

## A Survey of Plants used in Treatment of Hypertension and Diabetes Mellitus in Ilorin, Kwara State, Nigeria

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A – research concept and design; B – collection and/or assembly of data; C – data analysis and interpretation; D – writing the article; E – critical revision of the article; F – final approval of article.

### Abstract

**Background:** Hypertension and Diabetes mellitus have emerged as the leading non-communicable disease worldwide, thus, the increasing need to continuously explore more and better ways of treating these diseases.

**Objectives:** To carry out a survey of plants used in the treatment of hypertension and Diabetes mellitus in Ilorin, Kwara State, Nigeria.

**Materials and methods:** Interview was conducted among respondents using semi-structured questionnaires and asking open-ended questions. Descriptive statistics were used for data analysis.

**Result:** A total of 30 respondents comprising of 60.0% male and 40.0% female with the highest distribution of age range at above 50 years old (50.0%) was reported. Forty (40) medicinal plant species belonging to thirty-one (31) plant families were cited with the Apocynaceae family having the highest number of medicinal plants, followed by Asteraceae. For hypertension, 32 plant species were reported of which the most cited were *Allium sativum* (4) and *Ficus asperifolia* (2) while for Diabetes mellitus, 20 plant species were mentioned, of which the most cited were *Hunteria umbellata* (10) and *Vernonia amygdalina* (9). Of particular interest in this study were the plants that appeared for both hypertension and Diabetes treatment.

**Conclusion:** This survey has helped to increase available medicinal plants knowledge and documentation in the management of hypertension and Diabetes. However, further work on the pharmacological activity of these plants as well as formulation in proper dosage form is recommended.

**Keywords:** Hypertension, Diabetes mellitus, Traditional medicine practitioners, Kwara state

### INTRODUCTION

Non-communicable diseases such as hypertension, diabetes and other cardiovascular diseases are becoming increasingly important as causes of mortality and morbidity in all developing countries (Kegne *et al.*, 2007), with hypertension being the commonest (Akinkugbe, 1990). Hypertension is one of the leading causes of cardiovascular morbidity and mortality throughout the world (Dinicolaantonio and Makridakis, 2014). The overall prevalence of

hypertension in Nigeria ranges from 8%-46.4% depending on the study target population, type of measurement and cut-off value used for defining hypertension (Okechukwu *et al.*, 2012). In a study carried out by Kamaldeen *et al.*, 2014, the prevalence of hypertension using the Joint National Committee (JNC) classification of hypertension among 270 respondents that resides in Ilorin revealed prevalence of stage 1 and stage 2 hypertension is 16.7% and 11.9% respectively. Likewise, there is a compelling data to show an increasing incidence and

prevalence of diabetes mellitus in the continent. The estimated prevalence of diabetes in Africa is 1% in rural areas, and ranges from 5% to 7% in urban sub-Saharan Africa (Kegne *et al.*, 2005). The economic burden of these cardiovascular diseases comes in form of loss of income from disability and increased cost of healthcare. Reports on the global burden of these diseases indicate that it may likely have more adverse effects on middle-aged less-privileged people. This may relate to their higher risk profile and limited access to health interventions, which ultimately affect national productivity and development (Gaziano, 2007).

The development of natural products that are readily available, safe, effective, cheap, and assessable will improve acceptability of treatment and improve compliances that will greatly improve quality of life of sufferers. The plant kingdom has since time immemorial serves as a treasure house of potential

drugs (Yadav and Argawala, 2011). The plant kingdom represent a rich store house of organic compounds many of which have been used for medicinal purposes and could serve as lead for the development of novel agents having good efficacy in various pathological disorders now and the future.

Medicinal plants are widely used by many people in Ilorin, Kwara State to treat/manage hypertension and Diabetes mellitus, however, there is no proper documentation of these medicinal plants. This research therefore seeks to collect and document information on the medicinal plants used in treatment of hypertension and diabetes mellitus in Ilorin, Kwara State, Nigeria which can provide a very good lead towards the development of new, more potent and cost effective anti-diabetic and antihypertensive drugs.

## METHODOLOGY

The study was conducted in three major Local Government Areas of Ilorin, the capital city of Kwara State, namely, Ilorin-East, Ilorin-South and Ilorin West Local Government Areas (Figure 1). Ilorin is located at 8.50 latitude and 4.54 longitude and it is

situated at elevation 320 meters above sea level. Ilorin has a population of 814,192 making it the biggest city in Kwara State. The most predominant ethnic group in this area is the Yoruba.

