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Ecological Indigenous Plants Used for the Treatment of Hypertension by the People of Ikhin Owan East Local Government Area, Edo State, NigeriaErhenhi. A.H.¹*Delta State University, Abraka. Delta State¹**Author for Correspondence: aherhenhi@delsu.edu.ng/+234--***Abstract**

Survey of indigenous plants used in the treatment of hypertension by the people of Ikhin, Owan East Local Government Area, Edo State Nigeria was carried out. Hypertension is believed to be one of the leading causes of mortality in the world, representing 60% of all deaths. This survey was carried out to obtain knowledge and documentation of plants used in the treatment of hypertension. Ikhin is located at latitude 6°59'36" N of the equator and longitude 6°09'30" E of Greenwich Meridian. Twenty-seven (27) medicinal plants belonging to 21 families were used by the people of Ikhin in treatment of hypertension. The percentages of plant parts used indicated that leaves had the highest percentage of plant parts used (59.2%), next is the seeds (11.2%) while the least parts used were flowers and unripe fruits. The mode of preparations cum administration differs from one plant species to another. Ranging from the different parts of the plant parts used to the methods of preparation. While some plant parts are blended, squeezed, finely chopped or minced, some are soaked in cold water or ethanol, soaked in hot water, boiled, made into powdered forms or cut into smaller sizes.

Keywords: *Hypertension, Ikhin, Indigenous plants*

Introduction

Many undocumented, unaccounted and uncounted deaths have occurred both in the developed and developing countries with either wrong diagnosis, lack of equipment to make the right diagnosis or lack of knowledge for the

cause of such deaths. Hypertension is referred to as increase in blood pressure. It is an opportunist situation which gives room to other harmful conditions that can lead to high mortality rate in human population if not properly checked, curtailed or stopped as prompt as possible. Its leading causes include smoking and continuous exposures to smoke, high consumption alcoholic materials, different forms of stress and stress-induced activities and aging. The symptoms include chest pains, severe headache, nausea, breathing problems, dizziness, blood urine and irregular heartbeat. Some plants have been found to contain medicinal contents which can be used in the treatment of hypertension as discovered by some researchers.

According to WHO (2003), about 80% of the world population rely on traditional medicine, mostly herbal remedies for their health care needs (Muthu *et al.*, 2006).

Blood pressure between 120/80 and 139/89 is called pre-hypertension (to denote increased risk of hypertension) and a blood pressure of 140/90 or above is considered hypertension (Benowitz, 2001). According to a report issued by the centers for Disease Control and Prevention (CDC, 2012), hypertension may be classified as essential and secondary.

This paper seeks to do a proper documentation and preservation of unwritten traditional knowledge of essential indigenous medicinal plants of the Ikhin people as well as to determine the plant parts mostly used, classify the plants

into their respective families, uses, habit, mode of preparation, administration, local name, common and scientific names.

Materials and Methods

Study Area

Ikhin is located in Owan East Local Government Area of Edo State. It is located at the latitude of 6°59'36" N of the equator and longitude 6°09'30" E of the Greenwich Meridian. It has annual temperature of 30°C relative humidity of 69%. Annual rainfall of 2500mm – 3000mm. It has double rainfall maxima with an August break. Soil is loamy with pH of 4.1-5.2.

March is the warmest with an average temperature of 32.9°C at noon. December is coldest with an average temperature of 19.3°C at night. The wet season has a rainfall peak around July while the dry season is around the month of January.

There were thirteen herbal practitioners who had used these plants on the locals for the treatment of hypertension and could prove to certain

degree the efficacies of these medicinal indigenous plants. They also served as tour guides into the bushes for the collection of these plants. These herbal practitioners included five female herbalists and 8 male herbalists with age range of 40-70 years domiciled in Ikhin land. They provided the Local names, parts of plants used, methods of preparation and administration of plant in the course of interaction. Some of the plants were scientifically identified *in situ*; seeds, flowers, barks and other plant parts were taken for ease of identification of other plants that could not be identified on the field.

