ETHNO-BOTANICAL SURVEY OF MEDICINAL PLANTS FOR THE TREATMENT OF DIABETES MELLITUS

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ABSTRACT

An Ethno-Botanical survey of medicinal plants for the treatment of diabetes mellitus was carried out among the three major ethnic groups in Oyo state district, Nigeria, for the exploration of anti-diabetic herbal remedies due to the speedy increase in chronic disease which has became a grim threat to mankind in all parts of the world and the allopathic drugs have not shown any momentous effect. Diabetes mellitus is one of such disease, a metabolic disorder exemplified with elevated blood glucose level, excretion of glucose in urine and causes serious pathophysiological complications due to the defect in insulin secretion or insulin action or both. Interview and discussion method was used to collect data, a total number of 80 respondents were interviewed as sample size of the study using simple random sampling from eight (8) popular markets located in four (4) cities in Oyo state. A total number of 20 plants from plant were identified which are being used for the treatment of diabetes. The collected information of anti-hyperglycemic medicinal plants used by the three major ethnics of Nigeria in Oyo state have been listed along with their local names and plant parts used.

Keywords: *Ethnobotany, Diabetes.*

Introduction

Among the challenging health conditions that are increasingly affecting human beings is diabetes mellitus. It is a metabolic syndrome of etiologies and the most common disease in the world characterized by elevated blood glucose called hyperglycemia and excretion of glucose in urine with abnormalities in carbohydrate, fat and protein metabolism due to defect in insulin secretion,

insulin action or both, which lead to micro and macro pathophysiological complications such as neuropathy, nephropathy, retinopathy etc. The named diabetes was coined in year 3090AC by the Greek physician called Aretaeus and recorded the disease with symptoms such as constant thirst, loss of weight and excessive urination. More so, an Egyptian doctor was the first to define an unknown rare disease as a disease that causes the patients to lose weight rapidly and urinate frequently and this is considered to be the first definition to the diabetes mellitus. Indeed, the renowned Arabian physician called Avicenna was the first to provide the reference of the disease and described its pathophysiological complications in details during the Middle Age, Amos, McCart & Zimmet, (2006). Before the invention of chemical tests, the physicians of then tested the disease by examined the colour, odour and tasted the urine of the patients. The "Uroscopy" later came to existence as the way of examine the disease (Beverley & Eschwege, 2002) and this followed with the introduction of chemical tests which paved a way of examining the disease critically. The life of an average diabetic is gradually becoming longer and easier due to the drastically improvement on advanced treatment of the disease nowadays, although prevention and management remain difficult for diabetes mellitus (Mohana, 2012).

Epidemiology of Diabetes Mellitus in the World

Diabetes prevalence is increasing rapidly; previous 2013, it was estimated that the total number of 381 million people having diabetes (International Diabetes Federation, 2015). Globally, an estimated 422 million and more than 14.5 million in Africa regions adults are living with diabetes mellitus (WHO 2016 and IDF 2016). The number was projected to almost double by 2030, Wild (2004) and Type 2 diabetes makes up about 85-95% of all cases, Agardh (2011) and (World Health Organization, 2016). Diabetes mellitus occurs throughout the world but is more common in the developed countries while greatest increase in prevalence is, however occurring in low and middle income country such as Asian and African where most patients will probably be found by year 2030 follows the trend of urbanization and lifestyle changes such as less physically demanding work, increasingly sedentary and global nutrition transition, marked by increased intake of foods that high energy-dense but nutrient poor (often high in sugar and saturated fats called Western pattern diet,

(Wild, 2004). The WHO estimated that diabetes resulted in 1.5 million deaths in 2012 worldwide and according to the IDF about 40,815 adults died of diabetes mellitus in Nigeria in 2015. Three major types of this endocrine disorder responsible for the damage of pathophysiological of the body has been identified namely, Type 1 Diabetes, Type 2 Diabetes and Gestational Diabetes (Adeyi, Idowu, Mafiana, Oluwalana & Ajayi, 2015).

- **Type 1 Diabetes** also known as IDDM (Insulin Dependent Diabetes Mellitus or Juvenile Diabetes) and this occurs when the beta cell of the pancreas which produces insulin at has been smashed by the autoimmune disease. This condition occurs in genetically susceptible individuals from an autoimmune response and their life spans are drastically reduced up to one third as a result of degenerative complications like nerve impairment, kidney dysfunction, blindness, etc. it usually occurs after 30 years of age but the peak incidence occurs during puberty around 12-14 years in male and 10-12 years of age in girls, Adeyi, et al (2015).
- **Type 2 Diabetes** also known as NIDDM (Non Insulin-Dependent Diabetes Mellitus or "Adult-Onset" Diabetes) and this occurs when the cell fails to use the insulin properly. The insulin resistance or insulin deficiency leads to inefficient absorption of glucose into the cell for energy and this is most common type of diabetes mellitus present in about 90% of diagnosed cases of diabetes and affects 18% of the population above 65% years of age, usually occurs in Obese individual.
- **Gestational Diabetes** also called pregnancy diabetes and it develops during the period of pregnancy. The high blood glucose level during pregnancy is as a result of hormonal changes for development of pregnancy and this causes change in body ability to use insulin leading to carbohydrate intolerance. It may precede development of type 2 DM but usually disappears after the birth of the child and does not clarify that the child will be born with diabetes (CDCP 2003). Other forms of diabetes mellitus which are due to genetic defect of insulin are **Congenital Diabetes, Cystic Fibrosis Related Diabetes, Steroid Diabetes etc.** The likely symptoms of diabetes mellitus are: loss of weight, hyperglycemia, polyuria, polydipsia, hunger etc.

