

# Ethnobotanical studies of medicinal plants used in the management of diabetes mellitus in South Western Nigeria

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## Abstract

This survey was carried out in targeted areas of South West Nigeria in order to inventory plants used by traditional healers in the area for the management of diabetes mellitus. One hundred traditional healers who know and use medicinal plants for treating diabetes mellitus were interviewed. The inventory contains scientific, vernacular, common names of the plants used and method of preparation. Thirty-one plants commonly used by traditional healers in the region were identified. The survey shows plants from the Rutaceae, Leguminosae and Cucurbitaceae families are commonly used by traditional healers in South West Nigeria for the treatment of diabetes mellitus.

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## 1. Introduction

Diabetes mellitus is a growing health concern worldwide. The latest WHO publication (global burden of disease) estimates diabetes in adults to be around 173 million (Wild et al., 2003) and around two thirds of these live in developing countries.

It is a metabolic disease characterised by high-blood glucose levels resulting from defects in insulin secretion, insulin action or both (Ortiz-Andrade et al., 2005). The prevalence of diabetes mellitus is increasing 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 factors causing the rise in the number of diabetics. However, Asia and Africa are identified as regions with greatest potential where diabetics could rise to two- or threefold above the present level (ADA, 1997).

In traditional African societies, phytotherapy is highly valued and widely utilised. Majority of the population use plant materials as their sources of primary healthcare (Farnsworth et al., 1985).

There have been several reports of ethnobotanical surveys in Italy (De Feo and Senatore, 1993), Western Nigeria (Adjanohoun et al., 1991; Abo et al., 2000), Tanzania (Moshi and Mbwambo, 2002), China (Jia et al., 2003), Morocco (Bnouham et al., 2002; Tahraoui et al., 2007; Jouad et al., 2001), Mali (Besancon et al., 2005), Trinidad and Tobago (Mahabir and Gulliford, 1997), Eastern cape province, South Africa (Erasto et al., 2005) of various indigenous populations concerning use of medicinal plants for the management and treatment of diseases including diabetes mellitus. Information is very scanty on local medicinal plants and plant parts used traditionally in the South Western Nigeria for the management of diabetes mellitus.

This study aims at documenting plants and plant parts used exclusively for the management of diabetes mellitus by traditional healers in targeted areas of South Western Nigeria.

## 2. Methodology

This ethnobotanical survey of plants used in the management of diabetes mellitus was conducted in Lagos State (Ikorodu Local Government), Ogun State (Sagamu and Ikenne Local Government areas), Oyo State (Ibadan South-West Local Government area) and Osun State (Oriade Local Government area), respectively (Fig. 1). The indigenous population of these states

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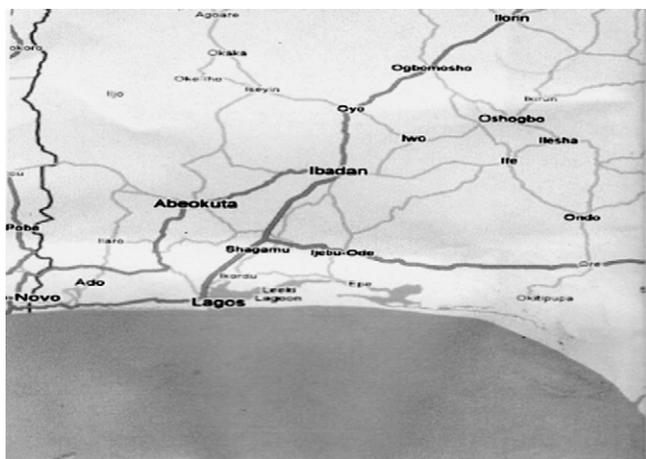


Fig. 1. Map indicating study areas.

belongs to the Yoruba ethnic group but other ethnic groups are represented.

A traditional healer for the purpose of this study is “a person who is recognized by the community in which he lives as competent” to provide healthcare by using vegetable, animal and mineral substances and certain other methods. These methods are based on social, cultural and religious backgrounds as well as on knowledge, attitude and belief that are prevalent in the community regarding physical, mental and social well-being and the causes of disease and disability (Sofowora, 1982).