Results

A total of 27 species from 21 families were identified as medicinal plants used in the treatment of hypertension in Ikhin. These medicinal plants can be effectively used alone or in combination with other plants. Traditionally, they are prepared in diverse ways for use in treatment of hypertension. The preparation and mode of administration of these plants also varied, some of these plants are domesticated while others grow in the wild.



Plate 1: *Persea americana* (Alvocado pear)



Plate 2: *Peperomia pellucida* (Silver bush)



Plate 3: *Phyllanthus amarus* (Sleeping plant)



Plate 4: *Piper guineense* (Climbing black pepper)



Plate 5: *Rauwolfia vomitoria* (Serpent wood)



Plate 6: *Carica papaya* (Pawpaw)

Table 1. The Percentage of Different Plants Habits

Habits	Percentage of different plant habits (%)
Herbs	42.8
Trees	33.8
Shrubs	15.2
Climbers	8.2
Total	100

The percentage of plant habits indicated that herbs were mostly frequently used resulting to 42.8%. This was closely followed by the trees with 33.8%, shrubs, 15.2% and climbers, 8.2%. The most frequent use of herbs may be due to the facts that most herbs are ephemerals or annuals,

herbaceous, earliest arrivals in the case of succession on the ecosystems as compared to other plant habits due to agricultural practices, bush burning and shift in vegetation. Climbers were the least used, this may be due to scanty or sparsely disperse vegetation of them (Table 1).

