



Ethnobotanical Survey of Medicinal Plants used in the Treatment of Diabetes in Irepodun Local Government Area of Osun State, Nigeria

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ABSTRACT

An ethnobotanical survey of medicinal plants used for the treatment diabetes in Irepodun Local Government Area of Osun State, Nigeria was conducted between March and June, 2013. Ethnobotanical data were collected by oral interview and semi-structured questionnaire administered to fifty (50) respondents made up of traditional medical practitioners (TMPs), herb sellers, civil servants and farmers. From the survey, a total of 45 plant species belonging to 29 families were found to be useful in the treatment of diabetes. Recipes used in the treatment of this disease were documented. Prominent among them are *Rauvolfia vomitoria*, *Aframomum melegueta*, *Momordica charantia*, *Xylopia aethiopica*, *Senna spp.* and *Vernonia amygdalina*. These species were found to be very important and useful in the treatment of diabetes based on their frequency of occurrence in the recipes obtained. Herbal remedies were either prepared from dried or freshly collected plants while traditional solvent of choice included water, lime and aqueous extract from fermented maize. Decoction and pulverization were the main methods of preparation while mode of administration varies within 2 to 3 times daily. Survey revealed that leaves form the major part of plants for herbal preparations. Residents in the study area find traditional medicine cheaper as compared to orthodox medicine. A need for further scientific research based on the findings of this work is needed.

INTRODUCTION

Diabetes is a common and very prevalent disease affecting the citizens of both developed and developing countries. The World Health Organization estimated the disease in adults to be around 173 million in year 2000, two-thirds of which live in developing countries (Wild *et al.*, 2004).

The prevalence of diabetes mellitus is on the increase worldwide and it is still expected to increase by 5.4% in 2025 (Moller and Flier, 1991). Increase in sedentary lifestyle, consumption of energy-rich diet and obesity are some of the factor causing the rise in the number of diabetics. According to American Diabetes Association, Asia, and Africa are regions with greatest potential where diabetics could rise to two or threefold above the present level (WHO, 1994). In the last few years there has been an exponential growth in the field of herbal medicine and these drugs are gaining popularity both in developing and developed countries because of their natural origin and less side effects (Modak *et al.*, 2007). Herbal medicines continue to play an important role in diabetic therapy, particularly in the developing countries where most people have limited resources and do not have access to modern treatment (Ajaiyeoba *et al.*, 2006). The use of herbal remedies for the treatment of diabetes has also been authenticated by WHO (Bailey and Day, 1989). The increase in demand for the use of plant based medicines to treat diabetes may be due to the side effects associated with the use of orthodox drugs such as insulin and oral hypoglycemic agents (Marles and Farnsworth, 1994). Another important factor that strengthens the use of plant materials as anti diabetics could be attributed to the belief that herbs do provide some benefits over and above allopathic medicine and allow the users to feel that they have some control in their choice of medication (Johshi and Kaul, 2001). Thus, the aim of this study was to document the medicinal plants used for the treatment of diabetes from Nigeria flora.

MATERIALS AND METHODS

The study was conducted in Irepodun Local Government Area in Osun State. The local government was created in September, 1991. There is a projected population of 119,496 people according to the 2006 census figure. Irepodun Local Government lies between latitude 7°50'N and longitude 4°29'E. It constitutes one of the 31 local government

areas in Osun State and is in the southern part of the state, sharing boundary with Ifon-osun in the north and south with Osogbo Local Government, and in the East by Oba and in the West by Erin-osun. Irepodun Local government is made up of sparsely forested area and is watered by Ojutu river, Elentere river, Konda river and a few other streams. The main ethnic group is Yoruba, with subordinate of other ethnic through trading such as Hausa, Igbira, Fulanis and Igbo.

Oral interviews and structured questionnaire methods were employed. Traditional Medical Practitioners, herb sellers, farmers, the aged and civil servants were targeted audience. The questionnaire had three sections. Section 'I' requested for bio-data of the respondents for information on demographic characteristics, while section 'II' was used to identify the forest plants used for treating diabetic patients. Section 'III' was used for information on the recipe preparation and administration. A total of 50 questionnaires were administered to the respondent randomly.