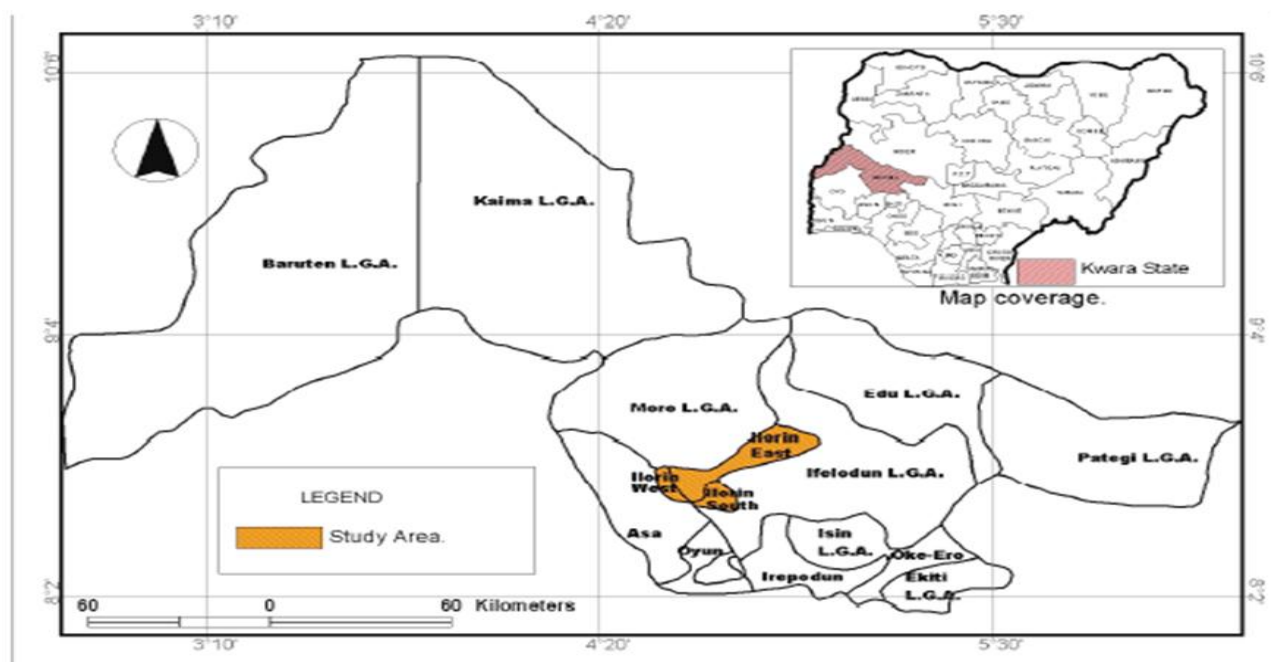


Figure 1: Map of Kwara State showing the study area (Raheem, 2011)

**Data collection**

Information was collected between June 2016 and January 2017 with the aid of semi-structured questionnaires and open-ended conversation to thirty respondents who are majorly traditional medicine practitioners, herb sellers and individuals with knowledge about medicinal plants used in treatment of hypertension and Diabetes mellitus. This population of study is chosen based on a pilot study carried out in Ilorin, Kwara State. Participation of the survey is voluntary.

The contents of the semi-structured questionnaires were organized using a standard protocol (Namsa *et al.*, 2009). Basic information about plants used in treatment of hypertension and diabetes mellitus, part(s) of the plants used, local name of the plant, botanical name of the plant, form in which the plant is used, method preparation of the plant and their dosage forms, and source of collection of the plant, sources of funding and record keeping of patients' information. Most respondents including the herb sellers and traditional healers were interviewed in the local language for clarity. Informed consent was obtained orally from all participants before the administration of the questionnaires and commencement of interview. The questionnaire was divided into three sections; the first section was demographic information, the second section was in their area of practice while the third section was the plants used the management of the diseases of interest. Frequency and percentage were employed for data analysis.

The Use of Mention Index (UMI) was calculated by dividing the number of use of each mentioned plant by the number of respondents.