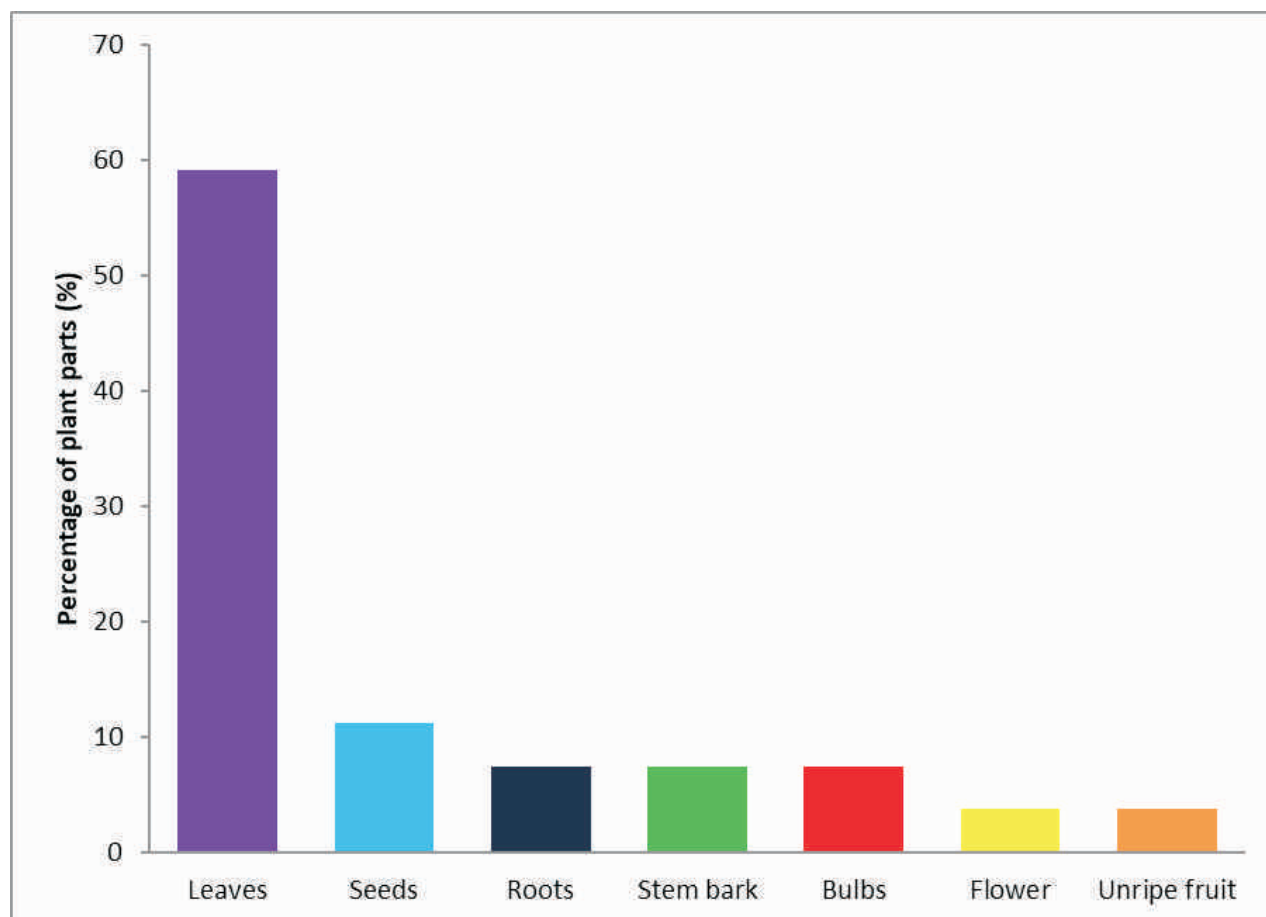


Figure 1. Percentage of plant parts used in the treatment of hypertension.

The percentages of plant parts used indicated that leaves had the highest percentage of plant parts used (59.2%), next is the seeds with 11.2%, the least parts used were flowers and unripe fruits (Figure 1)

Table 2: Scientific, Common Names and Plant Family Used in Treating Hypertension

S/No.	Scientific Names	Common Names	Family
1	<i>Allium sativum</i>	Garlic	Alliaceae
2	<i>Allium cepa</i>	Onion	Alliaceae
3	<i>Bryophyllum pinnatum</i>	Resurrection plants	Crassulaceae
4	<i>Carica papaya</i>	Pawpaw	Caricaceae
5	<i>Camellia sinensis</i>	Tea	Theaceae
6	<i>Cassia occidentalis</i>	Coffee weed	Caesalpinaceae
7	<i>Cuscuta reflexa</i>	Giant dodder	Cuscutaceae
8	<i>Daucus carota</i>	Carrot	Umbelliferae
9	<i>Euphorbia hirta</i>	Asthma weed	Euphorbiaceae
10	<i>Hibiscus sabdariffa</i>	Roselle	Malvaceae
11	<i>Loranthus spectobulus</i>	Mistletoe	Loranthaceae
12	<i>Lycopersicon esculentum</i>	Tomato	Solanaceae
13	<i>Magnifera indica</i>	Mango	Anacardaceae
14	<i>Musanga cecropioides</i>	Umbrella tree	Cecropiaceae
15	<i>Ocimum gratissimum</i>	Scent leaf	Laminaceae

16	<i>Peperomia pelucida</i>	Silver bush	Piperance
17	<i>Psidium guajava</i>	Guava	Mytaceae
18	<i>Piper guineensis</i>	Climbing black pepper	Piperaceae
19	<i>Persea Americana</i>	Avocado pear	Lauraceae
20	<i>Phyllanthus amarus</i>	Sleeping plant	Euphorbiaceae
21	<i>Rauwolfia vomiteria</i>	Serpent wood	Apocynaceae
22	<i>Senna occidentalis</i>	Negro coffee	Fabaceae
23	<i>Talinum triangulare</i>	Water leaf	Portulacaceae
24	<i>Theobroma cacao</i>	Cocoa	Malvaceae
25	<i>Vernonia amygdalina</i>	Bitter leaf	Asteraceae
26	<i>Vitex doniana</i>	Black plum	Verbenaceae
27	<i>Zingiber officinale</i>	Ginger	Zingiberaceae

The wide spread of the different plant species and families used can help to improve biodiversity of the ecosystem in Ikhin due to the domestication of these plants as a result of both their ecological and medicinal potentials or importance to the locals. This indirectly can help in the conservation of these plant species against over-exploitation *in situ* (Table 2).