Identification of specimen was done using illustrations and descriptions from a Flora (Vernacular Names of Nigerian Plants) by Gbile (2002) after collection while the authenticity was confirmed by Prof. D.A. Agboola of the Department of Biological Sciences, Federal University of Agriculture, Abeokuta, Ogun state. Pictures of the fresh specimens were also taken with the use of Sony Digital Camera.

Descriptive statistics such as frequency distribution, pie chart, and percentages were used in the analysis of the data.

RESULTS

The demographic characteristics of the respondents is as shown in Table 1, Fifty (50%) of the respondents are between the age of 51-60, 20% between age of 41-50, 16% of age greater than 60, 10% between age of 31-40 and 4% between the ages of 21-30 years. The educated among the respondents were 60%. It was observed that most of the respondents were married (70%) followed by the widow(er) (16%), single (10%) and finally the divorced (4%). Result showed that 60% of the respondents are females while 40% are males. Result also showed that most of the respondents in Irepodun Local Government Area of Osun State are herb sellers (60%), farmers (20%) and Traditional Medical Practitioners and civil servants (10%).

Table 1: Demographic Characteristics of the Respondents on the knowledge of plants used in the treatment of Diabetes

Variables	Specification	Percentage(%) of respondents
Practice specification	Traditional Medical Practitioners	10
	Herb sellers	60
	Farmers	20
	Civil servant	10
Sex	Male	40
	Female	60
Age	21-30	4
	31-40	10
	41-50	20
	51-60	50
	>60	16
Religion	Islam	80
	Christianity	10
	Traditional	10
Marital status	Married	70
	Divorced	10
	Single	16
	Widow(er)	4
Educational status	Tertiary Institution	10
	Secondary School	20
	Primary School	30
	No Formal Education	40
Nationality	Nigerian	100
	Non- Nigeria	0

Table 2: Enumeration of plants used for the treatment of Diabetes by the people of Irepodun Local Government Area

