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Ethnobotanical survey on antihypertensive medicinal plants in municipality of Ouémé, Southern Benin

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ABSTRACT

Background and aims: Hypertension is one of the most common causes of cardiovascular and cerebrovascular complications in human which take care requires permanent monitoring and lifelong treatment. Therefore, patients use herbal medicine to manage their disease. This study was conducted to list the medicinal plants used to manage hypertension in municipality of Ouémé, Southern Bénin.

Methods: The survey was conducted by oral interviews using a structure questionnaire. These questionnaires were administered to randomly selected vendors, traditional medicine practitioners and person resource. The specimen of each species was deposited at the National Herbarium of the University of Abomey-Calavi and the Relative Frequency Citation was calculated.

Results: 77 plants belonging to 46 families were recorded for the treatment of hypertension in department of Ouémé. 37 antihypertensive recipes were identified. Caesalpiniaceae, Annonnaceae, and Rubiaceae were the most represented. *Allium Sativum* was the most used species against hypertension with relative frequency of citation of 0.155 following by *Persea americana* (RFC= 0.134). The most parts used was aerial part (23.08%) followed by the leaves (21.98%). The principal mode of used is decoction (72.35%) and the main mode of administration was the oral route.

Conclusion: The survey enables to indicate plants species used to manage hypertension in department of Ouémé. The document resulting from this study is an effective way to preserve knowledge in traditional medicine. However, pharmacological screening of these plant species is very important to check their effectiveness.

Keywords: Hypertension, Medicinal plants, Southern Bénin.

Original article

INTRODUCTION

Cardiovascular diseases are a leading cause of worldwide death. They are responsible for about 17 million deaths per year worldwide, or nearly a third of all deaths. Of this, 9.4 million deaths a year are imputable to the complications of hypertension which is one of the most common causes of cardiovascular and cerebrovascular complications in human.[1] It is also the major risk factor for

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myocardial infarction, heart failure, stroke, peripheral arterial disease, and chronic kidney disease.[2] Hypertension is a silent and invisible killer, responsible of at least 45% of deaths from heart disease and 51% of deaths from cerebro-vascular accidents,.[3] Projections indicate that in 2025, the incidence of hypertension would increase to 24% in developed countries. Thus, there is a gradual increase of this public health problem in developing countries where the traditional diet has been replaced by a called modern diet that does not always follow a healthy lifestyle.

In Africa, the prevalence of hypertension in 2010 has been estimated to 30.8%.[4] In Benin, epidemiological data show that the prevalence of hypertension increased from 13.6% in 2001 to 20.2% in 2004 and 27.9% in 2008 with varying prevalences according to departments: Ouémé: 38.82%; Mono: 35.76%; Plateau: 32.12%; Couffo: 29.62%; Collines: 28.67%; Donga: 25.80%; Littoral: 25.64%; Alibori: 24.24%; Atlantic: 24.07%; Borgou: 23.44%; Atacora: 23.17% and Zou: 23.00%. Thus, the Department of Ouémé is most affected by the disease with a prevalence of 38.82%.[5] The management of the hypertensive patients requires permanent monitoring and lifelong treatment, expensive in hospitals using a combination of several drugs. Also, the accessibility of modern drugs was difficult and the treatment is relatively expensive. These situations lead patients to use medicinal plants for management of the disease. Indeed, the present study was aimed to investigate plant species used as antihypertensive remedies in department of Ouémé in Benin.

METHODS

Study area: Republic of Benin is located in West Africa, between 6°100 and 12°250 of latitudes north and 0°450-3°550 of longitudes East.[6] The current study was carried out in department of Ouémé situated in South-East of Bénin with a total area of 1281 km² and 1 096 850 inhabitants in 2013.[7] It is subdivided into nine (09) municipalities: Adjarra, Adjohoun, Aguégués, Akpro-Missérété, Avrankou, Bonou, Dangbo, Porto-Novo, and Sèmè-Kpodji. This region is predominantly populated by the *Goun*, *Tori* and *Yoruba*.

Data collection: The survey was conducted in April 2015 in the department of Ouémé (Figure 1). Before each interview, the consent of informants was obtained and the aims of the study were presented.

Informants were selected randomly among plants vendors in markets, traditional medicine practitioners and persons suffering from hypertension. The method used is direct interviews using a structured questionnaire. These questionnaires were administered to randomly selected informants. The local name, parts used, method of preparation and posology was collected.

Plants identification: Collected species were firstly identified using vernacular name and some documents of the Beninese pharmacopoeia.[8,9] Then, scientific name was confirmed by the National Herbarium of University of Abomey-Calavi where the specimen of each species was deposited to obtain Voucher numbers.