Table 3: Scientific, Local Name and Nature of Ailment

S/No.	Scientific Name	Local Name	Nature of Ailment
1	<i>Allium sativum</i>	Ayi	Treatments hypertension
2	<i>Allium cepa</i>	Alubasa	Treats hypertension
3	<i>Bryophyllum pinnatum</i>	Obe-uhuon	Treats hypertension
4	<i>Carica papaya</i>	Eyaba	Treats hypertension
5	<i>Camellia sinensis</i>	Cassia	Treats hypertension
6	<i>Cassia occidentalis</i>	Tea	Treats hypertension
7	<i>Cuscuta reflexa</i>	-	Treats hypertension
8	<i>Daucus carota</i>	-	Treats hypertension
9	<i>Euphorbia hirta</i>	-	Treats hypertension
10	<i>Hibiscus sabdariffa</i>	Ododo	Treats hypertension
11	<i>Loranthus spectobulus</i>	Orsi	Treats hypertension
12	<i>Lycopersicon esculentum</i>	Tomatosi	Treats hypertension
13	<i>Magnifera indica</i>	Emango	Treats hypertension
14	<i>Musanga cecropioides</i>	-	Treats hypertension
15	<i>Ocimum gratissimum</i>	Efin	Treats hypertension
16	<i>Peperomia pelucida</i>	-	Treats hypertension
17	<i>Psidium guajava</i>	Eguova	Treats hypertension
18	<i>Piper guineensis</i>	Esira	Treats hypertension
19	<i>Persea Americana</i>	Pear	Treats hypertension
20	<i>Phyllanthus amarus</i>	-	Treats hypertension

21	<i>Rauwolfia vomitaria</i>	-	Treats hypertension
22	<i>Senna occidentalis</i>	-	Treats hypertension
23	<i>Talinum triangulare</i>	Egbuwe	Treats hypertension
24	<i>Theobroma cacao</i>	Ecoco	Treats hypertension
25	<i>Vernonia amygdalina</i>	Olar	Treats hypertension
26	<i>Vitex doniana</i>	-	Treats hypertension
27	<i>Zingiber officinale</i>	-	Treats hypertension

The use of local names for the identification of these plants by the locals have aided in not only in the proper identification of the right plants to be used for the specific ailment but also to pass the information to the next generation in a manner to foster the ease of documentation (Table 3).

Table 4: Mode of plant Preparations and Administration in the Treatment of Hypertension

S/No	Scientific Names	Mode of Preparation	Administration
1	<i>Allium sativum</i>	Bulb (5 -10) are finely chopped and blended with honey.	3 spoons full, 3 times daily.
2	<i>Allium cepa</i>	Bulbs (5 -10) are finely chopped and blended with honey.	3 spoons full, 3 times daily.
3	<i>Bryophyllum pinnatum</i>	Squeeze out the juice and add salt and little water.	Infusion taken 2 times daily for 3 months with teaspoon.
4	<i>Carica papaya</i>	Leaves are squeezed in water or unripe fruit is eaten.	A glass of the infusion is taken 3 times daily for 3 months or unripe fruit is eaten daily until total relief achieved.
5	<i>Camellia sinensis</i>	Leafs are squeezed with water to obtain extract.	The infusion is taken twice a day with a glass cup.
6	<i>Cassia occidentalis</i>	Leaves are soaked in hot water for 10 minutes.	The decoction is taken 2 times daily using a tea cup.
7	<i>Cuscuta reflexa</i>	Leaves are squeezed with water.	Infusion is taken once daily for 2months.
8	<i>Daucus carota</i>	Roots are eaten.	5 roots are eaten daily for 6 months.
9	<i>Euphorbia hirta</i>	Leaves are prepared as soup.	Soup is eaten orally with pounded yam.
10	<i>Hibiscus sabdariffa</i>	Dry flower soaked in hot water for 15 minutes.	The decoction is taken with tea cup 3times daily for 6 months.