Botanical Names	Family	Local Names (Yoruba)	Common Names	Habit	Part(s) used	C/W
<i>Agerantum conyzoides</i>	Asteraceae	Rerinkomi	Goat weed	Herb	Leaves	W
<i>Albizia zygia</i>	Leguminaseae	Ire/Ayinre	Atanza/siris	Tree	Stem-bark	W
<i>Allium ascalonicum</i>	Liliaceae	Alubosa elewe	Shallot	Herb	Leaves	C
<i>Allium sativum</i>	Liliaceae	Alubosa aayu	Garlic	Herb	Bulb/leaves	C
<i>Alstonia boonei</i>	Apocynaceae	Awun	Stoolwood	Tree	Stem-bark	W
<i>Ananas comosus</i>	Bromeliaceae	Ope oyinbo	Pineapple	Herb	Fruit	C
<i>Anchomanes difformis</i>	Araceae	Ogirisako	Anchomanes	Herb	Tuber	W
<i>Antholeista djalensis</i>	Loganiaceae	Sapo	Cabbage tree	Tree	Root	W
<i>Carica papaya</i>	Cariacaceae	Ibepe	Pawpaw	Tree	Leaves/root/fruit	C
<i>Capsicum frutescens</i>	Solanaceae	Ata ijosi	African pepper	Herb	Fruits	W
<i>Citrullus colocynthis</i>	Cucurbitaceae	Egusi bara	Bitter gourd	Creepers	Fruit	C
<i>Citrus aurantifolia</i>	Rutaceae	Orombo	Lime	Shrub	Fruits	C
<i>Citrus aurantium</i>	Rutaceae	Osan jaganyin	Bitter orange	Shrub	Fruits	C
<i>Corchorus olitorus</i>	Tiliaceae	Ewedu	Jute plant	Herb	Leaves/seed	C
<i>Discorea alata</i>	Discoreaceae	Isu gidi	Water yam	Climber	Tuber	C
<i>Elaeis guinensis</i>	Palmae	Ope	Red oil palm	Tree	Leaves	C
<i>Euphorbia hirta</i>	Euphorbiaceae	Emi ile	Asthma weed	Herb	Leaves	W
<i>Garcinia kola</i>	Guttiferae	Orogbo	Bitter kola	Shrub	Seed	W
<i>Gladiolus psittacinus</i>	Iridaceae	Baaka	Sword lilly	Herb	Bulb	W
<i>Imperata cylindrica</i>	Poaceae	Ekan	Spear grass	Herb	Rhizome	W
<i>Jatropha curcas</i>	Euphorbiaceae	Lapa funfun	Purging nut	Shrub	Leaves	C
<i>Jatropha gossypifolia</i>	Euphorbiaceae	Lapa pupa	Purging nut	Shrub	Leaves	C
<i>Kigelia Africana</i>	Bignoniaceae	Pandoro	African sausage tree	Tree	Fruits	W
<i>Mangifera indica</i>	Anarcadaceae	Mongoro	Mango tree	Tree	Leaves	C
<i>Momordica charantia</i>	Cucurbitaceae	Ejinrin wewe	African cucumber	Climber	Leaves	W
<i>Momordica foetida</i>	Cucurbitaceae	Ejinrin nla	African cucumber	Climber	Leaves	W
<i>Mondia whitei</i>	Periplocaceae	Isigun	Mondi	Climber	Root	W
<i>Morinda lucida</i>	Rubiaceae	Oruwo	Brimstone tree	Shrub	Leaves	W
<i>Musa paradisiaca</i>	Musaceae	Ogede agbagba	Plantain	Herb	Fruits/leaves	C
<i>Musa sapientum</i>	Musaceae	Ogede wewe	Banana	Herb	Fruits/leaves	C
<i>Ocimum basilicum</i>	Labiatae	Efinrin wewe	Sweet hairy basil	Herb	Leaves	C
<i>Ocimum gratissimum</i>	Labiatae	Efinrin nla/aja	Sweet basil	Herb	Leaves/root	C
<i>Perquetina nigrescens</i>	Apocynaceae	Ogbo	Africa perquetina	Climber	Leaves/root	W
<i>Piper guinenses</i>	Piperaceae	Iyere	W/A black pepper	Climber	Fruits	W
<i>Parkia biglobosa</i>	Leguminosae	Igba/Igi-iru	Locust beans	Tree	Seed	W
<i>Plumbago zeylanica</i>	Plumbaganiaceae	Inabiri	Ceylon leadwort	Shrub	Fruits/root	W
<i>Rauvolfia vomitoria</i>	Apocynaceae	Asofeyeje	Swizzler stick	Shrub	Leaves	W
<i>Saccharum officinarum</i>	Poaceae	Ireke	Sugar cane	Herb	Stem	C
<i>Sansevieria liberica</i>	Agavaceae	Oja ikooko	Browstring hemp	Herb	Leaves	C/W
<i>Senna alata</i>	Leguminosae	Asunwon oyinbo	Candle bush	Shrub	Leaves	C
<i>Senna podocarpa</i>	Leguminosae	Asunwon ibile	Candle bush	Shrub	Leaves	C
<i>Syzygium aromaticum</i>	Myrtaceae	Konanfuru	Clove	Tree	Leaves	W
<i>Vernonia amygdalina</i>	Asteraceae	Ewuro	Bitter leaf	Shrub	Leaves	C
<i>Xylophia aethiopica</i>	Annonaceae	Eeru	Ethiopian pepper	Tree	Fruits	W
<i>Zea mays</i>	Poaceae	Agbado	Maize	Herb	Fruit/cob	C

C= Cultivated

W= Wild

The entire survey from the respondents yielded 45 plant species used as anti-diabetics from 29 different families. Botanical names, local names, common names, family habit/life form, plant parts used and distribution to their habitat (Cultivated/ Wild) are represented in Table 2. Plant forms include the climbers, herbs, shrubs and trees. The plant parts used mostly from the identified plants include mostly the leaves, fruits and roots. Figure 1 shows species distribution according to their families. Plant parts used in the treatment of diabetes and their frequencies are

as shown in Figure 2. Table 3 shows the enumeration of anti-diabetics recipes, solvent used, preparation and the mode of administration. It was observed that recipes are made from combination of different parts from more than one plant species including fruits, leaves mostly. The preferred solvents in most preparation are water and liquid from fermented maize. Preparations mostly preferred are by decoction and powdered forms. Some of these plants used in the treatment of diabetes are shown in Plate 1.