Collected data were analyzed using the Relative Frequency of Citation (RFC). Importance of each plant species was calculated according to previous study.[10] The RFC was calculated as follows: number of informants who cited the species (n), divided by the total number of informants (N).

$$RFC = \frac{n}{N}$$

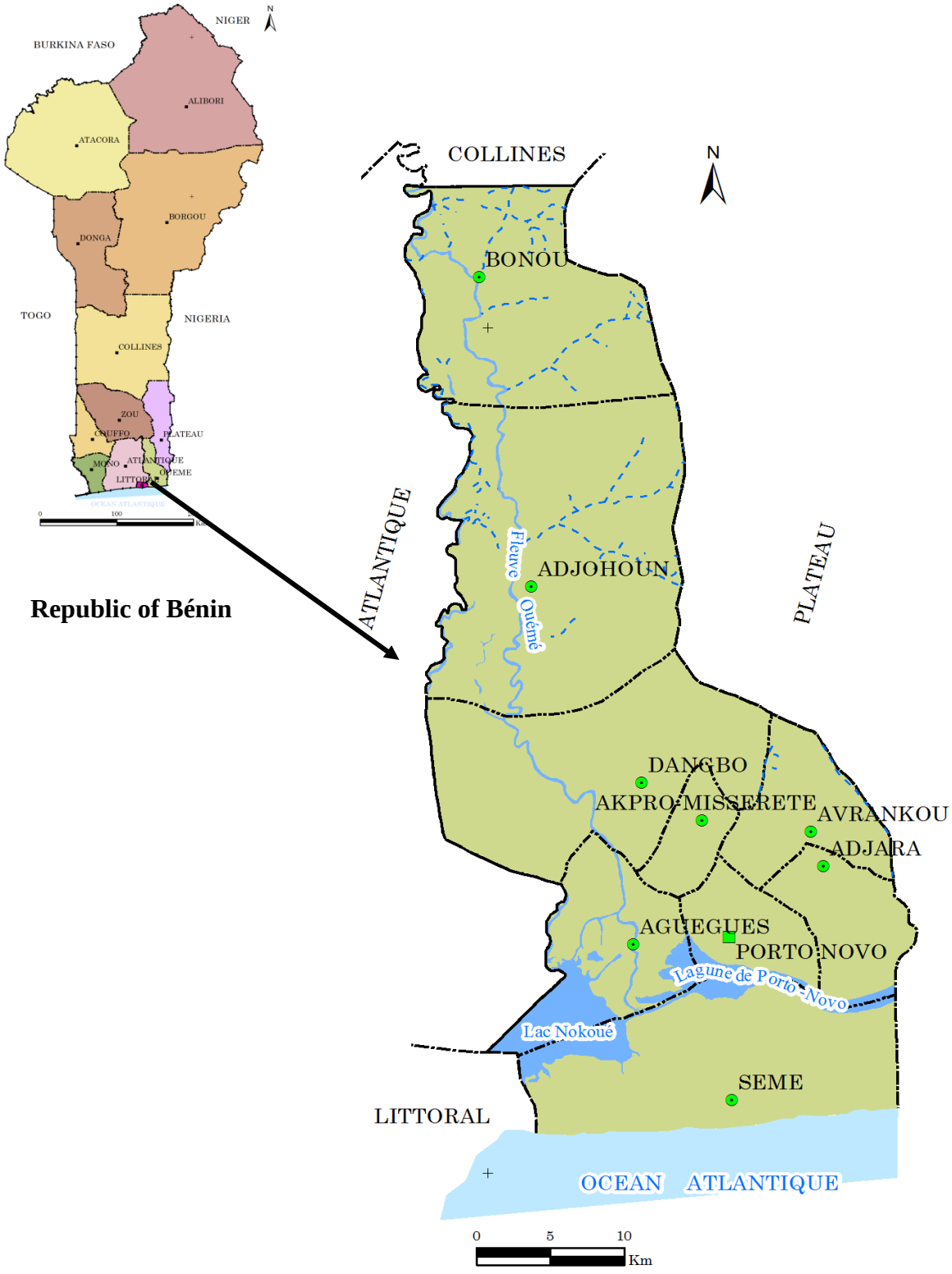

Figure 1: Study area, Department of Ouémé (South of Bénin)

RESULTS

The documentation was performed on the basis of information collected from knowledgeable local practitioners (healers), herbalists or plants vendors in the markets and person resources or hypertension patients who use medicinal plants. This survey enabled to interview 97 respondents whom constituted to 61 males (62.89%) and 36 females (37.11%). Majority of them were herbalists (42.27 %) following by healer (31.96%). The figure 2 presented the socio-professional status of informants.

