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Documentation of commonly used herbs in the management of obesity in southwestern, Nigeria

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Abstract

Obesity is a global health condition characterized by excessive accumulation of body fat. It is one of the major causes of degenerative diseases. The conventional medicines used for the management of obesity are expensive and have serious adverse effects. Hence, this study was aimed at identifying and documenting medicinal plants in Nigeria that can aid weight loss. Ethnomedicinal information was obtained through structured oral interviews. Thirty-five (35) plant species belonging to twenty-five (25) families were identified for the management of obesity in Southwestern Nigeria. Families Rutaceae and Euphorbiaceae have the highest number of species of three species each. *Curculigo pilosa* had the highest UMI of 15% followed by *Jatropha curcas* with 14%. The most used plant parts is the fruit which accounted for 34% of the recipes while decoction (55.4%) is the most preferred mode of preparation of the herbs.

Keywords: Obesity, medicinal plants, oral interviews, Southwestern Nigeria

Introduction

Obesity, which is an excessive accumulation of fat has become a global health concern all over the world. It has been associated with degenerative diseases such as cancer, type2 diabetes, stroke, hypertension and some psychological issues like bias and discrimination [1]. Being overweight is a high risk factor for short life expectancy with increased morbidity and mortality [2]. According to the World Health Organization [3], obesity is classified as chronic and severe disease in developed and developing countries, affecting both adults and children.

The amount of fat in the body is measured by body mass index (BMI) which is the ratio of one body weight and square of the height. The higher the BMI, the greater the risk of developing additional health problems. A BMI of 18.5 to 24.9 is considered healthy, 25 to 29 is overweight while BMI of 29.1 and above is obese. Obesity can be as a result of genetics, physical inactivity, overeating, taking high calories diets, diseases such as hypothyroidism, psychological factors as well as certain medications. Recent research data suggest that the global incidence of obesity has increased more than 75% since 1980, while the last twenty years has tripled in developing countries and particularly, in low-income countries. More than 1.1 billion adults are overweight, of which 312 million are obese. According to estimates of the International Obesity Task Force, 1.7 billion people are exposed to health risks related to body weight, while the increase in Body Mass Index (BMI) is responsible for more than 2.5 million deaths annually, which is expected to double by 2030 [4,5]. In Nigeria, the prevalence of overweight individuals ranged from 20.3%–35.1%, while the prevalence of obesity ranged from 8.1%–22.2% [6]. Certain medications such as orlistat, phentermine, lorcaserin and topamate are used to treat obesity. These drugs have been presented with severe adverse effects such as abdominal pain, flatulence, allergic reactions, angioderma, dizziness, fatigue, constipation, headache and hypoglycemia. Medicinal herbs and their bioactive components have been used traditionally to treat myriads of sicknesses and diseases. Hence, this study aims at documenting Nigerian plants with anti-obesity potentials.

Methodology**Ethnobotanical Survey**

This was done via oral structured interviews with 200 respondents that consented to grant the interviews. Their demography ranged between 18 to 60 years and comprised of males and females from all walks of life. Information on plants used in the management of obesity, their modes of preparation and administration were gotten via oral interviews. The survey was conducted in six cities of southwestern Nigeria namely; Abeokuta, Ibadan, Lagos, Akure, Ado-Ekiti and Ilesha between August and October, 2018.

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There was an easy flow of communication with the sellers as the interviews were conducted in vernacular language. The Use of Mention Index (UMI) was calculated by dividing the frequency of mentioning of each plant with the number of respondents for all the plants.

Plant Collection

The plants identified were collected from the wild by the herb sellers and were purchased from them for proper identification. They were identified and authenticated by Dr. OJ Sharaibi of Department of Botany. Voucher specimens with reference numbers were deposited in Lagos State University herbarium.

Results and Discussion

Ethno medicinal information obtained from oral interviews of

the respondents were conducted in the native language (Yoruba) and this enhanced easy flow of communication with them. Though, some of the respondents were friendly and ready to respond to any question but some were quite aggressive, especially the herb sellers; but eventually disclosed a bit of the information while some totally refused to give any information. They accused researchers of displaying the information given online which leads to reduction in the number of customers that patronize them. They also accused researchers of stealing their knowledge, which is the source of their livelihoods.