The earlier onset of complications of diabetes mellitus could be controlled by oral hypoglycemic drugs/insulin treatment but chronic late complications

emerge in many patients (Kaatabi, 2010), and due to the unpleasant side effects such as severe hypoglycemia, lactic acidosis, peripheral edema and abdominal discomfort which accomplished the clinical uses of the current drugs (Ahmad, 2013). Therefore, the WHO expert committee on diabetes has listed as one of its recommendations that traditional methods of treatment of diabetes should be further investigated (WHO, 1980). Although, plants are used to treat many ailments and the Botanists have identified over 45,000 plants species and several thousands have been claimed to possess medicinal properties, Grover, Yadav & Vats (2002). Ethnobotany has been defined as the traditional knowledge of indigenous communities, about surrounding plant diversity and how various peoples make use of indigenous plants found in their localities. Medicinal plants used to treat hypoglycemic or hyperglycemic conditions are of considerable interest for the ethno-botanical community as they are recognized to contain valuable medicinal properties in different parts of the plant and number of plants has shown varying degree of hypoglycemic and anti-hyperglycemic activity, Ignacimuthu, Ayyanar & Sankaran (2006). In most cases, however, these reports are confirmed by animal models and even in *in vitro* studies of many researchers and limited evidence exists about their clinical usefulness.

STATEMENT OF THE PROBLEM

With the vision year 2030 of World Health Organization based on the prevalence of diabetes mellitus today, the risk of getting diabetes mellitus has been widely found to be associated with lower socio-economic position across countries like Nigeria where balance diet is now rapidly going into extinction and it's on this note the study was carried out.

OBJECTIVE OF THE STUDY

The study was carried out to explore the medicinal plants in Nigeria on the treatment of diabetes mellitus as the emerging discourse on science for sustainable development in Nigeria.

RESEARCH QUESTIONS

1. Are you aware of the drastic increment of diabetes mellitus?

2. What is your discernment on the uses of medicinal plants available in your community for the treatment of diabetes mellitus?
3. What is your perception on the non-usage of therapeutic drugs to treat diabetes mellitus?

MATERIALS AND METHODS

Population and Geographical Position of the Study Area

The study area lies on Nigeria which inhabitants by a large population of about 140,431,790 (National Population Census, 2006), estimates the population as 188,462,640 in year 2015 and it has 36 states and comprises of about 774 ethnical groups with three major and popular tribes, namely, Hausa, Yoruba and Igbo. Among these 36 states, Oyo state which is one of the states among the state of Yorubas in Nigeria. The Oyo state has (8000ºN Latitude and 4000ºE Longitude) and the elevation above the mean sea level ranges between 500 to 1,219m. The state is covered approximately an area of 28,454 km^2 and is ranked 14^{th} by size in Nigeria, its population is 5,591,589 (NPC 2006) and the average daily temperature ranges between 25º-35º almost throughout the year and among this Oyo state tribe is dominant in the pursuit of therapeutic uses of plants.

Sample and Sampling Techniques

The systematic ethnobotanical survey was carried out in Oyo state district and a total number of 80 people were selected as sample size using simple random sampling of eight (8) popular markets in four (4) cities in Oyo state, namely, Bode and Oja'ba markets in Ibadan, Akesan and Sabo markets in Oyo, Jagun and Janugo markets in Ogbomosho, and Ebedi and Ode-Oba markets in Iseyin, between September – November 2016.

Research Instrument

Interview and discussion method was used as an instrument for the collection of data and the entire study was based on the stated researcher questions. All plant specimens were bought from different locations of the study area. The bought plants were preserved and the locality of their location and information regarding the uses were kept in the field book. The bought plants were properly labeled with help of the works in Hooker (1872-1897).

Criteria for Selection of the Informants

During the survey, specialist herbal medicine sellers and the local people were identified for interview and discussion on the basis of the following criteria:

4. Ethnic group;
5. A victim of a disease;
6. A person of the resident of the city; and
7. A specialist herbal seller of the medicinal plants.

RESULTS/DISCUSSION

The ethnobotanical survey was conducted in different market areas of Oyo state district to call the attention of the people and strengthen their beliefs on the utilization of indigenous medicinal plants by the Nigerians for the treatment of diabetes mellitus. Nature always stands as a golden mark to exemplify the outstanding phenomena of one race depending on other for food. Natural products from plants have potential to heal many ailment of human from the times immemorial and the uses of medicinal plants as remedy to pathophysiological complication of diabetes mellitus is becoming popular due to toxic and side effects of allopathic drugs, Aiyeloja & Bello (2006). A total of 20 plant species were identified belonging to 16 plant families which are being used for the treatment of diabetes with their local names and this was in line with the result of Khalid (2012) where 28 plants to treat diabetes were identified among the Baiga tribes in Rewa of India. The anti-hyperglycemic plants used by the ethnic groups in Oyo state have been listed in alphabetical order in Table 1 along with the plant botanical, family and local names, plant parts used, location of identification and mode of application while the graph of the bar chart shown the plant parts used more frequently with their popularity among the ethnics.