**RESULTS AND DISCUSSION**

Hypertension and Diabetes mellitus are two cardiovascular diseases that are projected to triple by 2030 and majority expected to come from developing countries with sub-Sahara Africa leading (Laslett *et al.*, 2012). It is also known that early detection and management can lead to improved quality of life with increased economy. Documentation and development of medicinal plants is a major step in healthcare development. Scientific evaluation of these plants can improve access and acceptability and provide new drugs or templates for new drugs.

**Information on Demography of Respondents**

This study reveals a total of thirty (30) respondents, with the highest percentage coming from Ilorin-South followed by Ilorin-West and then Ilorin-East Local Government Areas of Kwara State at 46.7, 30.0 and 23.3% respectively. The population of respondents consisted of 60.0% male and 40.0% female with the highest distribution of age range at above 50 years old (50.0%). 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. The educational status of the respondents reveals that only a small fraction (3.3%) of them are graduates, while majority have the secondary education (43.3%). Some others had primary education (10.0%), other forms of education (23.3%) while some were not exposed to any form of formal education (20.0%) (See Table 1).

**Table 1: Demographic Information of respondents**

Parameter	Description	Frequency	Percentage (%)
Location	Ilorin-East	7	23.3
	Ilorin-West	9	30.0
	Ilorin-South	14	46.7
Age	25-35	4	13.3
	36-50	11	36.7
	51 and above	15	50.0
Sex	Male	18	60.0
	Female	12	40.0
Educational status	Graduate	1	3.3
	Secondary education	13	43.3
	Primary Education	3	10.0
	Other forms of education	7	23.3
	None	6	20.0

### Information on Practice of Respondents

Majority of the respondents (80.0%) were Traditional medicine practitioners (TMP) with specialty on herbal medicine only, while others combine the herbal medicine with bone settings, traditional birth attendance with a spice of spiritual elements. The others were herb sellers and knowledgeable individuals at 13.3 and 6.7% respectively. A high percentage of the respondents (40.0%) claim to have been practicing for more than 30 years while majority of them (76.7%) acquire their knowledge through their family ancestry and only 6.7% of them acquired their knowledge through apprenticeship. However, some had the opportunity to experience both forms of knowledge acquisition (6.7%) while others (6.7%) acquire their knowledge through other means such as personal research. Some of the respondents (50%) keep records of their patients using of notebooks, cards and files.

It was also revealed that apart from plants, other raw materials such as animal parts, aquatic organisms and minerals are incorporated in preparation of recipes used for patients.

The result of this study has also shown cultivation of medicinal plants is an important tool in the practice of TMPs and that medicinal plant conservation is important in the plant usage as 100.0% and 86.7% of the respondents claim to be aware of the importance of cultivation of medicinal plants and conservation methods for medicinal plants (See table 2). Also, more than half (53.3%) fund from their pockets (personal funding) with no support from the government. Source of funding for traditional medicine practice is very important for the success of the practice.

### Information on medicinal plants mentioned by respondents in the treatment of hypertension and Diabetes mellitus

A total of forty (40) medicinal plant species belonging to thirty-one (31) plant families were mentioned by respondents for treatment of hypertension and Diabetes mellitus (See Table 3). For hypertension, 32 plant species were cited (Table 3), of which the most cited were *Allium sativum* (13.3%) and *Ficus asperifolia* (6.7%), while the other

### Information on the diagnosis and the dosage forms used by respondents

The management/treatment of hypertension and Diabetes mellitus with medicinal plants is an acceptable practice in Kwara State, but there is still a growing need for proper documentation and development. According to this study, majority of the respondents (80.0%) claim to diagnosis hypertension in their patients by observing signs of sleeplessness, persistent headache, inactivity or reduced activity of a body part, increased heartbeat, fever, inability to stand up immediately from sitting position, inability to talk properly, excessive fluid intake, trembling of the hand, vomiting, inability to eat well, body pain, loss of weight, pain in the leg, loss of sight and stomach ache, while 93.7% of the respondents diagnose diabetes by identifying signs such as excessive urination, sugary taste of urine, insects on urine after urination, body ache, sleeplessness, loss of weight, body weakness, general body illness, wound not healing or delayed wound healing, roughness of skin, urine not drying up quickly, fever and irritation in mouth causing increased salivation.