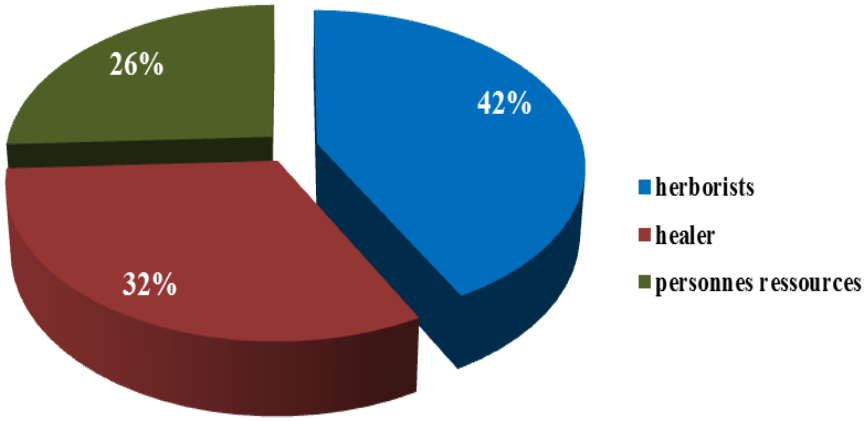

Figure 2: Socio-professional status of informants

This study allowed to record 77 species of plants belongs to 46 families for the treatment of hypertension in the study area (Table 1). Generally, collected species are used in combination. Thirty-seven (37) herbal recipes were also listed for the management of hypertension in the study area (Table 2). They consist of herbs, trees, shrubs and creepers (Table 3).

Table 1: Medicinal plants used in hypertension management in department of Ouémé

Families	Plant species	Voucher Number	Local name	Used Parts	Mode of preparation and administration	RFC
Alliaceae	*Allium cepa* L.	YH 307/HNB	Ayomassa, Alou-bôssa (g, y)	Pu	Decoction, oral	0,021
	Allium Sativum L.	YH 308/HNB	Ayo (g, y)	Pu	Decoction/Infusion/ Maceration, oral	0,154
Amaranthaceae	*Pupalia lappacea* (L.) Juss.	YH 234/HNB	Trèdoagboko, èman agbo (g, y)	EP	Decoction, oral	0,010
Anacardiaceae	*Mangifera indica* L.	YH 236/HNB	Manga (g, y)	B	Decoction, oral	0,010
	Lannea barteri (Oliv.)	YH 237/HNB	Houmansitékan (g)	B	Decoction, oral	0,010
	Annona muricata L.	YH 238/HNB	Yiglwe (g)	AP	Decoction, oral	0,031

f: fon; g: goun; y: yoruba; cn: common name; Pu: pulp; EP: entire plant; B: bark; R: root; AP: aerial part; F: fruit; S: stem; L: leaves; St: stone; S: seeds; F: flowers; RFC: Relative Frequency of Citation.

Table 1: Medicinal plants used in hypertension management in department of Ouémé (*continued*)

Families	Plant species	Voucher Number	Local name	Used Parts	Mode of preparation and administration	RFC
	Monordica myristica (Gaertn.) Dunal	YH 240/HNB	Sassalikou, Shasha-gbakou (g, y)	F	Maceration, oral	0,010
	Cleistopholis patens (Benth.) Engl. and Diels	YH 239/HNB	Houzoukou (g)	AP	Decoction, oral	0,010
	Xylopia aethiopica (Dunal) A. Rich.	YH 242/HNB	Kpédjré, Eèrou (g, y)	B, F, S	Decoction/Maceration, oral	0,082
Apocynaceae	*Catharanthus roseus* (L.) G.	YH 245/HNB	Flawé, Bobo (g, y)	R, AP	Decoction,oral	0,062
Araceae	*Anchomanes difformis* (Blume) Engl.	YH 247/HNB	Ago do, ishu igo (g, y)	R	Decoction, oral	0,021
Arecaceae	*Cocos nucifera* L.	YH 248/HNB	Agoukè (g, y)	R	Decoction, oral	0,010
Asclepiadaceae	*Secamone afzelii* (Schult.) K. Schum.	YH 251/HNB	Zoukoudjou, ayilou (g, y)	EP	Decoction, oral	0,010
	Calotropis procera (Aiton) W. T. Aiton	YH 250/HNB	Amou man, boum boum (g, y)	L	Infusion/Decoction, oral	0,010
Asteraceae	*Acanthospermum hispidium* DC.	YH 252/HNB	Kponomi, Dagouro (g, y)	EP	Decoction, oral	0,072
Bignoniaceae	*Newbouldia laevis* (P. Beauv.) Seem	YH 254/HNB	Desléman, akoko (g, y)	B, L, R	Decoction/Macera-tion, oral	0,052
Boraginaceae	*Heliotropium indicum* L.	YH 256/HNB	Koklodin, Egbè-akiko (g, y)	EP	Decoction, oral	0,062
Burseraceae	*Commiphora Africana* (A. Rich.) Engl.	YH 257/HNB	Félidjiman, oridji (g, y)	AP	Decoction, oral	0,010
Caesalpiniaceae	*Caesalpinia bonduc* (L.) Roxb.	YH 280/HNB	Adjikou, oman ayo (g, y)	R	Infusion/Maceration, oral	0,041
	Dialium guineense Willd.	YH 284/HNB	Assisoè, anwin (g, y)	B, L	Decoction, oral	0,021
	Senna obtusifolia (L.) H.S. Irwin and Barneby	YH 286/HNB	Kpahou, abrangbé (g, y)	AP	Decoction, oral	0,010
	Senna occidentalis (L.) Link	YH 287/HNB	Senawan, ajangulu (g, y)	AP	Decoction, oral	0,010
	Senna podocarpa (Guill. and Perr.) Lock	YH 288/HNB	Amassou, Assen (g, y)	AP	Decoction, oral	0,010
	Senna siamea (Lam.) H. S. Irwin and Barneby	YH 289/HNB	Kenu ma (g)	AP	Decoction, oral	0,052
	Erythrophleum suaveolens (Guill. and Perr.) Brenan	YH 285/HNB	Obo (y)	B	Powder, oral	0,010
Caricaceae	*Carica papaya* L.	YH 261/HNB	Gbègpè, igbèkpè (g, y)	L, F	Decoction, oral	0,021