No	Name Botanical	Common name	Family	Yoruba	Igbo	Hausa	Uses	Part used
1	*Allium cepa*	Onion	Alliaceae	Alubosa	Yabasi	Alabasa	Leaf juice is taken orally with honey or milk till cure	Bulb
2.	*Allium sativum*	Garlic	Alliaeceae	Aayu	Ayo-ishi	Tafarunua	Leaf and bulb concoction is taken orally with till cure	bulb
3.	*Anthocleista diaglomensis*		Loganiaceae	Sapo	Akpakoro	Putaa	Extract from *Anthodeista*	Stem bark

							diaglomensis mixed with pure honey and taken with two table spoonful twice daily before food.	
4.	*Carica papaya*	Pawpaw	Caricaceae	Ibepe	Okworo-beke/ojo	Gwanda	Unripe *Carica papaya* peeled and soaked in water for three days and one glass of the liquid is taken thrice daily for three days.	Latex fruit/ seed
5.	*Psidium quajava*	Guava	Myrtaceae	Gurofa	Ugova/ ugwoba	Gwaabaa	Unripe *Psidium quajava* peeled and soaked in sweet-water for three days and one glass of the liquid is taken thrice daily for three days.	Unripe fruit
6.	*Abelmoschus esculentus*	Okro	Malvaceae	Ila/ilasa	Okwuru	Kubewa	Fruit is properly cooked and orally taken and a cup of leaf juice extracted with palm wine is taken once in a day	Fruit & leaves
7.	*Ocimum gratissimuum*	Mint	Lamiaceae	Efinrinnla	Nchanwu	Dadoya	*Ocimum gratissimum* leaf soaked in sweet-water for three days	

							and one glass of the liquid is taken thrice daily	
8.	*Garcinia kola*	Bitter kola	Clusiaceae	Orogbo	Adu/aku-inu	Namiji-goro	One teaspoon seed powder mixed with honey is taken daily	seed
9.	*Syzgium aromaticum*	Clove	Myrtaceae	Kanafuru	Osasagbogbo	Kanumfari	Infusion of fruits given three times a day after foods or fresh raw leaves eaten daily	Fruit
10.	*Cassia occidentalis*		Caesalpinaceae	Rere	Akedeagbara	Rai dore	A one teaspoon seed with water is taken orally for about 15 days	Seed
11.	*Mangifera Indica*	Mango	Anacardiaceae	Mongora	Mango	Sawamsop	Seed power with cow's milk is taken till care	Seed
12.	*Musanana/ sapientum*	Banana	Musaceae	Ogede wewe	Ule/uneri	Ayaba	Powder with cow's milk is taken daily	Fruit
13.	*Musa paradisiacal*	Plantain	Musaceae	Ogede agbagba	Abrika	Okamu/ ayaba	A cup of palm wine extract of stem is taken daily till care	Stem
14.	*Cajanus cajan*	Pigeon pea	Papilionaceae	Otilli	Fiofio		Seeds cooked and taken along with food and a cup water extract of leaf are taken daily	Leaves / seed

15.	*Kigelia Africana*	Cucumber / Sausage tree	Bignoniaceae	Pand or o	Alamborogod a	Rahunia	A cup coconut-water extract of leaf is taken daily	Leave
16.	*Aloe vera*	Aloe vera		Alon-erin	Ebubu agu	Tinya	A cup palm wine extract of leaf is taken daily	Leaves
17.	*Hunteria umbellate*	Bitter seed	Apocynaceae	Abere	Ofo	Taura	One teaspoon seed powder mixed with honey is taken daily	Seed/ leaves
18.	*Momordica charantia*	Bitter melon	Cucurbitaecea e	Ejirin	Okwunuolo	Daddasu	A cup coconut-water extract of leaf is taken once in 2 days	Leaves
19.	*Hibiscus rosasinensis L.*		Malvaceae	Sobo	Sobo	Sobo	Tender leaf juice is taken daily	Leaves
20.	*Vermonia amyygdalina*	Biter leaf	Asteraceae	Ewuro	Onugbu/ olubu	Shiwaka/ chukwu aka	*Vermonia amyygdalina* mixed with pure honey and taken with two table spoonful twice daily before food.	Leaves

RECOMMENDATION

- The government should provide the sensitization program for the people on the ethnobotany as a remedy for any ailment for human being.
- Inclusion of ethnobotany as a course in NCE curriculum this will surely be of great assistance to the biology graduate students to be self employed.
- The Colleges management should provide adequate support to researchers for further studies on the medicinal plants so as to be a great

benefit to the entire Nigerians in overcoming the long standing problems of any chronic diseases.

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