ETHNOBOTANICAL SURVEY OF MEDICINAL PLANTS USED IN THE MANAGEMENT OF KIDNEY IMPAIRMENT LAGOS STATE, NIGERIA.

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ABSTRACT

Background: In traditional medicinal practice, a variety of plants have been used in the restoration of kidney impairment to prevent chronic kidney disease. The objective of the study was to carry out a comprehensive ethnobotanical survey of plants used in the restoration of kidney impairment in Lagos State, Nigeria.

Method: Semi-structured questionnaires were used to conduct interviews with traditional healers and herb sellers on the use of medicinal plants in Lagos State for the restoration of kidney impairment. The survey was carried out in ten different markets; traditional medicine practitioners and herb sellers were randomly selected with a total of 100 respondents.

Result: The respondents consist of 26% males and females 74% with a ratio of 1:2.8. The respondents were also classified based on their age, level of education and occupation to the type of formulation used (monoherbal and polyherbal).

Conclusion: The survey revealed that the 21 plants were obtained and were distributed into 18 families; the life forms of the plants include trees 45%, shrubs 37.7%, woody vines 9%, rhizomes 8.3%. Classification according to plant parts used showed that roots have 80.4%, barks have 8.1%, seeds have 6.8% and leaves have 1.3%. Conservation of these plants is paramount in order to avoid extinction and further research should also be encouraged in area of phytochemical screening and pharmacology of plants in order to develop ideal agents for the management of kidney impairment.

KEYWORDS: Kidney impairment, Ethnobotanical survey, Medicinal plants
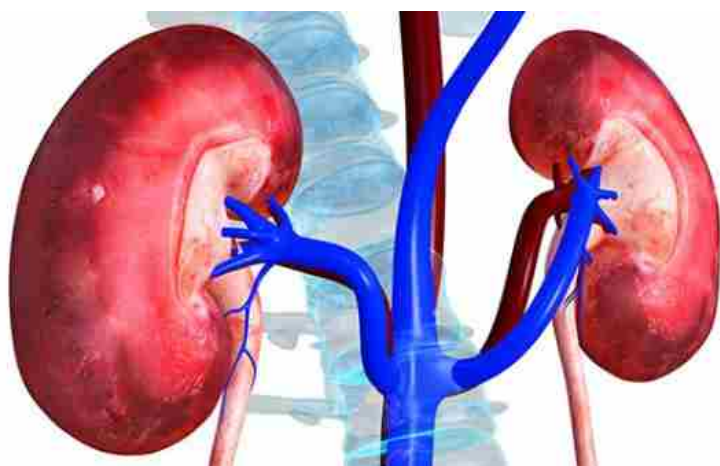
INTRODUCTION

The use of natural products with healing properties is as old as human civilization and for a long time, minerals, animal and plant products were the main sources of drugs. The World Health Organization (WHO) defines traditional medicine as practices, knowledge and belief systems which use minerals, plants and animal based remedies, spiritual therapies and exercises to prevent, treat and maintain well-being. The African continent has a long history with the use of plants, in some African countries up to 95% of traditional medicinal preparations are of plant origin; according to the WHO, about 80% of the population of the world depends on traditional medicine, mostly herbal remedies, for their primary health care needs and in some African countries, up to 90% of the population rely on medicinal plants as a source of drugs. Traditional societies in Africa and elsewhere have always used plants to promote healing [1,2].

Ethnobotany is an area of human ecology that defines the interface between people and their forests and offers clues needed for rural development based on sustainable yields of forest products. In some African countries up to 95% of traditional medicinal preparations are of plant origin [2]. Ethnobotanical surveys can help to identify plants with market potential that can generate incomes for local communities. Again, ethno-botanical surveys provide the rationale for selection and scientific investigation of medicinal plants and animals, since some of these indigenous remedies have successfully been used by significant numbers of people over extended periods of time.

Documentation of indigenous traditional medicine knowledge is important for the preserving of indigenous knowledge, cultural values and knowledge of medicinal plants, and is the bedrock for further pharmacological research, bio-prospecting and drug discovery [3]. Therefore the documentation of the traditional therapeutic know-how could lead to the discovery of new drugs as well as contribute to the conservation, sustainable management and use of plant resources [1].