f: fon; g: goun; y: yoruba; cn: common name; Pu: pulp; EP: entire plant; B: bark; R: root; AP: aerial part; F: fruit; S: stem; L: leaves; St: stone; S: seeds; F: flowers; RFC: Relative Frequency of Citation.

Table 1: Medicinal plants used in hypertension management in department of Ouémé (*continued*)

Families	Plant species	Voucher Number	Local name	Used Parts	Mode of preparation and administration	RFC
Celtidaceae	*Trema orientalis* (L.) Blume	YH 262/HNB	Koklodotin, éwé afè (g, y)	AP	Decoction, oral	0,010
Clusiaceae	*Garcinia Kola* Hekel	YH 263/HNB	Ahowé, Orogbo (g, y)	F	Decoction/Maceratio, oral	0,021
Cucurbitaceae	*Momordica balsamina* L.	YH 266/HNB	Aslosikan, kplayi (g, y)	EP	Decoction/Maceration, oral	0,010
Dichapetalaceae	*Dichapetalum madagascariense* Poir.	YH 267/HNB	Gbaglo (g)	L	Decoction, oral	0,010
Dracaenaceae	*Sansevieria liberica* Hort. Ex Gerome and Labory	YH 233/HNB	Kpoyan, oja koriko (g, y)	R	Decoction, oral	0,031
Euphorbiaceae	*Croton gratissimus* Burch.	YH 269/HNB	Djélélé, Adjèofolé (g, y)	AP	Decoction, oral	0,010
	Phyllanthus amarus Schumach. and Thonn.	YH 273/HNB	Hlinwé/Eyin olou-bé (g, y)	EP	Decoction, oral	0,052
	Jatropha curcas L.	YH 271/HNB	Gbagidi kpotin, akporo (g, y)	L	Decoction, oral	0,010
Flacourtiaceae	*Oncoba spinosa* Forssk.	YH 275/HNB	Kakandika (y)	L	Maceration, oral	0,010
Icacinaceae	*Raphiostylis beninensis* (Hook. F. ex Planch.)	YH 276/HNB	Kplakplakan, itapara (f, y)	AP	Decoction, oral	0,010
Lamiaceae	*Ocimum americanum* L. Syn.: *O. canum* Sims	YH 277/HNB	Kessou kessou, Efirin ocho (g, y)	EP	Decoction, oral	0,041
	Ocimum gratissium L.	YH 278/HNB	Chamandidoé, Efirin (g, y)	AP	Decoction/Infusion/Ma-ceration, oral	0,031
Lauraceae	*Laurus nobilis*	nd	Feuilles de laurier (cn)	L	Infusion, oral	0,010
	Persea americana Mill.	YH 279/HNB	Avoka (f)	B, L,	Decoction, oral	0,134
Lythraceae	*Lawsonia inermis* L.	YH 309/HNB	Laritin,Lali (g, y)	AP	Decoction, oral	0,010
Malvaceae	*Gossypium barbadense* L.	YH 310/HNB	Sékanfoun (g, y)	AP	Decoction, oral	0,021
Marantaceae	*Thalia geniculata* L.	YH 312/HNB	Afléma (g, f)	L	Decoction, oral	0,021
Melastomataceae	*Heterotis rotundifolia* (Sm.) Jacq.-Fél.	YH 313/HNB	Hêhê, Ewé eti ékouté (g, y)	AP	Decoction, oral	0,021
Meliaceae	*Khaya senegalensis* (Desr.) A. Juss.	YH 315/HNB	Agawu, oganwo (g, y)	B	Decoction, Maceration Powder, oral/massage	0,041
Mimosaceae	*Parkia biglobosa* (Jacq.) R. Br. Ex Benth.	YH 299/HNB	Ahwa, Irou (g, y)	B, R, S	Maceration, oral	0,041
	Schrankia leptocarpa DC.	YH 301/HNB	Ahossiboassa, Kpadiman (g, y)	AP	Decoction, oral	0,072