11	<i>Loranthus spectobulus</i>	Leaves are boiled.	The decoction is taken 2 times daily with glass cup.
12	<i>Lycopersicon esculentum</i>	Tomato blended.	Extract taken daily for 3 months.
13	<i>Magnifera indica</i>	Dried or wet bark is boiled at 100°C in water.	The decoction is taken 3 times daily until total relief
14	<i>Musanga cecropioides</i>	Ethanol or water extract of stem bark.	The infusion 40mg/kg dose is taken daily.
15	<i>Ocimum gratissimum</i>	Leaves are squeeze with little quantities of water.	The infusion is taken 2 times a day with tea cup.
16	<i>Peperomia pelucida</i>	Leaves are dried and made into powder form.	The powder is dissolved in hot water and is taken as tea daily.
17	<i>Psidium guajava</i>	Leaves are squeezed with little quantity of water.	The infusion is taken with a tea cup daily.
18	<i>Piper guineensis</i>	Leaves are prepared as soup.	Soup is taken orally daily for 3 months.
19	<i>Persea Americana</i>	Fresh leaves are boiled in water for 5-10 minutes.	Half glass of decoction is taken 2 times daily.
20	<i>Phyllanthus amarus</i>	Leaves are squeeze with little quantities of water.	Infusion is taken 80mg/kg daily.
21	<i>Rauwolfia vomitaria</i>	Roots are soaked in alcohol or water for 2-3 days.	Infusion is taken half glass cup daily for 3 months.
22	<i>Senna occidentalis</i>	Seeds are roasted, grounded in powder form.	It is mixed with water in powder form and taken as beverage.
23	<i>Talinum triangulare</i>	Leaves are crushed with water and add little quantity of salt.	Infusion is taken once daily for 3 months.
24	<i>Theobroma cacao</i>	Cocoa powder.	Daily consumption of 46 -105g provide 213 to 500mg of cocoa polyphenols, it lowers blood pressure.
25	<i>Vernonia amygdalina</i>	Leaves are prepared as soup or squeezed with little quantity of water to obtain an extract.	The soup is eaten orally with "eba or fufu" daily or the infusion taken orally after meal at night.
26	<i>Vitex doniana</i>	Leaves are cut into smaller sizes and squeeze with little quantity of water.	The infusion is taken with one full glass cup 2 times daily for 5 months.
27	<i>Zingiber officinale</i>	Dried roots (5 -10) pieces are grounded into powder or fresh roots are crushed with little quantity of water.	The powdered form is used for cooking while the infusion is taken 2 times daily for 3 months.

The mode of preparation and administration differs from one plant species to another. Ranging from the different parts of the plant parts used to the methods of preparation. While some plant parts are blended, squeezed, finely chopped or minced, some are soaked in water or ethanol, soaked in hot water or boiled, made into powdered forms or cut into smaller sizes (Table 4).



Discussion

The use of ecological indigenous plants for the treatment of hypertension revealed ease and affordability to many people in various rural areas across the world with Nigeria not being an exception. People of low income as well as high income earners are turning to plants due to lethal side effects often encountered by synthetic drugs or medicines. Although the mode of preparations cum administration differs from one plant species to another, there were some slight similarities in some cases. Some of these plants, though acting as medicine in the treatment of hypertension, they were equally taken or eaten as food. Some other authors documented either similar or different usage of these plants with respect to other users in other places. The bulbs (5-10) of garlic were blended with honey and the decoction was taken 3 spoonful 3 times daily. Gill (1992), Anslem (2006) and Okoli *et al.* (2007) have also reported similar uses of garlic for the treatment of hypertension in Esan, Edo State. Similarly, Ayitey-Smith (1989) reported the use of garlic in Ghana in the treatment of hypertension due to the presence of saponin, flavonoids, cardiac glycosides and inulin found in it (garlic).