Majority (43.3%) of the respondents have loose powder and liquid as the dosage form of medicines they administer to their clients, 30% of the respondents administer or give drugs to their clients in loose powder, liquid and tea bag dosage forms. 3% of respondents administer or give medicines in liquid only dosage form to their clients.

plants mentioned were only cited once. For diabetes mellitus, 20 plant species were listed, of which the most cited were *Hunteria umbellata* (33.3%), *Vernonia amygdalina* (30.0%), *Cocos nucifera* (20.0%), *Aristolochia rigens* (16.7%), *Securidaca longepedunculata* (10.0%) and *Ocimum gratissimum* (10.0%) (See Table 3). Of particular interest in this study were the plants that appeared for both hypertension and Diabetes treatment, which includes: *Allium sativum*, *Anthocleista djalonensis*, *Carica papaya*, *Cassia alata*, *Citrus aurantifolia*, *Ficus*

*asperifolia*, *Heliotropium indicum*, *Hunteria umbellata*, *Nauclea laterifolia*, *Ocimum gratissimum* and *Vernonia amygdalina*. There have been previous reports on the antihypertensive and anti-diabetic activities of majority of these plants, such as *Hunteria umbellata* (Adeneye and Adeyemi, (2009); Gbolade, (2012); *Carica papaya* (Juarez-Rojop et al., (2012); Yasmeeen and Prabhu, (2012) *Allium sativum*

(Suetsuna, (1998), Thomson et al., (2007) *Anthocleista djalonensis* (Olubomehin et al., (2013) and *Heliotropium indicum* (Kuffour et al., (2012), to mention a few. However, the mechanisms of action of these plants as well as the therapeutic profile are yet to be identified.

**Table 2: Information on Practice of Respondents**

Parameter	Description	Frequency	Percentage (%)
Area of practice	Traditional medicine practitioners	24	80.0
	Herbal sellers	4	13.3
	Knowledgeable individuals	2	6.7
Years of practice	1-10	5	16.7
	11-20	6	20
	21-30	7	23.3
	31 and above	12	40.0
Knowledge acquisition	Family	23	76.7
	Apprenticeship	2	6.7
	Both	2	6.7
	Others	3	10
Number of staff	1-5	21	70
	6-10	4	13.3
	11 and above	1	6.6
	None	3	10
Awareness about cultivation of plants	Yes	30	100
	No	0	0
Cultivation of medicinal plants	Yes	17	56.7
	No	13	43.3
Source of funding	Personal funds	16	53.3
	Family and friends	4	13.3
	Loans and Co-operatives & Contributions	10	33.3
	Government	0	0.0
Knowledge of patient	Yes	20	66.7
	No	9	30.0
	Not sure	1	30.0
Keeping records of clients	Yes	15	50.0
	No	15	50.0
Use of preservatives	Yes	19	63.3
	No	11	36.7
Conservation methods for plants used	Yes	26	86.7
	No	4	13.3
Medicinal plants being used as food also	Yes	25	83.3
	No	5	16.7
The medicinal plants going into extinction	Yes	13	43.3
	No	17	56.7
Plants as source of some orthodox medicines	Yes	26	86.7
	No	4	13.3
Room for improvement in practice	Yes	30	100
	No	0	0

This study also revealed that leaves formed the most frequently used plant part, followed by root, fruit and seed at 40.4%, 23.4%, 14.9% and 6.4% respectively (See Figure 2). The bulb, rhizome and juice accounted for 4.3% each of the plant part used while the stem is the least occurring at 2.1%. 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 plant families with

the highest number of plants cited by the respondents in the management of hypertension and Diabetes mellitus is Apocynaceae (10%), followed by Fabaceae (8%), Asteraceae (5%), Liliaceae (5%) and Rubiaceae (5%) (See figure 4). The Apocynaceae plant family has been reported to be predominant in the mention of plants used in the management of various ailments (Rahman and Akter, 2016). Other plant families cited can be seen as represented on Table 3.