f: fon; g: goun; y: yoruba; cn: common name; Pu: pulp; EP: entire plant; B: bark; R: root; AP: aerial part; F: fruit; S: stem; L: leaves; St: stone; S: seeds; F: flowers; RFC: Relative Frequency of Citation.

Table 1: Medicinal plants used in hypertension management in department of Ouémé (*continued*)

Families	Plant species	Voucher Number	Local name	Used Parts	Mode of preparation and administration	RFC
Moraceae	*Ficus sur Forssk.*, Syn.: *F. capensis* Thunb.	YH 317/HNB	Voliman, Okpoto (g, y)	L	Decoction, oral	0,010
	Ficus polita Vahl	YH 316/HNB	Kplongbassa, Okpokpo (g, y)	L	Decoction, oral	0,010
Moringaceae	*Moringa oleifera* Lam.	YH 318/HNB	Kpatiman/ Ewé ayère (g, y)	L, AP, S	Decoction/Maceration/ Infusion/Powder, oral	0,082
Myrtaceae	*Eucalyptus torrelliana* F. Muell.	YH 319/HNB	Eucalyptus (cn)	L	Decoction, oral	0,010
	Syzygium aromaticum (L.) Merr. and Perry	YH 320/HNB	Atikèngbadota, Yére-éyibo (g, y)	F	Maceration, oral	0,031
Papilionoideae	*Baphia nitida* Lodd.	YH 304/HNB	Sokpakpè, irosun (f, y)	AP	Decoction, oral	0,010
	Pterocarpus erinaceus Poir	YH 306/HNB	Kosso, osun dudu (g, y)	R	Decoction, oral	0,041
Phytolacaceae	*Petiveria alliacea* L.	YH 323/HNB	Zoroman, Ewé iso (g, y)	AP	Decoction, oral	0,010
Piperaceae	*Piper guineense* Schumach. and Thonn.	YH 324/HNB	Lènkoun, Iyéré (g, y)	S	Maceration, oral	0,021
Plumbaginaceae	*Plumbago zeylanica* L.	YH 325/HNB	Adagla (g, y)	AP	Maceration, oral	0,010
Poaceae	*Cymbopognon citratus* (DC.) Stapf	YH 326/HNB	Timan (g)	L	Decoction/Maceration, oral	0,010
	Zea mays L.	YH 327/HNB	Gbadé, igbado (g, y)	F	Decoction, oral	0,010
Rubiaceae	*Spermacoce verticillata* L.	YH 336/HNB	Akoligweasu, akoirawo ilè (g,y)	EP	Decoction, oral	0,010
	Gardenia ternifolia Schumach. and Thonn.	YH 332/HNB	Adakpla (g)	AP	Decoction, oral	0,010
	Chassalia kolly (Schumach.) Hepper	YH 330/HNB	Atinjè, àkpa ara (g, y)	R	Decoction, oral	0,010
	Sarcocephalus latifolius (Sm.) E. A. Bruce	YH 335/HNB	Ko, ègbèsi (g, y)	R	Decoction, oral	0,031
Rutaceae	*Zanthoxylum zanthoxyloides* (Lam.) Zeper. and Timler	YH 341/HNB	Oxètin, igi ata (g, y)	R	Decoction/Maceration, oral	0,021
	Citrus sinensis Osbeck	YH 338/HNB	Yovozèn, ossan (g, y)	F	Decoction, oral	0,010
	Citrus aurantifolia (Christm. and Panzer) Swingle	YH 337/HNB	Klé, osan orombo (g, y)	F	Maceration, oral	0,082
	Clausena anisata (Willd.) Hook. f. ex Benth.	YH 339/HNB	Gbossou zohwèn (f)	L	Decoction, oral	0,010

f: fon; g: goun; y: yoruba; cn: common name; Pu: pulp; EP: entire plant; B: bark; R: root; AP: aerial part; F: fruit; S: stem; L: leaves; St: stone; S: seeds; F: flowers; RFC: Relative Frequency of Citation.