Thirty-five (35) plant species belonging to twenty-five (25) families were identified for the management of obesity in Southwestern Nigeria as shown in Table 1. Most of the plants mentioned were used singly while others were in combination with other herbs.

Table 1: List of medicinal plants used for the management of obesity in Southwestern Nigeria.

| S. N | Botanical name | Local name | Family name | Part used | Mode of preparation |
|------|--|---------------|-----------------|-------------|----------------------|
| 1 | <i>Croton penduliflorus</i> Linn. | Aworosho | Euphorbiaceae | Seed | Decoction |
| 2 | <i>Chrysophyllum albidum</i> G. Don. | Baka | Sapotaceae | Bark | Decoction |
| 3 | <i>Curculigo pilosa</i> Engl. | Epakun | Hypoxidaceae | Rhizome | Decoction |
| 4 | <i>Anthocleista djalensis</i> A. Chev. | Sapa | Longaniaceae | Bark | Decoction |
| 5 | <i>Irvingia gabonensis</i> Bail. | Oro | Irvingiaceae | Seed | Maceration |
| 6 | <i>Dracaena surculosa</i> Lindl. | Olugborogun | Asparagaceae | Root | Maceration |
| 7 | <i>Petiveria alliacea</i> Linn. | Aworogun | Phytolaccaceae | Bark | Decoction |
| 8 | <i>Kigelia africana</i> (Lam.) Benth. | Amuyan | Bignoniaceae | Bark | Decoction |
| 9 | <i>Aloe barteri</i> Baker | Eti-erin | Aloaceae | Leaf | Extraction |
| 10 | <i>Veronia amygdalina</i> Del. | Ewuro | Asteraceae | Leaf | Extraction |
| 11 | <i>Citrus medica</i> Linn. | Osan wewe | Rutaceae | Fruit | Extraction |
| 12 | <i>Ananas comosus</i> (L) Merr. | Ope-oyinbo | Bromeliaceae | Fruits | Maceration/ Juice |
| 13 | <i>Maesobotrya barteri</i> (Baill.) Hutch | Olohun | Phyllanthaceae | Fruit | Extraction |
| 14 | <i>Capsicum annum</i> Linn. | Ata | Solanaceae | Fruit | Paste |
| 15 | <i>Zingiber officinale</i> Rosc. | Ata ile | Zingiberaceae | Rhizome | Maceration/Decoction |
| 16 | <i>Rauwolfia vomitaria</i> Afzel. | Asofe yeye | Apocyanaceae | Root | Decoction |
| 17 | <i>Heliotropium indicum</i> Linn. | Igboriakuko | Boraginaceae | Leaf | Extraction |
| 18 | <i>Jatropha curcas</i> Linn. | Botuje funfun | Euphorbiaceae | Fruit | Maceration |
| 19 | <i>Colocynthis citrullus</i> Linn. | Baara | Curcubitaceae | Fruit | Maceration |
| 20 | <i>Kigelia africana</i> (Lam.) Benth. | Pandoro | Bignoniaceae | Bark | Decoction |
| 21 | <i>Citrus aurantium</i> Linn. | Orombo | Rutaceae | Fruit juice | Infusion |
| 22 | <i>Nicotiana tabacum</i> Linn. | Ewe taba | Solanaceae | Leaf | Decoction |
| 23 | <i>Citrus limon</i> (L.) Burm. | Ilamuna | Rutaceae | Fruit juice | Extraction |
| 24 | <i>Allium sativum</i> Linn. | Ayu | Amarylloidaceae | Cloves | Maceration |
| 25 | <i>Camellia sinensis</i> Linn. | Ewe tii | Theaceae | Leaves | Infusion |
| 26 | <i>Boerhavia diffusa</i> Linn. | Olowojeja | Nyctaginaceae | Root | Decoction |
| 27 | <i>Bombax ceiba</i> Linn. | Poponla Odan | Bombacaceae | Stem bark | Decoction |
| 28 | <i>Curcuma longa</i> Linn. | Atale pupa | Zingiberaceae | Rhizomes | Infusion |
| 29 | <i>Cucumis sativus</i> Linn. | Cucumber | Cucurbitaceae | Fruits | Eating raw |
| 30 | <i>Mentha piperita</i> Linn. | Ewe minti | Lamiaceae | Leaves | Infusion |
| 31 | <i>Persea americana</i> Mill. | Avocado | Lauraceae | Fruits | Eating raw |
| 32 | <i>Alstonia boonei</i> De Wild. | Ehin Ahun | Apocynaceae | Bark | Decoction |
| 33 | <i>Cola acuminata</i> P. Beauv. | Obi | Sterculiaceae | Seeds | Eating raw |
| 34 | <i>Tetracarpidium conophorum</i> (Müll. Arg.) Hutch. & Dalziel | Awusa | Euphorbiaceae | Fruits | Cooked |
| 35 | <i>Cinnamomum verum</i> Blume | Oloorun | Lauraceae | Stem | Decoction |