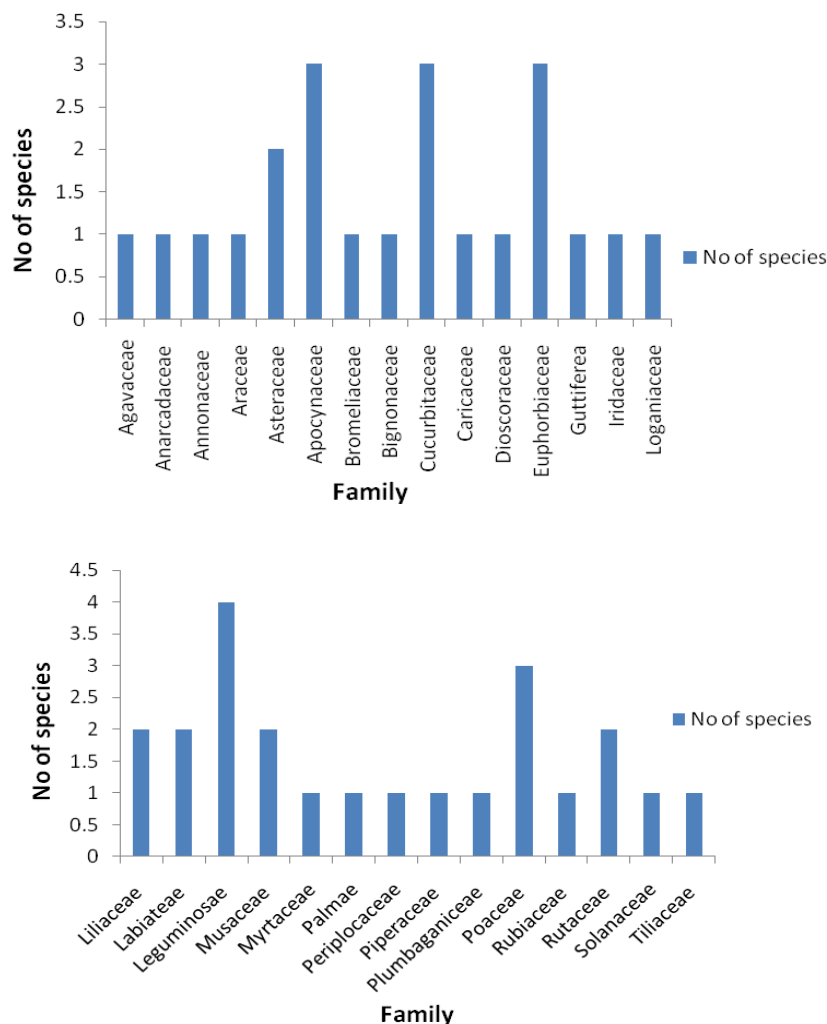


Figure 1: Species distribution according to families of plants used for the treatment of diabetes.

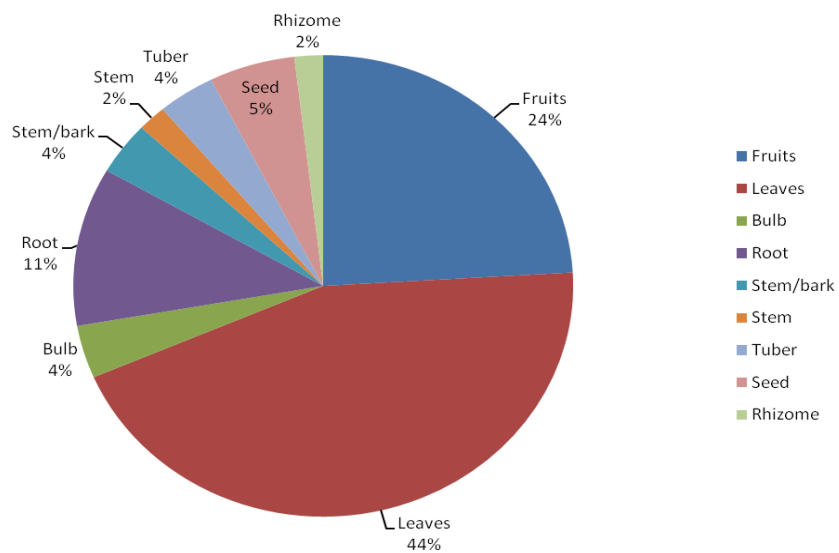


Figure 2: Percentage occurrence of plant parts used for diabetes treatment.