Table 1: Medicinal plants used in hypertension management in department of Ouémé (*continued*)

Families	Plant species	Voucher Number	Local name	Used Parts	Mode of preparation and administration	RFC
Sapotaceae	*Vitellaria paradoxa* C. F. Gaertn.	YH 342/HNB	Tagan, èmi gidi (g, y)	B	Decoction, oral	0,021
Sterculiaceae	*Cola millenii* K. Schum.	YH 344/HNB	Alovi aton (y)	L	Decoction, oral	0,010
	Waltheria indica L.	YH 346/HNB	Adassounsoun-ma, okoro oman (g, y)	R	Decoction, oral	0,010
Strelitziaceae	*Ravenala madagascariensis* J. F. Gmel.	YH 347/HNB	Arbre du voyageur (cn)	L	Decoction, oral	0,010
Tiliaceae	*Triumfetta rhomboidea* Jacq.	YH 348/HNB	Adjamantou (g)	R	Maceration, oral	0,010
Verbenaceae	*Gmelina arborea* Roxb	YH 349/HNB	Fofitin (f)	L	Decoction, oral	0,010
Zingiberaceae	*Aframomum melegueta* (Roscoe) K. Schum	YH 353/HNB	Atakou, Ataarè (g, y)	F	Decoction/Infusion/ Maceration, oral	0,021
	Costus afer Ker Gawl.	YH 354/HNB	Trétrégougou, tétérégoun (g, y)	L	Decoction, oral	0,021
	Zingiber officinale Roscoe	YH 355/HNB	Doté, atalè (g, y)	R	Decoction, oral	0,010

f: fon; g: goun; y: yoruba; cn: common name; Pu: pulp; EP: entire plant; B: bark; R: root; AP: aerial part; F: fruit; S: stem; L: leaves; St: stone; S: seeds; F: flowers; RFC: Relative Frequency of Citation.

Table 2: Herbal recipes for hypertension treatment in department of Ouémé

Recipes (combinations of plant species)	Methods of preparation
Spermacoce verticillata, Xylopiaa ethiopica	Decoction
Persea americana, Allium Sativum	Maceration with alcohol
Piper guineense, Allium Sativum, Citrus aurantifolia	Maceration
Persea americana, Citrus sinensis	Decoction
Vitellaria paradoxa, Dialium guineense	Decoction
Phyllantus amarus, Ocimum americanum, Catharantus roseus	Decoction
Pterocarpus erinaceus, Xylopia aethiopica, Heliotropium indicum	Decoction
Phyllantus amarus, Ocimum americanum	Decoction
Sansevieria Liberia, Anchomanes difformis, Chassaliakolly, Newbouldia laevis, Rhopalostylis beniensis, Cleistopholis patens, Pterocarpus erinaceus, Xylopia aethiopica	Decoction

Table 2: Herbal recipes for hypertension treatment in department of Ouémé (Continued)

Recipes (combinations of plant species)	Methods of preparation
Persea americana, Acanthospermum hispidium	Decoction
Dalium guineense, Senna siamea, Costus afer, Cymbopogon citratus, Thalia geniculata, Cola millenii, Heterotis rotundifolia, Sarcocephalus latifolia	Decoction
Kaya senegalensis, Pterocarpus erinaceus	Decoction
Senna siamea, sansevieria liberica, Acanthospermum hispidium, Catharanthus roseus, Heterotis rotundifolia, Persea americana	Decoction
Commiphora Africana, Schrankia leptocarpa, Heliotropium indicum, Persea Americana, Annona muricata, Ocimum americanum, Senna podocarpa, Phyllantus amarus, Catharanthus roseus	Decoction
Schrankia leptocarpa, Acanthospermum hispidium, Citrus aurantifolia	Decoction
Allium Sativum, Citrus aurantifolia	Macerationwith water
Secamone afzelii, Ocimum americanum, Trema orientalis, Garcinia Kola	Decoction
Pupalia lappacea; *Citrus aurantifolia*	Decoction
Anchomanes difformis, Sansevieria liberia, Catharantus roseus, Gardenia ternifolia, heterotis rotundifolia	Decoction
Vitellaria paradoxum, Pterocarpus erinaceus, Kaya senegalensis, Sarcocephalus latifolia	Decoction
Cocos nucifera, Uvaria chamae, Sarcocephalus latifolia, Mangifera indica	Decoction
Triumfetta rhomboidea, Allium Sativum	Maceration
Oncoba spinosa, Eugenia aromatic, Piper guineense, Aframomum melegueta	Maceration with water and urine of oxen
Ocimumgratissium, Aframomum melegueta	Infusion with water
Kaya senegalensis, Allium Sativum, Citrus aurantifolia	Maceration with lemon
Persea Americana, Heliotropium indicum, Annona muricata, Catharantus roseus, Moringa oleifera, Commiphora africana, Ocimum americanum	Decoction
Allium Sativum, Zanthoxylum zanthoxyloides, Eugenia aromatic ,Monordica myristica,Xylopia aethiopica	Macerationwithalcohol
Annona muricata, Persea Americana, Thalia geniculata, jatrophacurcas	Decoction
Newbouldia laevis (bark and roots)	Maceration
Zanthoxylum zanthoxyloides, Xylopia aethiopica	Decoction
Ocimum gratissium, Clausena anisata	Decoction
Cleistopholis patens, Costus afer	Decoction
Allium Sativum, Xylopia aethiopica, Eugenia aromatic, Garcinia Kola	Maceration
Carica papaya, Citrus aurantifolia	Maceration
Xylopia aethiopica, Zingiber officinale	Maceration with alcohol
Phyllantus amarus, Xylopia aethiopica	Decoction