The distribution of the plants into families (Table 2) showed that families Rutaceae and Euphorbiaceae have the highest number of species of three species each followed by families

Bignoniaceae, Cucurbitaceae, Zingiberaceae, Solanaceae, Lauraceae and Apocynaceae with two (2) species each. Other families were represented with a species each.

Table 2: Frequency of Distribution of Medicinal Plants in Families.

| S. N | Family | Frequency of Distribution |
|------|---------------|---------------------------|
| 1 | Rutaceae | 3 |
| 2 | Euphorbiaceae | 3 |
| 3 | Bignoniaceae | 2 |
| 4 | Solanaceae | 2 |
| 5 | Curcubitaceae | 2 |
| 6 | Zingiberaceae | 2 |

| | | |
|----|----------------|----|
| 7 | Lauraceae | 2 |
| 8 | Apocynaceae | 2 |
| 9 | Hypoxidaceae | 1 |
| 10 | Longaniaceae | 1 |
| 11 | Irvingiaceae | 1 |
| 12 | Asparagaceae | 1 |
| 13 | Phytolaccaceae | 1 |
| 14 | Aloaceae | 1 |
| 15 | Asteraceae | 1 |
| 16 | Bromeliaceae | 1 |
| 17 | Phyllanthaceae | 1 |
| 18 | Sapotaceae | 1 |
| 19 | Boraginaceae | 1 |
| 20 | Amaryllidaceae | 1 |
| 21 | Theaceae | 1 |
| 22 | Nyctaginaceae | 1 |
| 23 | Bombacaceae | 1 |
| 24 | Lamiaceae | 1 |
| 25 | Sterculiaceae | 1 |
| | Total | 35 |

The Use of Mention Index (UMI) was obtained by calculating the ratio of the number of mention of each plant to the total number of respondents. Some of the plants such as *Citrus limon*, *Tetracapidium conophorum*, *Curculigo pilosa*, *Allium cepa*, *Zingiber officinale* and *Cucumis sativum* can be used singly for weight loss as well as in combination with other herbs.

Curculigo pilosa had the highest UMI of 15% followed by *Jatropha curcas* with 14%. It was discovered that both plants with highest UMI have never been previously reported to aid weight loss. Though, *Curcuma longa* had the lowest UMI among the selected plants, it has never been previously reported. Other plants with high UMI have been previously reported in the literatures.

Table 3: The Use of Mention Index of Plants used for the Management of Obesity in Lagos State, Nigeria.

| S/N | Species | Quotation Frequency | Use Mention Index | % | Previously Reported |
|-----|---------------------------------|---------------------|-------------------|-----|---------------------|
| 1. | <i>Curculigo pilosa</i> | 30 | 0.15 | 15 | No |
| 2. | <i>Jatropha curcas</i> | 28 | 0.14 | 14 | No |
| 3 | <i>Citrus limon</i> | 22 | 0.11 | 11 | Yes |
| 4 | <i>Cucumis sativum</i> | 20 | 0.10 | 10 | Yes |
| 5 | <i>Zingiber officinale</i> | 18 | 0.09 | 9 | Yes |
| 6 | <i>Mentha piperita</i> | 17 | 0.085 | 8.5 | Yes |
| 7. | <i>Cinnamomum verum</i> | 17 | 0.085 | 8.5 | Yes |
| 8. | <i>Tetracapidium conophorum</i> | 17 | 0.085 | 8.5 | No |
| 9. | <i>Vernonia amygdalina</i> | 16 | 0.08 | 8 | Yes |
| 10. | <i>Curcuma longa</i> | 15 | 0.075 | 7.5 | No |

The most used plant parts is the fruit which accounted for 34% of the recipes followed by bark 22% and then leaf 17%. The roots, seeds and rhizomes accounted for 8% each of the

recipes while the clove is the least used for weight loss recipes accounting for only 3% as shown in figure 1