Table 3: Enumeration of Anti-diabetics recipes, methods of preparation and mode of administration

Recipes	Solvent of Choice	Method of Preparation	Mode of Administration
<i>Morinda lucida</i> (Leaves), <i>Momordica charantia</i> (Leaves), <i>Vernonia amygdalina</i> (Leaves), <i>Musa sapientum</i> (Fruits)	Fermented <i>Zea mays</i> liquor.	Decoction	Two tablespoon is taken three times daily.
<i>Mangnifera indica</i> (Stem bark), <i>Alstonia boonei</i> (Stem bark)	Fermented <i>Zea mays</i> liquor. Water	Decoction	Half glass cup full of the extract is taken twice daily.
<i>Carica papaya</i> (Leaves), <i>Xylopia aethiopica</i> (Fruits), 1 tablespoonful of salt	Fermented <i>Zea mays</i> liquor.	Decoction	Half a glass cup is taken every morning
<i>Allium sativum</i> (Bulb), <i>Vernonia amygdalina</i> (Leaves), <i>Ocimum gratissimum</i> (Leaves)	Lime	Decoction	One glass cup is taken every morning until the ailments disappear.
<i>Vernonia amygdalina</i> (Leaves)	—	Scotching	The patient takes one glass cup of the extract daily.
<i>Garcinia kola</i> (Fruits), <i>Allium ascolanicum</i> (Bulb), <i>Khaya ivorensis</i> (Stem bark), <i>Kigelia africana</i> (Stem bark)	—	Pulverization after sun dry	Small quantity of the powder is taken on the palm with water, in the morning and late at night.
<i>Corchorus olitorus</i> (seeds)	Water	Pulverization after sun dry	Small quantity of the material is taken with hot pap in the morning and evening.
<i>Elaeis guinensis</i> (Leaves)	—	Scotching/Extraction	One glass cup of the extract is taken daily until ailments disappear.
<i>Senna alata</i> (Leaves), sugar cubes	Lime	Pulverization after sun dry	Small quantity of the material is taken with hot pap once in the morning.
<i>Carica papaya</i> (male) (Roots), <i>Senna podocarpa</i> (Roots), <i>Senna alata</i> (Roots), <i>Citrus aurantifolia</i> (Fruit juice)	Lime	Decoction	One tablespoon is taken in the morning and evening.
<i>Imperata cylindrica</i> (Roots), <i>Perquetina nigrescens</i> (Roots), <i>Citrus aurantifolia</i> (Fruit juice)	Water	Decoction	Half glass cup is taken in the morning and evening.
<i>Sansevieria liberica</i> (Leaves)	Water/Lime	Scotching	One tablespoon of the extract is taken in the morning and afternoon.
	—		

<i>Albizia zygia</i> (Stem bark)		Infusion	Half glass cup of the extract is taken in the morning before meal and after meal in the night.
<i>Rauvolfia vomitoria</i>	—	Pulverization after air dry	One tablespoons of the powder dissolved in 150ml/200ml of boiled water is taken twice daily.
<i>Euphobia hirta</i>		Pulverization after air dry	One tablespoons of the powder dissolved in 150ml/200ml of boiled water is taken twice daily.