A medicinal plant is any plant which, in one or more of its organs, contains substances that can be used for therapeutic purposes or which are precursors for the synthesis of useful drugs. A number of plants have been used in traditional medicine by human beings for the treatment of diverse ailments for many years [4].

The kidney is a paired retroperitoneal organ on the posterior abdominal wall [5]. Due to the asymmetry caused by the liver, the right kidney is generally slightly smaller and lower than the left. Each kidney weighs 125-170 g in males and 115-155 g in females [6].

The kidneys purify toxic metabolic waste products from the blood in several hundred thousand functionally independent units called nephrons. A nephron consists of one glomerulus and one double hairpin-shaped tubule that drain the filtrate into the renal pelvis. The glomeruli located in the kidney cortex are bordered by the Bowman's capsule [7]. The kidney is a chief regulator of all body fluid and it is primarily responsible for maintaining homeostasis or equilibrium of fluid and electrolytes in the body. It is also an organ with several functions that are essential for animal's survival and also serve as the body's natural filter of blood by removing metabolic byproducts and wastes [5].

Kidney impairment (Renal impairment) refers to when the kidneys fail to properly filter toxins and other waste products from the bloodstream. When renal impairment becomes severe, kidney dialysis is sometimes needed to take over for the failing kidneys. It is important to note that impairment or renal insufficiency is not the same as renal failure or kidney failure. If not managed, however, the impairment may progress to renal failure. Signs of renal impairment include a urine-like body odor that persists despite repeated efforts to remove it through bathing. This occurs as a result of waste products being excreted through the skin instead of being filtered through the kidneys. Sometimes, people complain of a bad taste in their mouths as well [8].

Excess use of antibiotics (chiefly aminoglycosides), NSAIDS and anti-tubercular drugs damage the kidneys. Renal failure is the condition where withholding of metabolic products in response to weakening of function [9]. Chronic kidney disease is defined by the National Kidney Foundation as the presence of kidney tissue damage manifested by pathologic abnormalities or markers of damage or a decline in glomerular filtration rate (GFR) to <60 mL/min/1.73m² persisting for at least 3 months. CKD is

a common non-communicable disease worldwide. Patients with reduced renal function represent a population at risk for progressive kidney disease, end-stage renal disease (ESRD) and cardiovascular disease[10].

Chronic kidney disease (CKD) is a worldwide public health problem, with adverse outcome of kidney impairment/failure, cardiovascular diseases (CVD), and premature death[11]. The number of patients with chronic kidney disease (CKD) is increasing. Unfortunately, the survival of CKD patients remains poor[12].

Management of CKD requires the clear understanding of its definition as proposed by the National Kidney Foundation (NKF). An informed interpretation of the estimated glomerular filtration rate (eGFR) is required, since the GFR is still considered the best overall index of kidney function in stable, non-hospitalized patients. Kidney damage is defined pathologic kidney abnormalities, persistent proteinuria, other urine abnormalities, e.g. renal hematuria, imaging abnormalities, eGFR <60 mL/min/1.73m^2 on two occasions separated by 90 days and that is not associated with a transient, reversible condition such as volume depletion[13].

Several hospital based studies in Nigeria have put the prevalence of CKD between $1.6 - 12.4$% with a high prevalence of risk factors observed in various studies among different groups[14] (Wachukwu et al.[2015]). In Edo state, significant persistent proteinuria was detected in 3.8%. Prevalence of hypertension was 34.2%, diabetes 2.1% and obesity 14.1%. The prevalence of CKD was 27.2%[10].

World Health Organization (WHO) statistics reveal that the death rate from intrinsic kidney and urinary tract disease was one million in the year[2002], ranking twelfth on the list of major causes of death. According to the NHS (National Health Service), UK, approximately 1 to 4 in every $1,000$ British people is affected by chronic

kidney disease. The average age of a British person with the disease is[77].

By[2020,] the burden of diabetes and cardiovascular disease will have increased by 130% in Africa alone, with concomitant increases in the prevalence of CKD and end-stage renal disease (ESRD)[15].