Table 3: Distribution of the growth forms of species

Species	Numbers	Percentages (%)
Herbs	29	37.66
Trees	24	31.17
Shrubs	23	29.87
Creepers	01	1.3
Total	77	100

Information regarding their family, botanical name, voucher number, vernacular name, part used, mode of used and their relative frequency of citation are listed and presented in Table 1. Caesalpiniaceae constituted the most represented family with seven species of plant, followed by Annonaceae, Rubiaceae and Rutaceae with four plant species each (Figure 3). During the investigation, some already packaged traditional medicines have been also identified. However, their composition has not been indicated (Figure 4).

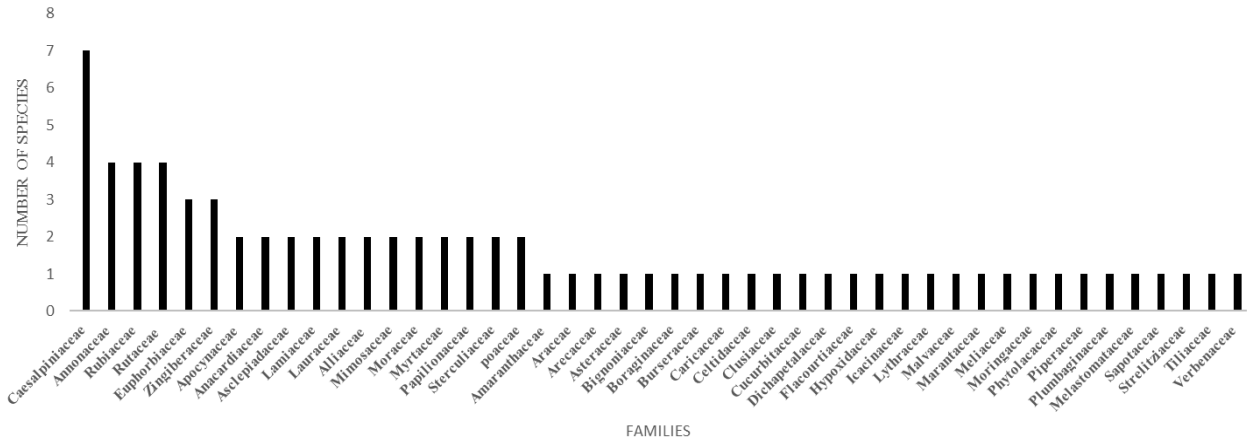

Figure 3: Distribution of reported plants among family

Figure 4: Samples of traditional drugs used to treat hypertension

Whole plant as well as aerial part, leave, stem, root, bark, fruit, flower, stone and seed were used for treatment of hypertension. Aerial part (23.08%) was the most used in the preparation of herbal remedies followed successively by leaves (21.98%), root (16.48%), bark, whole plant and fruit (8.79%), seed, pulp and the stem, stone and flower (1.1%). The most common method of preparation is decoction (72.35%). Sometimes, the recipes were prepared using maceration, infusion or powder (Figure 5). The main mode of administration was the oral route.