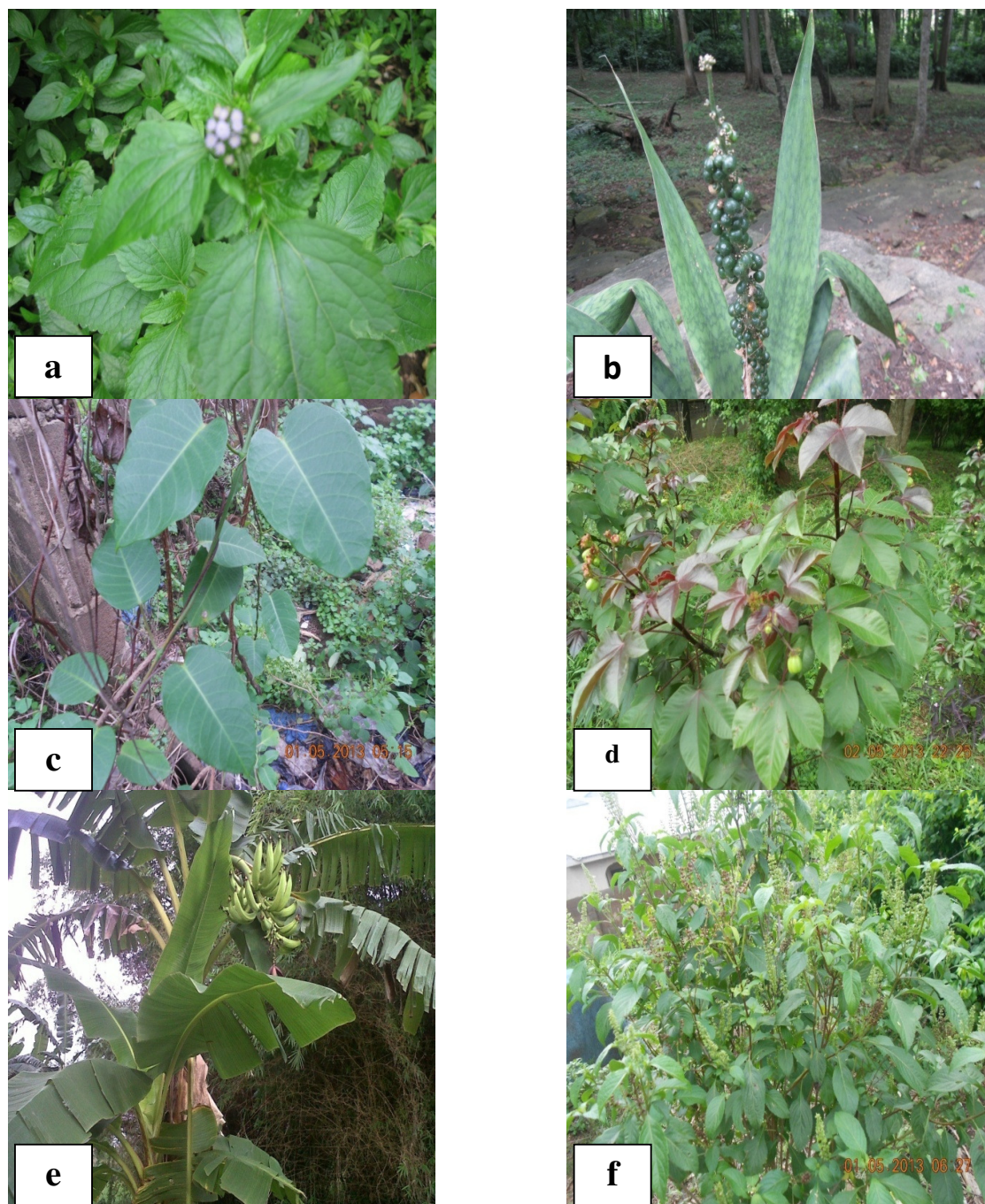


Plate 1: Some of the plants used in the treatment of diabetes in Irepodun local government area of Osun State, Nigeria (a) *Agerantum conyzoides* (b) *Sansevieria liberica* (c) *Perquetina nigrescens* (d) *Jatropha gossypifolia* (e) *Musa paradisiaca* (f) *Ocimum gratissimum*

DISCUSSION

The result showed that 50% of the respondents in Irepodun Local Government fall under age 51-60 and 4% fall under age 21-30 ages. This implies that practices of traditional medicine in the study area are actively involved by old people. This was in support of the result of Faleyimu and Oluwalana (2008) who reported that, the older the people, the more active and experienced they are in the use and sourcing of medicinal plants.

Most of the respondents in Irepodun Local Government Area are Herb sellers (60%), Traditional Medical Practitioners, Civil Servants (10%) and farmers (20%). This could be as a result of high involvement in traditional medicine as a primary occupation by the respondent. All other economics activities are additional source of income.