Treatment

Treatment is aimed at stopping or slowing down the progression of the disease - this is usually done by controlling its underlying cause. Plants, with their curative values possess the potentials to ameliorate the situation[16]. If chronic kidney failure ends in end-stage kidney disease, the patient will not survive without dialysis (artificial filtering) or a kidney transplant[17]. Therefore, it is important to establish strategies to delay the progression to end-stage kidney disease in CKD patients[18].

The selection of the renal replacement therapy (RRT) modality depends on physical and socio-demographic characteristics of the patient[19]. In recent time its management is by dialysis, kidney transplantation or chemotherapy[9]. When renal impairment is treated through dialysis, kidney transplant, or medication, the symptoms typically resolve[8]. Renal transplantation (RT) is the best RRT option because it assures better quality of life and longer survival; nevertheless due to the scarcity of transplants, peritoneal dialysis (PD) and mainly hemodialysis (HD) are applied in most cases[19].

The aims of this study focused on identifying and documenting the various traditional medicinal plants used for the management of kidney impairment in Lagos State, the parts of plant used and how they are used with the specific objectives of conducting a survey on plants used for management of kidney impairment and assess the knowledge of Traditionalists and Herbs sellers in Lagos State on medicinal plants used in the management of kidney impairment.

MATERIAL AND METHOD

Study Area

This survey was carried out in Lagos, a state located in the southwestern geopolitical zone of Nigeria. Lagos is the most populous city in the state and in Nigeria as a whole. As of[2015,] the population of Lagos city is approximately[16] million. Lagos is a port which originated on islands separated by creeks, such as Lagos Island. The Metropolitan area of Lagos include: Ikeja, Agege and Mushin.

The Survey: Data Collection

The study was carried out from May,[2016] to September,[2016] using Key Informant Interview and semi-structured questionnaire administered to traditional medical practitioners (TMPs) and herbal ingredient sellers in Lagos State on the utilization of medicinal plants for the restoration of kidney impairment. The semi-structured questionnaires were written in English language and discussed in English and Yoruba language with the aid of an interpreter (the apprentice); most of the respondents communicated fluently in Yoruba language. In each market, the respondents were systematically selected (in locations with more than ten practitioners and the objective of the study was explained to them and their consent was sought to publish the findings obtained from questioning. Token sum were paid to some of the respondents for their time and knowledge shared and sometime plants bought from them. The questionnaires were completed by each of the[100] respondents (comprising) selected from[10] different major markets in Lagos State: Mushin, Awolowo, Oshodi, Agboju, Oyingbo, Ketu, Ojota, Ikorodu, Mile[12,] and Lagos Island. Interactions with the respondents took place in the premises of the traditional healer and herb sellers.

Interviews were designed to obtain data on the plant species used to

restore kidney impairment, part(s) of the plants used, methods of preparation, mode of administration/dosage, life form of plants used and tests recommended. The information received was built on trust with clear understanding of the aim of the survey.

Plant Collection and Identification

Based on ethno-botanical information provided by the respondents, voucher specimens of the reported plants used in restoration of kidney impairment were collected for identification and deposited for reference at University of Lagos, Faculty of Pharmacy. Relevant literature and the University of Lagos Herbarium were consulted for plant nomenclature authentication.

Data Analysis

Information obtained from the questionnaires was extracted and presented in tables, bar charts and graphs with the aid of Microsoft Excel.

RESULTS

One hundred (100) questionnaires were administered to consenting adults in the ten (10) different markets and interviewed on their knowledge of plant used in management of kidney impairment. All the questionnaires were filled and hence used in the analysis, giving a response rate of 100%. 26% male and 74% female traditional herb seller/herbalist were surveyed with 13% between ages 21-30, 25% between ages 31-40, 29% between ages 41-50 and 33 are above 50 years of age. The use of polyherbal formulation increases with age of the practitioners with age group above 50 years have 31%, 41-50 yaers have 29%, 31-40 years have 23% and 21-30 years have 2%. other parameters observed in the course of this research are represented in the following tables:

Table 1: Distribution of the Respondents by Level of Education

	Frequency	Percent	Cumulative Percent
Primary	52	52	52.0
Secondary	34	34	86.0
Tertiary	4	4	90.0
Non-literate	10	10	100.0
Total	100	100	