In the work, a glass of infusion from pawpaw leaves was taken daily 3 times for 3 months or the unripe fruit is eaten raw until total relief experienced. Similarly, in Ghana, the unripe rind of pawpaw (*Carica papaya*) is peeled and soaked in water and after three days, a cup is taken daily. Leaves are also used to treat hypertension, as reported by Ayitey-Smith (1989). According to Gill (1992), Anslem (2006) and Okoli *et al.* (2007), Esan people used infusion from pawpaw (*Carica papaya*) leaves to treat hypertension. Tannins, saponins, cardiac glycosides, alkaloids and inulin have been found in the plant (pawpaw leaves).

In this study, fresh leaves of *Persea americana* are boiled in water for 5-10 minutes. Half glass of decoction is taken 2 times daily. This is different from the mode of preparation in Ghana as reported by Ayitey-Smith (1989) where the leaves of *Persea Americana* are dried and made into tea for treatment of hypertension. Asprey and Thomson (2007) reported the use of avocado

pear (*Persea americana*) leaf extract for the treatment of hypertension as well as diabetes mellitus. According to Odugbemi (2006), *Persea americana* cotyledons are made into powdered form. After meal, a spoonful of the powdered form in 200ml of hot water is taken as a desert

The people of Ikhin in Edo State Nigeria used dried grounded leaves of *P. pelucida* made into powder and dissolved in hot water and taken as tea. Ayitey-Smith (1989) also reported that dried leaves of *P. pelucidawere* very effective in the treatment of hypertension in Ghana.

Leaves of *Psidium guava* were squeezed with little quantity of water. The infusion is taken with a tea cup daily. Anslem (2006), reported similar results on the use of *Psidium guava* among Esan people who soak the leaves in salt water, squeeze and washed and the solution is used to treat hypertension as well as protection against heart attack.

The use of leaves of *Piper guineensis* in soup preparation by the people of Ikhin in treatment of hypertension was similar to previous reports (Okoli *et al.*, 2007; Ayitey-Smith, 1989) which indicated that the leaves of climbing black pepper (*Piper guineensis*) were very active in treatment of hypertension by Esan people of Edo State, Nigeria and Ghanaians respectively.

Our finding indicated that *Vernonia amygdalina* is used in the treatment of hypertension through the use of leaves in soup preparation and infusion by the people of Ikhin of Edo state, Nigeria. Our observation is consistent with a previous report (Okoli *et al.*, 2007) which indicated that the leaves of *Vernonia amygdalina* are chewed raw by the Esan people and Ghanaians.

We observed that the people of Ikhin use the leaves of *Phyllanthus amarus* squeezed with little quantity of water and the infusion is taken daily to treat hypertension. Our finding agrees with a previous report (Kiran *et al.*, 2011) which indicated that people of Kogi State, Nigeria use *Phyllanthus amarus* in the treatment of hypertension.

The roots of *Rauwolfia vomitoria* are soaked in

alcohol. For those that are allergic to alcohol it could be soaked in water for 2 to 3 days and the infusion is taken half in a glass cup daily for 3 days as used by the people of Ikhin. Our finding is consistent with previous reports (Bisong *et al.*, 2011; Yesmin *et al.*, 2008) which indicated that *Rauwolfia vomitoria* extract are commonly used by Kogi people for the treatment of hypertension.

Conclusion

The indigenous knowledge from traditional medicine of the people of Ikhin in Owan East Local Government Area of Edo state, Nigeria, could become very valuable for identifying new anti-hypertensive drugs that could proffer a lasting treatment for hypertension.

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