Identification of traditional healers was through signpost, notices, enquiries in the neighborhood and also at the market stalls where herbs are sold. The traditional healers were approached and asked for their consent in talking about diabetes mellitus and its management.

Table 1  
Biodata of respondents

Age of traditional healer	Number of respondents
<20	11
21–40	23
41–60	33
60 and above	33
Sex	
Male	96
Female	4
Marital status	
Single	11
Married	89
Divorced	0
Tribe	
Yoruba	100
Ibo	0
Hausa	0
Religion	
Islam	27
Christian	10
Others	73

*n* = 100.

Table 2  
Experience and source of information of respondents

Experience in treating diabetic patients	Number of respondent
Yes	100
No	0
Source of information on herbal treatment	
Ancestral	83
Others	17
Years of experience	
<5	5
5–10	4
11–20	8
20 and above	83
Method of treatment	
Herbal alone	0
Herbal and divination	86
Herbal and diet	14
Divination	0

The investigation was conducted by interviews (interviewing 100 informants) and by administering designed pilot tested questionnaire containing items on demographic variables such as diagnosis of diabetes mellitus (traditionally), methods of treatment, length/duration of treatment or management, recipes for management (including names of plants and any animal part used).

Assistance from the traditional healers was also sought for plant collection from the field. Unambiguous identification of plant species was achieved at the Forestry Research Institute of Nigeria, Ibadan (where herbarium specimens are kept) and by reference to standard botanical classifications and nomenclature (Keay, 1989; Gills, 1988; Gbile, 1984). Identification was also confirmed by Mr. A. Olutayo of the Herbarium of Faculty of Pharmacy, Olabisi Onabanjo University, Shagamu.

### 3. Results

Data obtained from this survey on plants used in targeted local government areas of Oyo, Ogun, Osun and Lagos states of Nigeria.

Table 3  
Methods of diagnosing diabetes mellitus in traditional medicine

Basis of treating diabetes on diagnosis	Number of respondent
Excessive urination	100
Loss of weight	100
Presence of sugar in urine	100
Duration of treatment	
1–6 months	92
6–12 months	8
Effect of herbs on patients	
Disappearance of sugar in the urine	100
Reduction in frequency of urinating	100
Traditional healers claim of total cure after treatment	
Yes	100
No	0

There were 100 respondents in this study with 96 males and 4 females. Sixty-six (66%) were aged 40 years and above (Table 1). Eighty-three (83%) of the respondents gave a 20 or more years experience.

Furthermore, 83% of respondents attributed experience in managing diabetes mellitus to family and clan traditions, i.e. ancestral (Table 2). Only 14 (14%) considered dietary changes as part of management of diabetes mellitus.

The traditional healers in this study, claimed they are able to diagnosis diabetes mellitus in their patients by observing symptoms such as excessive urination, loss of weight and presence

of sugar in urine, which is detected, by presence of ants around spots of urine (Table 3).

The traditional healers claimed that treatment takes about 1–6 months for patients to be cured. They indicated that the herbs administered often led to reduction in urinating frequency and complete disappearance of sugar in urine.

In this study, 31 plants from various families were mentioned as used traditionally as part of recipe for the management of diabetes mellitus in South Western Nigeria (Table 4).

Each of the 31 plants documented in this study were mentioned by three or more respondents as included in their recipe

Table 4  
Leaf of plants used in managing diabetes mellitus in South Western Nigeria