Table 2: Table of Education versus Formulation

EDUCATION	MONOHERBAL	POLYHERBAL
Literate	9	81
Non-literate	3	7

Table 3: Distribution of the respondents by occupation

OCCUPATION	Frequency	Valid Percent	Cumulative Percent
Traditional healer	15	15.0	15.0
Herb seller	85	85.0	100.0
Total	100	100.0	

Table 4: Table of Occupation versus Formulation

OCCUPATION	MONOHERBAL	POLYHERBAL
Traditional healer	4	11
Herb seller	10	75

Table 5: Distribution of the respondents by Location

Market Location	Frequency	Valid Percent	Cumulative Percent
Agboju	5	5	5
Awolowo	17	17	22
Ikorodu	12	12	34
Ketu	5	5	39
Lagos Island	15	15	54
Mile 12	13	13	67
Mushin	14	14	81
Ojota	5	5	86
Oshodi	9	9	95
Oyingbo	5	5	100.0
Total	100	100.0	

TABLE 6: PLANTS USED IN MANAGEMENT OF KIDNEY IMPAIRMENT IN LAGOS STATE AND FREQUENCY FROM SURVEY

| S/N	BOTANICAL NAME/FAMILY	LOCAL NAME	LIFE FORM	PARTS USED	MODE OF ADMINISTRATION	FREQUENCY
1	Anthocleista dialonensis A.Chev Loganiaceae LUH 7469	Sapo	Tree	Root, Bark	Cook root with Sagere and Abere and drink once daily.	80
2	Strophanthus hispidus DC. Apocyanaceae	Sagere	Shrub	Root	Cook root with Sapo and drink once daily.	57
3	Hunteria umbellata K. Schum Apocyanaceae	Abere	Tree	Seed	Cook seeds with Sapo and Sagere and drink one daily.	21
4	Plumbago zeynalica L. Plumbaginaceae	Inabiri	Shrub	Root	Cook root with Sapo or Sagere and drink once daily.	35
5	Curculigo pilosaq Engl. (Schum and Thonn) Hypoxidaceae	Epakun	Rhizome	Root, Seed	Cook root with Sapo or Sagere and drink once daily.	32
6	Flabellaria paniculata Cav. Malpighiaceae	Tinupogbe	Woody vine	Root	Soak in water alone with Asofeyeje, Gbogbonse and Arigba and drink once daily.	13
7	Gongronema latifolium Benth. Asclepiadaceae LUH 7471	Madunmaro	Climbing shrub	Root	Cook root with Sapo or Akogun and drink once daily.	13
8	Cassia sieberiana DC.	Aidantoro	Tree	Root	Cook root with Sapo or Sagere and drink once	14