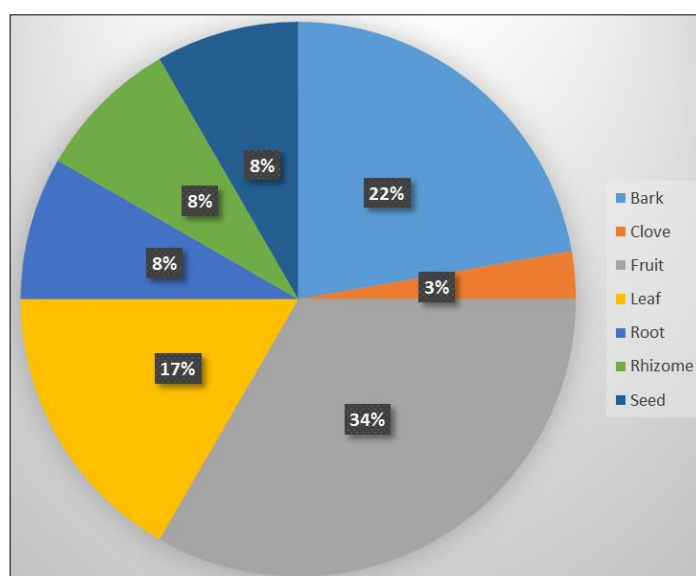


Fig 1: Plant Parts Distribution for the Treatment of Obesity in Southwestern, Nigeria.

Decoction (55.4%) is the most preferred mode of preparation of the herbs followed by maceration (18.1%), extraction of the plant juice accounted for 15.3%, infusion and eating the

plant raw accounted for 5 % each while the use of herbs in paste and cooked forms accounted for the lowest methods of preparation as shown in figure 2.

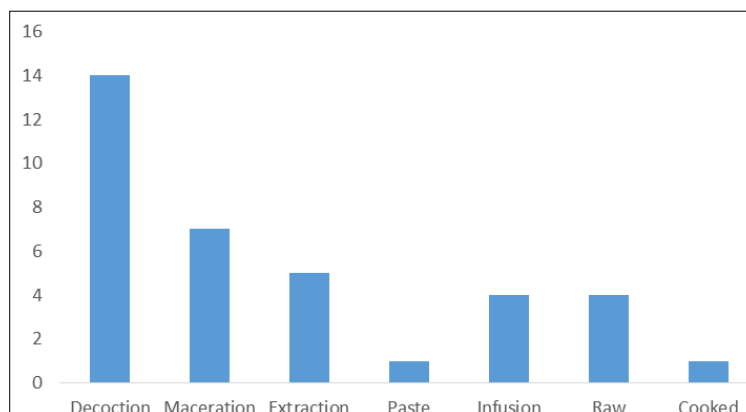


Fig 2: Mode of Preparations of Herbs Used for Obesity in Southwestern Nigeria.

Medicinal plant preparations may enhance satiety, boost metabolism, and speed up weight loss [7]. *Zingiber officinale*, *Camellia sinensis* and *Curcuma longa* extracts can alleviate lipid deposition in hyperlipidemia Dawley rats [8]. It was also reported that ginger water reduced weight gain and improved energy expenditure in laboratory rats [9]. The antiobesity functions of the medicinal plants may vary; it has been reported that *Citrus limon*, *Mentha piperita*, *Zingiber officinale* and *Cucumis sativum* help to suppress appetite while *Cucurma longa*, *Capsicum annum* and *Allium sativum* have been reported to prevent adipocyte differentiation, thereby prevent fat accumulation. *Momordica charantia*, *Tetracarpidium conophorum* and *Anana comosus* enhance lipid metabolism [10].

Conclusion

Obesity is a medical condition that cannot be handled with levity because of its implication in the emergence of some degenerative diseases and since the medications are not effective and are also presented with severe adverse effects, the best alternative is the use of medicinal plants. Nigeria is a reservoir of great diversity of plants that can be used to manage obesity as revealed from this study. There is the need to conserve these plants from over harvesting and overexploitation. This documentation will serve as a guiding light in the knowledge of indigenous plants that can aid weight loss. It will also help in the manufacturing of effective, cheaper and less toxic remedy for obesity.

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