Botanical name	Local names	Common names	Families	Morph. part used	Method of preparation	Proof <sup>a</sup>	Number of respondent
<i>Abrus precatorius</i> L.	Ojuologbo	Cat's eye	Papilionaceae	Leaf	Decoction	N	3
<i>Azadirachta indica</i> Juss	Dongoyaro	Neem	Meliaceae	Leaf, fruit	Infusion, Decoction	Y	3, 6
<i>Bridelia micrantha</i> (Hochst.) Baillon	Iranje	Sweetberry	Euphorbiaceae	Leaf	Decoction	N	3
<i>Cassia alata</i> L.	Asunwon	Ringworm plant	Leguminosae	Leaf	Maceration	Y	42
<i>Colocynthis citrullus</i> L.	Baara	Bitter gourd	Cucurbitaceae	Leaf, fruit	Infusion, Decoction	Y	12, 3
<i>Corchorus olerius</i> L.	Ewedu	Long fruited jute	Tiliaceae	Leaf	Decoction	Y	3
<i>Cola acuminata</i> (Beauv) Schott and Endl	Obi abata	Kola nut	Sterculiaceae	Leaf	Decoction	Y	3
<i>Manihot esculenta</i> Krantz	Gbaguda	Cassava	Euphorbiaceae	Leaf	Decoction	N	3
<i>Ocimum gratissimum</i> L.	Efirin	Basil	Lamiaceae	Leaf	Maceration	Y	8
<i>Parkia biglobosa</i> (Jacq) Benth	Iru	African Locust beans	Leguminosae	Leaf	Infusion	N	3
<i>Secamone afzelii</i> (Schult) K Schum	Ailu	Secamone	Asclepiadaceae	Leaf	Maceration	N	12
<i>Spondias mombin</i> L.	Iyeye	Yellow Hog plum	Anacardiaceae	Leaf	Decoction	N	3
<i>Vernonia amygdalina</i> L.	Ewuro	Bitter leaf	Asteraceae	Leaf, Root	Decoction	Y	34, 65
<i>Aframomum melegueta</i> K Schum	Atare	Grains of Paradise	Zingiberaceae	Fruit	Tincture	N	3
<i>Abelmoschus esculentus</i> L.	Ila	Okro	Malvaceae	Fruit	Decoction	Y	3
<i>Carica papaya</i> L.	Ibepe	Pawpaw	Caricaceae	Fruit, Root	Infusion, Decoction	Y	5, 6
<i>Capsicum frutescens</i> L.	Ata Ijosi	Bird pepper/chilli	Solanaceae	Fruit	Decoction	N	3
<i>Citrus aurantiifolia</i> (Christm) Swingle	Osan wewe	Lime	Rutaceae	Fruit	Lemonade	Y	13
<i>Citrus sinensis</i> Osbeck	Osan mimu	Sweet orange	Rutaceae	Fruit, seed	Lemonade, Infusion	Y	6
<i>Curculigo pilosa</i> Schum & Thonn	Epakun	Donkey's ear	Hypoxidaceae	Fruit	Decoction	N	3
<i>Garcinia cola</i> Heckel	Orogbo	Bitter cola	Clusiaceae	Fruit, Root	Maceration	Y	6
<i>Musa paradisiaca</i> L. (pro sp.)	Ogede agbagba	Plantain	Musaceae	Fruit	As a meal	Y	3
<i>Ficus exasperata</i> Vaghl	Eepin	Sampaper	Moraceae	Root	Decoction	N	3
<i>Momordica charantia</i> L.	Ejirin	Africa cucumber	Cucurbitaceae	Root	Decoction	Y leaf	17
<i>Morinda lucida</i> Benth	Oruwo	Brimstone tree	Rubiaceae	Root	Decoction	N	3
<i>Alstonia boonei</i> Dewild	Awun	Stoolwood	Apocynaceae	Stem bark	Tincture	N	3
<i>Curcuma longa</i> L.	Atale pupa	Tumeric	Zingiberaceae	Rhizome	Decoction	N	5
<i>Gladiolus psittacinus</i> Hook f	Baaka	Corn flag	Iridaceae	Bulb	Maceration	N	6
<i>Phyllanthus amarus</i> Schum and Thonn	Eyin olobe	Pick-a-back	Euphorbiaceae	Whole plant	Decoction	Y	3
<i>Zea mays</i> L.	Agbado, Oka	Corn	Poaceae	Seed, Silk	Decoction	N	6
<i>Zingiber officinale</i> Roscoe	Atale	Ginger	Zingiberaceae	Rhizome	Maceration	Y	4

<sup>a</sup> Proof of plants with scientific evidence of hypoglycaemic or antidiabetic activity. Y = yes; N = none; n = 100.

for the management of diabetes mellitus. Forty-two percent of the respondents mentioned *Cassia alata*, 34% and 64% mentioned the leaf and root, respectively of *Vernonia amygdalina* as plants mostly used.