9	Rauwolfia vomitoria Afzeli Apocyanaceae LUH 7463	Asofeyeje	Shrub	Root	Soak with Tinupogbe, Gbpgbonse and Arigba and drink once daily.	10
10	Aristolochia ringens Vahl. Aristochiaceae	Akogun	Woody vine	Root	Cook root with Sapo or Madunmaro and drink once daily.	10
11	Chasmanthera dependens Menispermaceae LUH 7460	Ato	Climbing shrub	Root	Cook root with Sapo and drink once daily.	16
12	Rhaphiostylis beninensisex Benth. Icancinaceae LUH 7467	Itapara	Tree	Root	Cook root with Tinupogbe and drink once daily.	14
13	Olax subscorpioidea Oliv. Olacaceae LUH 7465	Ifon	Tree/ Shrub	Root	Cook root with Inabiri and Sapo and drink once daily.	10
14	Securidata longipedunculata Fres.	Ipeta	Tree	Root	Cook root with ata ijosi and drink twice daily.	8
15	Tetracera alnifolia Wild. Dilleniaceae	Opon	Shrub	Root	Cook root with Inabiri and Sagere and drink once daily	6
16	Uvaria afzelii G.F. Scot-Elliot Annonaceae LUH 7470	Gbogbonse	Shrub	Root	Cook root with Asofeyeje, Tinupogbeand Arigba and drink once daily.	5
17	Gambeya africana Pierre Sapotaceae	Baka	Rhizome	Bulb	Cook with Inabiri and drink once daily.	4
18	Calliandra portoricensis (Jacq) Benth MimosaceaeLUH 7466	Tude	Shrub	Bark	Cook bark with Sapo and Sagere and drink once daily.	4
19	Spondias mombin Var. lutea Anacardiaceae LUH 7462	Iyeye	Tree	Bark	Cook with Sapo and Inabiri and drink once daily.	2
20	Mormodica charantia L. Curcubitaceae	Ejirin	Climbing shrub	Leave	Powder leaves taken orally with pap or prepared as tea.	2
21	Langenaria breviflora (Benth) Roberty Curcubitaceae LUH 7461	Tagiri	Tree	Seed, Bark	Cook bark or powdered seed with Inabiri and drink once daily.	1
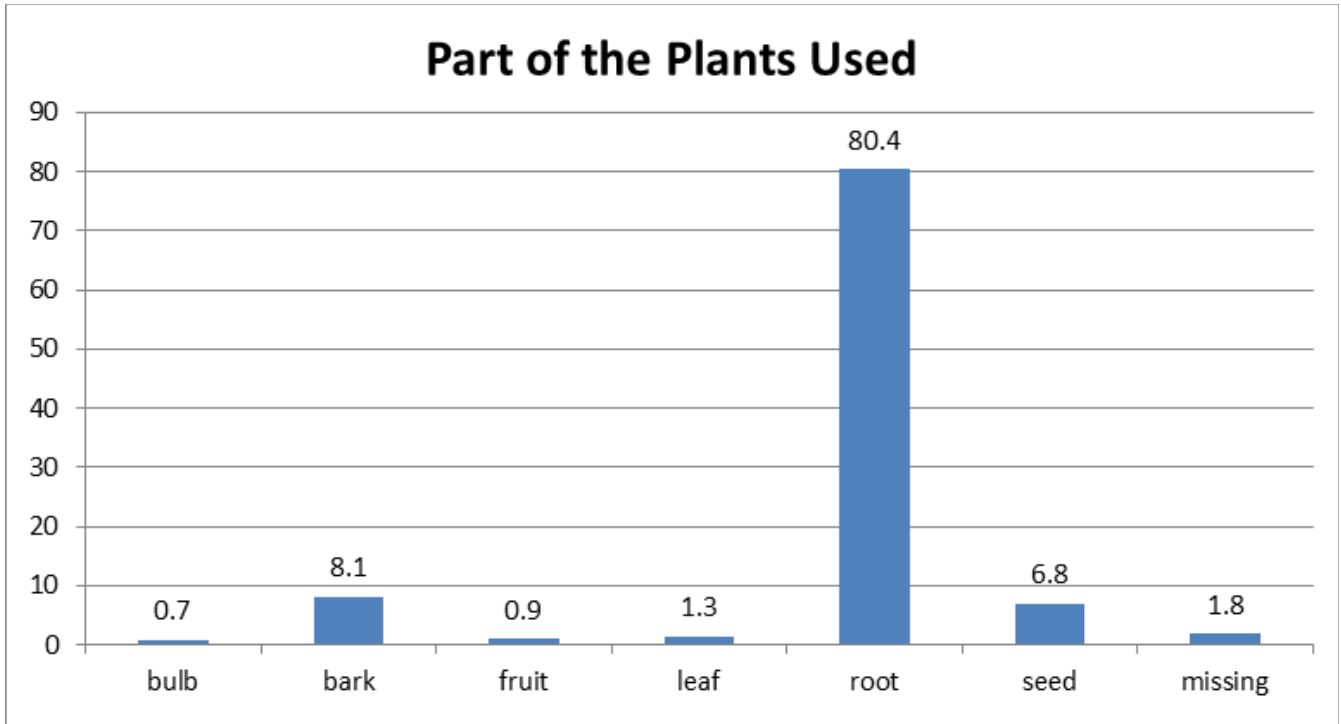
Figure 1: Percentage Distribution of Parts of Plants Used

Table 7: Live Forms/Habits of Plants Used

	Frequency	Valid Percent	Cumulative Percent
Rhizome	36	8.3	8.3
Shrub	164	37.7	46.0
Tree	196	45.0	91.0
Woody vine	39	9.0	100.0
Total	435	100.0	