The various plant parts mentioned include leaves, fruits, roots, seeds, stem bark, bulb, tuber, stem and rhizome. It was observed that leaves formed the most frequently used part for diabetes (44%),

followed by fruits (24%), root (11%), seeds (5%), bulb, tubers, stem bark (4%) and rhizome (2%). The plant leaves are important ingredient in traditional treatment of various diseases as it occurred as a component in many herbal preparations. This finding was in line with other studies such as Adekunle (2008) and Ayodele (2005).

The families with the highest occurrence of species include Leguminosae with 4 species, followed by Euphorbiaceae, Apocynaceae, Curcubitaceae and Poaceae (3 each), which is an indicative of their importance in the treatment of diabetes. The frequent occurrence of these families was supported by Soladoye *et al.* (2012) who reported that antidiabetics medicinal plants suggests their importance as repository of useful plants which may be explored for diabetes treating drugs. However, Agavaceae, Araceae, Amaryllidaceae, Bromeliaceae, Bignoniaceae, Solanaceae, Tiliaceae, Piperaceae among others had the least number of species (1 each) as shown in the result, these call for urgent attention on these families before they go into extinction.

Some of the recipes were prepared from single plant source, for example, *Corchorous olitorus*, *Euphorbia hirta*, and *Rauvolfia vomitoria* while some others are in combinations with other common plants. Method of preparation varies while decoction and grinding are the most frequently used methods.

CONCLUSION

The practice of traditional medicine has been with us from time immemorial and it is upon it that the rural population depends. The study has shown that some forest plants could be used for the treatment of diabetes in Irepodun Local Government Area of Osun State.

REFERENCES

Adekunle, M.F. (2008). Indigenous Uses of Plant Leaves to Treat Malaria Fever at Omo Forest

- Reserve (OFR), Ogun state, Nigeria. *Ethiopian Journal of Environmental Studies and Management*. 1 (1): 31 – 35.
- Ajaiyeoba, E.O., Ogbale, O.O. and Ogundipe, O.O. (2006). Ethnobotanical survey of plants used in the traditional management of viral infections in Ogun State of Nigeria. *European J. Sci. Res.*, 13(1): 64-73.
- Bailey, C.J. and Day, C. (1989). Traditional plants medicines as treatment for diabetes. *Diabetes care.*; 12: 553-564.
- Faleyimu, O.I. and Oluwalana, S.A. (2008). Efficacy of Medicinal Forest Plants. See us in Ogun State, Nigeria. *Obeche Journal*. 26(1): 63 – 67.
- Gbile, Z.O. (2002). *Vernacular names of Nigerian Plants*. Molukomi press, Ibadan. Pp: 24-56
- Johshi, B.S. and Kaul, P.N. (2001). Alternative medicine: Herbal drugs and their critical appraisal-part 1. *Prog. Drug Res.*; 56: 1-76.
- Marles, R. and Farnsworth, N.R. (1994). Plants as Sources of antidiabetic agents in: *Economic and Medicinal Plant Research*. Wanger, H., Farnsworth, N.R., editors. Academic press limited.UK. 6: 149-187.
- Modak, M., Dixit, P., Londhe, J., Ghaskadbi, S. and Devasagayam, T.P.A. (2007). Indian herbs and herbal drugs used for the treatment of Diabetes. *J. Clin. Biochem.*; 40: 163-173.
- Moller, D.E. and Flier, J.S. (1991). Insulin resistance-mechanism, syndromes and implications. *N.Engl. J. Med.*; 325: 938-948.
- Soladoye, M.O., Chukwuma. E.C. and Owa, F.P. (2012). An 'Avalanche' of Plant Species for the Traditional Cure of *Diabetes mellitus* in South-Western Nigeria. *Journal of Natural Product and Plant Resources*. 2(1): 60-72.
- Wild, S., Rolic, G., Green, A., Sicree, R. and King, H. (2004). Global prevalence of diabetes: Estimate of the year 200 and projections for 2030. *Diabetes Care.*; 27: 1047-1053.
- World Health Organization (1994): Prevention of Diabetes mellitus. Report of WHO Study Group Tech.Rep.Serial No. (144). WHO Geneva.