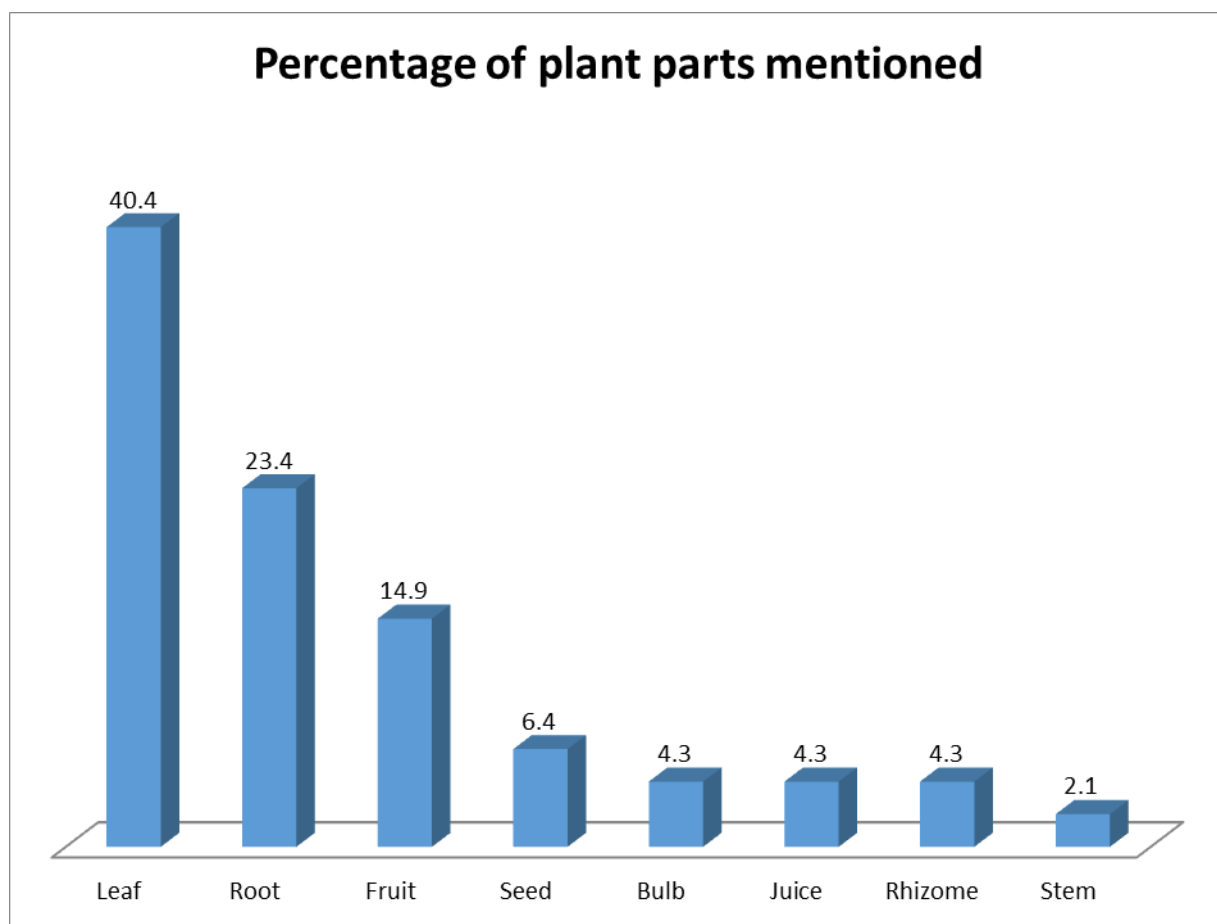


Figure 2: Percentage distribution of plant parts mentioned by respondents

**Table 3: Plants mentioned by respondents in the treatment of Hypertension and Diabetes mellitus**

Botanical Name	Family	Local name	Plant part used	Disease	Use Mention Index (%)
<i>Acanthospermum hispidum</i> DC.	Asteraceae	Egun-igba	Leaf	DM	3.3
<i>Allium ascalonicum</i> L.	Liliaceae	Alubosa elewe	Leaf	HT	3.3
<i>Allium sativum</i> L.	Liliaceae	Ayu	Bulb	HT, DM	13.3, 3.3
<i>Anthocleista djalonenis</i> A.Chev.	Loganiaceae	Sapo	Leaf, Root	HT, DM	6.7
<i>Aristolochia ringens</i> Vahl.	Aristolochiaceae	Akogun	Root	HT, DM	16.7, 3.3
<i>Blighia sapida</i> K.D.Koenig	Sapindaceae	Isin	Fruit	HT	3.3
<i>Calotropis procera</i> Ait R.Br	Apocynaceae	Bomubomu	Leaf	HT	3.3
<i>Carica papaya</i> L.	Caricaceae	Ibepe	Leaf, Fruit, Root	HT, DM	3.3, 3.3
<i>Cassia alata</i> L.	Fabaceae	Kasia	Fruit	HT, DM	3.3, 3.3
<i>Citrus aurantifolia</i> (Christm.) Swingle	Rutaceae	Osan wewe	Leaf, Juice	HT, DM	3.3, 3.3
<i>Cocos nucifera</i> L.	Arecaceae	Agbon	Juice	DM	20.0
<i>Crinum jagus</i> (J. Thomps.) Dandy	Liliaceae	Ogede odo	Bulb	DM	3.3
<i>Curculigo pilosa</i> (Schumach. & Thonn.) Engl	Hypoxidaceae	Epakun	Rhizome	HT	3.3
<i>Cymbopogon citratus</i> L.	Poaceae	Tea oyinbo	Leaf	HT	3.3
<i>Daniellia oliveri</i> (Rolfe) Hutch. & Dalziel	Fabaceae	Iya	Leaf	HT	3.3
<i>Diospyros monbuttensis</i> Gurke	Ebenaceae	Eguneja	Leaf	DM	3.3
<i>Ficus asperifolia</i> Miq.	Moraceae	Ipin	Leaf	HT, DM	6.7, 3.3
<i>Ginkgo biloba</i> L.	Ginkgoaceae	Gbogbo	Root	HT	3.3
<i>Heliotropium indicum</i> L.	Boraginaceae	Agogo-igun	Leaf	HT, DM	3.3, 3.3
<i>Hunteria umbellata</i> K. Schum	Apocynaceae	Abeere	Fruit, Seed	HT, DM	3.3, 33.3
<i>Jatropha curcas</i> L.	Euphorbiaceae	Lapalapa	Root	DM	3.3
<i>Kigelia Africana</i> (Lam.) Benth.	Bignoniaceae	Pandoro	Fruit	DM	3.3