DISCUSSION

According to this survey carried out, it is apparent that the use of herbal medicine in Lagos State is on the increase. The widespread availability of herb and herbal products marketing both in the conventional and unconventional way of selling drugs as well as the sexes and number of people that are involved in the trade is a confirmation of this assertion. Not only this, year of expertise, the standard of living and material achievements pointed to the fact that the trade is lucrative in Lagos. From the study, the gender distributions of the respondents revealed that almost three quarter (74%) of the total respondents are female and this is more when compared to the male respondents (26%). Thus it can be inferred that majority of the traditional medicine practitioners and herb sellers are mostly female. Knowledge of the use of medicinal plants is not limited to a particular gender, though traditional medicine practice for livelihood is dominated in Nigeria by males, women are versed in knowledge of plants.22, 23

Information on the uses of medicinal plants for treatment, diagnosing prevention or elimination of diseases is usually passed from generation to generation, verbally or in writing. Majority of these respondents obtained their knowledge from their parents, with the majority receiving verbal and practical experience from their progenitors. This shows that they have long cumulative experience on the uses of plants in treating various diseases24. Also, respondents in this study revealed that majority of the practitioners had completed at least a basic education level, hence are able to read and acquire knowledge relating to their practice- especially as it relates to patients with kidney impairment.

The formulations are grouped into two; Monoherbal (use of one plant)

and Polyherbal (use of more than two plants). 86% of the respondents with age above 50 used polyherbal formulation while14% used monoherbal; 88% of age 41-50 used polyherbal formulation while 12% used monoherbal; 79% of age 31-40 used polyherbal formulation while 21% used monoherbal formulation. In general, 85% of the total respondents used polyherbal formulation while 15% used monoherbal formulations.

The study revealed that majority of the respondents with atleast basic level education recommended polyherbal formulations for management of kidney diseases, similarly upto two-thirds of those without any formal education also recommended polyherbal formulations. This similarity in practice may arise from the knowledge and cultural practice of herbal use and can also be explained by the close proximity of practice leading to cross-pollination of ideas. There is also similarity in the information obtained from practitioners who had completed at least basic education level and those who had no formal education. Hence, based on the type of formulation they use, polyherbal formulations are used more by both literate and non-literate respondents when compared to monoherbal formulations.

The traditional healers and herb sellers used polyherbal formulation more than monoherbal formulation. Traditional medicine practitioners believe that there are many causes of a disease and all these causes must be treated. Secondly, it is believed that each active component of a plant will be strengthened by the presence of another plant that has such active ingredient or can aid its effectiveness in the body.

The largest occurrence of plant life forms is trees (45%), shrubs have 37.7%, woody vines have 9%, while rhizomes have 8.3%. The results obtained from the study also revealed that roots are used more in the management of kidney impairment than any other parts. Roots have 80.4%, barks have 8.1%, seeds have 6.8% and leaves have 1.3%.

The mode of preparation of the plants obtained from the study revealed that most of the plants are prepared by cutting the roots or barks in pieces, soak or boil in water and depending on the formulation, seeds can be added. The leaves are prepared by drying, grinding the leaves and mix powdered leaves with custard, akamu or pap, while some can be prepared as tea. The mode of administration of the plants obtained from the study revealed that the plants formulation are administered orally, two table spoons full to be taken once or twice daily.

CONCLUSION

Plants are a major source of medicine for human kind. Medicinal plants contain chemical constituents which have been used for the management of various ailments including kidney impairment. The result obtained from the study revealed that 21 plants distributed into 18 families are widely used by herbal practitioners for improving kidney function and managing kidney impairment; different parts of the plants that can be used include; roots, stem barks, seeds and leaves.

RECOMMENDATIONS

Public awareness and regulation of use of herbal medicines are required to eradicate kidney related diseases from the community. A more serious government intervention is required to uplift the quality status of the traditional medicine practice in the country. The frantic efforts of Nigeria Natural Medicine Development Agency and Lagos State Traditional Medicine Board should be praised in ensuring safe delivery of medicinal preparation in the country.

Further research should also be encouraged in area of phytochemical screening and pharmacology of plants in order to develop ideal agents for the management of kidney impairment. In order to preserve traditional medicinal knowledge, it is necessary that inventories of plants with therapeutic value are carried out,

and the knowledge related to their use documented in systematic studies.

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