranthaceae	Leaves	Boiled, ground into powder	Drink as tea, mix powder with food	One glass 3 times daily or 2 teaspoon of powder
Ricinus communis	Euphorbiaceae	Seed	Cooked and processed	Used as spice in food	Eat as desired
Securidaca longipendiculata	Polygalaceae	Leaves	Squeeze or boil, Ground in to powder	Drink as tea, mix powder with food,	One glass 3 times daily, half tea spoon in food
Lycopodium cernum	Lycopodiaceae	Leaves	Cooked, ground into powder	Eaten as soup, drink with spoon or glass	Eat soup as desired, take 1 glass or 3 teaspoons twice daily

Talinum triangulare	Portulacaceae	Leaves	Wash leaves, boil	Cooked as soup, drink as tea.	Eat as desired

Twelve different plant species used in the treatment of hypertension were identified in this study as the most well-known among the people of Awka (Table 8). They collect and consumed these plants as food or medicine. The respondents interviewed provided vital information on the indigenous uses of these plants; the parts used, mode of preparation, method of administration and their dosages.

Photos of some plants used for the treatment of diabetes and hypertension in Awka

Plate 1: *Cucurbita pepo* (Anyu)

Plate 2: *Ocimum gratissimum* (Nchanwu)

Plate 3: *Spondias mombin* (Ijikere)

Plate 4: *Annona muricata* (Shawashopu)

CONCLUSION

Ethno study research can provide a wealth of information regarding both past and present relationships between plants and the traditional societies. Ethno study may also prove to an important tool in the search for new pharmaceuticals and food security. In addition to its traditional roles in economic botany and exploration of human cognition, ethno study research may be applied to current areas of study such as biodiversity prospecting and vegetation management. It is hoped that, in the future, ethno study of plant may play an increasingly important role in sustainable development and biodiversity conservation.

The finding that about 83% of respondents had apprentice as an information source supports the finding by Stephen (2016) that apprenticeship and history was among the means used successfully in rural areas. It was noted that most of the information sources provided rural dwellers with useful information on plants. Plants have been used as sources of remedies for the treatment of many diseases since ancient times and people of all continents especially Africa have this old tradition. Despite the remarkable progress in synthetic organic medicinal products of the twentieth century, over 25% of prescribed medicines in industrialized countries are derived directly or indirectly from plants (Newman *et al*., 2000; Okogun, 2002). However, plants used in traditional medicine are still understudied (Kirby, 1996).

Medicinal plants and their use by indigenous culture are not only useful for conservation of cultural traditions and biodiversity but also for community healthcare and drug development now and in the future. Fifteen different species of plants used for the treatment of diabetes and twelve different species of plant used for the treatment of hypertension were identified in this study as the most well-known and frequently used among the people of Awka. This work showed these were *Bridelia ferruginea, Garcinia kola, Irvingia gabonensis, Musa paradisiacal,* etc. The people of Awka collect and consumed these plants as mostly food or medicine to treat diabetes and hypertension. They also gave useful information on local names, mode of preparation, method of administration and particular parts of plant to be used. The respondents interviewed provided vital information on the indigenous ways of using these plants, such as the use of the fruit and leaves of *Annona muricata* by eating the fruit raw and boiling the leaves and drinking it as tea.

The work went further to show the use of some other plant species in the study area. The frequently used plants for treatment of diabetes was *Gongronema latifolium* (80.8%), *Dioscorea bulbifera* (80%) and *Musa paradisiaca* (87.5%) while for hypertension *Pterocapus mildbraedii* (87.5%), *Pterocapus soyaxii* (87.2%) and *Hibiscus sabdariffa* (85.5), the reason these are the most prominent may be because they consumed either as food ingredient or as main food component.

On the mode of preparation of plant species for the treatment of diabetes and hypertension, it was ascertained among the rural dwellers in the study area that the most used and effective mode of preparation of herbal medicine for treatment of diabetes was extractions and gruels (79.2%) and (79.0%) respectively and then for hypertension was decoction (79.8%) and mixtures (89.0%) respectively. Extractions are preparations containing the active principles or crude drugs, prepared by extracting the ingredients with suitable solvents like water or alcohol, while gruels are made by using the filtrate of the infusion to prepare a very light porridge, using maize, sorghum or millet flour. Sometimes a fine powder of a dry plant part or ashes of dry plants, are added to fuels. Mixtures are liquid preparations intended for oral administration. It consists of combinations of medicaments dissolved, suspended or diffused in either water or some aqueous vehicle such as emollients (which soften or soothe), as a protective preparation on the skin, or as vehicles for tropical application of medications (Okafor, 2013).

This work showed the uses of some plant species in the study area for the treatment of diabetes and hypertension.

The indigenous knowledge of people on the application of plant species for treatment of ailments should be preserved, so that there will be transfer of this knowledge from one generation to another. Further research should be geared towards creating awareness in order to increase plant species production for use as medicine, thereby preventing ailments and development of chronic and acute diseases in developing countries. Since plant species comes with many benefits like medicinal purpose and food nutrition, it is therefore recommended to consume them as food or medicine.

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