The ethnobotanical survey revealed that more plants from the Rutaceae, Leguminosae and Cucurbitaceae families are included as recipes for managing diabetes mellitus by traditional healers of South Western Nigeria.

#### 4. Discussion

This ethnobotanical study documents the ethno-phytotherapeutic management of diabetes mellitus and patronage of traditional healers in South West Nigeria. The indigenous population still relies to a great extent on traditional healers and medicinal plants to meet their healthcare needs because of the perceived effectiveness, presumed safety with minimal side effects and affordability (Vliathan, 1998).

Despite the differences in language, tradition, culture and beliefs, this study shows that traditional healers in South West Nigeria claim to diagnose diabetes mellitus in their patients the same way as traditional healers in ancient India (Subbulakshmi et al., 2001).

Comparative analysis of this study with other ethnobotanical surveys of plants used traditionally in treating diabetes mellitus (Table 4) in South eastern Nigeria (Obute, 2005), India (Subbulakshmi et al., 2001), Morocco (Besancon et al., 2005), North centre region of Morocco (Jouad et al., 2001), South Eastern Morocco (Tahraoui et al., 2007), Eastern Cape Province of South Africa (Erasto et al., 2005), Tanzania (Moshi and Mbwambo, 2002), Mali (Besancon et al., 2005), Trinidad and Tobago (Mahabir and Gulliford, 1997) revealed some similarities in the plants cited in these surveys. Of the 35 plant species cited as used in South Eastern Nigeria (Obute, 2005), nine species are identified in our study: *Aframomum melegueta*, *Alstonia boonei*, *Azadirachta indica*, *Carica papaya*, *Citrus aurantifolia*, *Corchorus olitorius*, *Garcinia cola*, *Manihot esculenta* and *Vernonia amygdalina*. *Citrullus colocynthis* used by traditional healers in South West Nigeria for treating diabetes was also documented for the same purpose in India (Subbulakshmi et al., 2001), North centre region of Morocco (Jouad et al., 2001) and South Eastern Morocco (Tahraoui et al., 2007).

In the ethnobotanical survey conducted in Tanzania (Moshi and Mbwambo, 2002), four of the cited plants were also identified in this study (*Abrus precatorious*, *Bridelia micrantha*, *Carica papaya* and *Ficus exasperata*). Of the 14 plants documented as used in Eastern Cape province of South Africa (Erasto et al., 2005), *Vernonia amygdalina* was the only plant species mentioned by informants used in this survey while *Parkia biglobosa* and *Citrus* species cited in the study carried out in Sikasso Mali (Besancon et al., 2005) were also identified in this study.

*Phyllanthus amarus*, *Zingiber officinale*, *Citrus aurantifolia*, *Momordica charantia* and *Carica papaya* identified in this study were also documented as used traditionally in Trinidad and Tobago (Mahabir and Gulliford, 1997) for treating diabetes.

However, none of the plants used by traditional healers in South West Nigeria is used in treating diabetes in China (Jia et al., 2003).

The hypoglycaemic activity of some plants identified in this study (Table 4) has been experimentally demonstrated in the in vivo and in vitro diabetic models [*Azadirachta indica* (Dixit et al., 1986; Khosla et al., 2000), *Cassia alata* (Palanichamy et al., 1988), *Colocynthis citrullus* (Abdel-Hassan et al., 2000), *Cola acuminata* (Ogunleye et al., 2003), *Carica papaya* (Oke, 1998), *Ocimum gratissimum* (Aguiyi et al., 2000; Egsie et al., 2006), *Citrus aurantifolia* and *Citrus sinensis* (Jaiyesimi et al., 2000), *Momordica charantia* (Bailey et al., 1985), *Musa paradisiacal* (Ojewole et al., 2003), *Garcinia cola* (Iwu et al., 1990), *Zingiber officinale* (Ojewole, 2006), *Phyllanthus amarus* (Ali et al., 2006), *Ficus exasperata* (Ogunleye et al., 2003)].

Many plant species are known as sources of treating human ailments, this study documents the plants used in South Western Nigeria by traditional healers for the treatment of diabetes mellitus. Further experimental investigation of these plants may possibly offer effective and alternative affordable management of diabetes mellitus.

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