<i>Morinda lucida</i> Benth.	Rubiaceae	Oruwo	Leaf, root	HT	3.3
<i>Musa paradisiaca</i> L.	Musaceae	Ogede	Stem	DM	3.3
<i>Nauclea latifolia</i> Smith	Rubiaceae	Egbesi	Root	HT, DM	3.3, 3.3
<i>Ocimum grattissimum</i> L.	Lamiaceae	Efinrin	Leaf	HT, DM	3.3, 10.0
<i>Paquentina nigrescens</i> (Afzel.) Bullock	Apocynaceae	Ogbo	Leaf	HT	3.3
<i>Piper nigrum</i> L.	Piperaceae	Iyere	Fruit	HT	3.3
<i>Piptadeniastrum africanum</i> (Hook. f.) Brenan	Fabaceae	Agboin	Root	HT	3.3
<i>Pseudoedrela kotschyi</i> (Schweinf.) Harms	Meliaceae	Emigbegi	Leaf	HT	3.3
<i>Psidium guajava</i> L.	Myrtaceae	Guava	Leaf	HT	3.3
<i>Psorospermum febrifugum</i> Spach.	Hypericaceae	Legun oko	Root	HT	3.3
<i>Pyrus communis</i> L.	Rosaceae	Pear	Seed	HT	3.3
<i>Rauwolfia vomitoria</i> Afzel	Apocynaceae	Asofeyeje	Root	HT	3.3
<i>Securidaca longepedunculata</i> Fresen.	Polygalaceae	Ipeta	Root, seed	DM	10.0
<i>Talinum triangulare</i> (Jacq.) Willd.	Portulacaceae	Gbure	Leaf	HT	3.3
<i>Vernonia amygdalina</i> L.	Aster44aceae	Ewuro	Leaf	HT, DM	3.3, 30.0
<i>Viscum album</i> L.	Santalaceae	Afomo	Leaf	HT	3.3
<i>Xylopia aethiopica</i> (Dunal) A. Rich.	Annonaceae	Eeru	Fruit	HT	3.3
<i>Zingiber officinale</i> Roscoe	Zingiberaceae	Ataale	Rhizome	HT	3.3

HT = Hypertension; DM = Diabetes mellitus

## CONCLUSION

Cardiovascular diseases are serious health challenges in Sub-Sahara Africa and the use of medicinal plants and traditional medicine should continuously be developed. Documentation of traditional practice is the first step in traditional medicine development, especially, using ethnomedicinal survey.

This survey has helped to increase available medicinal plants knowledge and document or source for further development and has revealed that traditional medical practitioners (TMPs) and herb sellers are becoming more aware of the need for cultivation of medicinal plants.

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