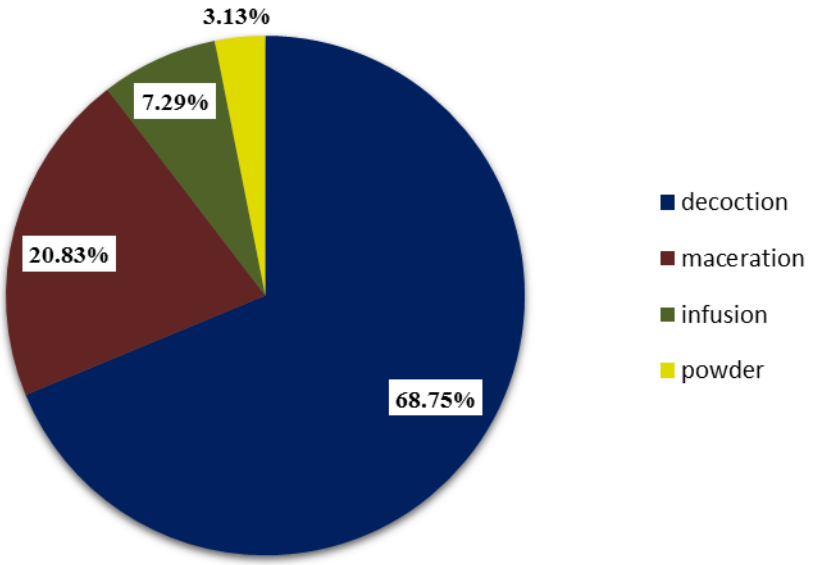

Figure 5: Methods of preparation of remedies in the management of hypertension

Allium Sativum was the most cited species used for the treatment of hypertension with Relative Frequency of Citation (RFC) of 0.155. It was following by *Persea americana* (RFC= 0.134), *Xylopia aethiopica*, *Moringa oleifera*, *Citrus aurantifolia* (RFC= 0.082), *Schrankia leptocarpa*, *Acanthospermum hispidium*, *Catharantus roseus*, *Heliotropium indicum*, *Newbouldia laevis* (0.072-0.062). The RFC of other plants ranged from 0.052 to 0.012. Number of citation and RFC were presented in Table 4.

DISCUSSION

The aim of the present study was to document plants used in the management of hypertension in Ouémé department. Hypertension is one of the most common causes of cardiovascular and cerebrovascular complications in human.[1] Hypertension was for a long time considered as a disease affecting only people in developed countries. Nowadays, it represents a public health problem for developing countries in Africa.[11] Hypertension is a silent and invisible killer which takes care had to be the priority of health responsibility staff.[3] In spite of advance of synthesis drug and improvement of modern medicine, herbal medicine remains in force to treat many diseases such arterial hypertension.[12]

In this study, informants are predominantly men. The large number of men, herbalists and healers informants in our study could be explained by the mode of

transmission of knowledge. Indeed, traditional knowledge is transmitted orally from generation to generation. Also, men are much preferred as it is believed that they better keep the family secrets than women. Previous study also showed that inheritance was the major source of knowledge acquisition of all tradi-practitioners (herb-seller and herborists).[10,13,14]

Our results also showed that herbal recipes were mainly used by traditional medical practitioners in Department of Ouémé to manage hypertension. Thirty seven (37) recipes were registered for hypertension management and these were usually administered orally. The significant proportion of recipes is recognized by several authors. A total of 77 species belonging to 43 families are used for the treatment of hypertension in study area. Caesalpiniaceae, Annonaceae, Rubiaceae, Rutaceae Euphorbiaceae and Zingiberaceae were the most represented. *Allium Sativum, Persea americana, Xylopia aethiopica* were the most cited species in antihypertensive recipes. Similar results were already been recorded in several studies.[13] Previous study reported hypertension as one of the major diseases in an ethnobotanical survey in Akwa Ibom State in south east Nigeria. This study listed *Persea americana, Allium sativum* and *Zingiber officinale* as prominent plants in its treatment.[15] A same kind of study in Central Region of republic of Togo also showed that *Allium Sativum, Persea americana, Parkia biglobosa, Khaya senegalensis* were the most privileged species used to treat hypertension.[14] This similarity could be explained by the proximity to the study area with Nigeria and Togo. Our results showed that several parts of plant species have been used for treatment of hypertension and the most parts used were the aeriel part followed by leaves. This result could be explained by ease of access of these parts. Gbolade reported that the leave were the major morphological part used in preparing the hypertension recipes in Edo State in Nigeria.[13] The principal mode of preparation of antihypertensive recipes was the decoction. Sometimes, recipes were prepared as maceration, infusion or powder. The main mode of administration was the oral route. Our findings are consistent with previous results.[11-13] The widespread use of certain plants in several countries (Benin, Nigeria, Togo, Burkina Faso, ...) could justify their antihypertensive activity. However, it would be important to give special attention to the confirmation of their antihypertensive activity but also to check their toxicity. This is the follow-up to this investigation in our laboratory.

CONCLUSION

Overall, this survey shows that a large number of medicinal plants are used in department of Ouémé in Bénin to manage hypertension. The collected data provide an effective means of preservation of traditional knowledge in the management of hypertension by medicinal plants. These data provide a new basis of new research topics on hypertension.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interests.

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