



Ethnomedicinal Survey on the Uses of Mistletoe in South-Western Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. Author OTO designed the study and carried out the field work. Author BPO put the manuscript into writing. Author MIA carried out the statistical analysis. All authors read through the manuscript and made contributions to the final output.

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ABSTRACT

Survey on the ethnomedicinal uses of mistletoe in Southwestern Nigeria was carried out in various major market centers identified in the major capital towns of four different States in the Southwest Nigeria including Oyo, Ondo, Ogun and Ekiti States. A combination of social surveys and direct field observations comprising literatures, through friends, internet and consultation of local herb vendors were used in this study. A total number of 50 respondents comprising both male and female of various levels of educational status were interviewed. The major occupation of the people is farming, trading and herbal practice and the African mistletoe is widely used in the Southwestern Nigeria folk medicine to treat diabetes mellitus and hypertension. Only aged ones above 40 years (86%) compared to the least represented youths (4%) could only give details of the information about mistletoes. However, the problem of identification and authentication still remained. There is need for further scientific research to explore the pharmacological importance of mistletoes as the result shows that it possesses a lot of ethnomedicinal assets.

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1. INTRODUCTION

Mistletoe is a common name used generally for woody shoot parasites in various plant families, mostly in the Loranthaceae and Viscaceae families [1]. Mistletoe was much prominent in the folklore and religions of ancient Europe before Christianity started. It was used as a remedy for evil as it was reputedly endowed with magical powers; it is used for decorations during the Christmas and New Year celebrations, and it is still a common practice to kiss under a branch of mistletoe [2].

In the Northern Europe the plant was associated with Freya, Norse goddess of love, and the custom of kissing underneath mistletoe branches was developed. This custom was incorporated by Christians into their Christmas celebrations, and eventually became a part of secular Christmas tradition to kiss under a mistletoe branch [3].

Mistletoe is commonly found growing on tree crops like cocoa, kolanut, coffee, bush mango etc known botanically as *Theobroma cacao* L., *Cola nitida* (Vent.) Schott & Endl. or *Cola acuminata* (P. Beauv.) Schott & Endl., *Coffea arabica* L. and *Irvingia gabonensis* (Aubrey-Lecomte ex O. Rorke) Baill. respectively in the Southwestern Nigeria. Mistletoe can also grow on citrus trees like orange (*Citrus sp.*) and guava (*Psidium guajava* L.).

Mistletoes grow on many trees and tree crops indigenous to West Africa and which are of economic importance; among them are sheabutter, neem, citrus [4], cocoa [5] and rubber [6,7].

Mistletoe is of interest in Botany especially because it is a partial parasite (a "hemiparasite") [2]. It grows on the branches of tree trunks and sends out roots tagged "haustoria" that penetrate into the tree and take up nutrients [8]. Mistletoe can also grow on its own as it can manufacture its own food by photosynthesis like other plants. However, it is more common to find it growing as a parasite.

The name 'mistletoe' given to the plant was derived from the belief of old that it sprang up from bird droppings. This belief was connected to the principle accepted in those days that life could arise suddenly from dung. In ancient times

it was noticed that mistletoe often would appear on a branch or twig where birds' droppings were found [9]. This study aims at getting information about the popularity of mistletoe in health care as it's tagged an 'all healer plant' and comparing it to the orthodox treatment of such ailments for which mistletoe is claimed to treat.

1.1 Uses of Mistletoe

In Europe, mistletoe is used mainly as an anticancer agent [10]. In contrast to American mistletoe which is toxic, European mistletoe is believed to have medicinal properties to date. European mistletoe has been reported to treat a wide variety of physical and mental conditions by the Drug Digests. It is best known currently as a therapy in addition with other drugs and or radiation for cancer treatment". It was also reported by some HIV/AIDS Organizations (NGO's) to help restore immune systems [9].

The usefulness of mistletoe in medicine has confirmed it well as an "all healer" as one of its older frames. *Viscum album*, the mistletoe with white-berries has been reported as a treatment for diabetes and high blood pressure traditionally. In Germany, mistletoe extracts serve as the most unorthodox oncology therapy. *Viscum album* was documented as a treatment for skin diseases and prostate cancer in Palestine as discovered through ethnobotanical surveys carried out [11].

In Nigeria, *Loranthus bengwensis* L. (Loranthaceae), African mistletoe, has found popularity in its being widely used to treat *Diabetes mellitus* in folk medicine [12]. Another species of African mistletoe *Tapinanthus dodoneifolius* exhibited a wide range of antimicrobial activities against some bacterial and fungal isolates of farm animals that are resistant to multiple drugs. The ability to inhibit the growth of certain bacteria species, such as *Agrobacterium tumefaciens*, *Bacillus sp.*, *Escherichia coli*, *Proteus sp.*, *Pseudomonas sp.* and *Salmonella sp.* linked with crown gall or gastrointestinal tract and wound infections by this mistletoe extract serves as a clue to its being used ethnomedicinally [13]. Osadebe and Ukwueze have presented the wide range of data regarding the antimicrobial activities of *Loranthus micranthus*, an eastern Nigeria species of the African mistletoe [14].

2. MATERIALS AND METHODS

2.1 Study Area

This survey was carried out in various major market centers identified in the major capital towns of four different States in the Southwestern Nigeria including Oyo, Ondo, Ogun and Ekiti States. The visited markets where the herb sellers and other practitioners are located include the Oje and Bode/Ibuko markets, Ibadan and Akesan market, Oyo town in Oyo State; Lafenwa, Kuto and Itoku markets in Ogun State; Oja-Oba and Oja Ikoko markets, Owo town in Ondo State; and individuals in Ekiti State. The respondents reside in various rural villages across the states; major occupation of the people is farming and trading which they practice at subsistence level.

2.2 Sampling Procedure

A combination of social surveys and direct field observations comprising literatures, through friends, internet and consultation of local herb vendors were used in this study [15]. In each market center, botanical vendors were identified and survey of the use of African mistletoe was carried out. The vendors were interviewed, guided by a semi structured questionnaire with a view to determine the medicinal importance of mistletoe. All the interviews (market and social interviews) were conducted with a fairly open framework that allowed for focus, conversational and two-way communication. Respondents of different age ranging from 30 to 40 and above years of age having different forms of formal education and different occupation were interviewed. At every moment, the interviewees were informed of the objectives of the survey as well as of the indications on the content of the questionnaire that were being administered. To the respondents, all the questions were relative to their domestic statute, their knowledge of using the plant, the effectiveness when being used compared to the orthodox, and the availability. To the herb vendors, after some explanations, the anonymous questionnaire was given to be filled to those who could either have it filled by an author through a non-oriented conversation (made at random); no direct questions were asked in order to prevent biased answers and avoid compromising spontaneity. Every information that came out during the conversation was transferred to a structured form in the questionnaire. The method being adopted followed the criteria outlined by [16-19] in conducting interviews.

3. RESULTS AND DISCUSSION

A total number of 50 respondents were interviewed in this study comprising both male and female of various levels of educational status. The percentage age of respondents (Table 1) implies that the respondents are mostly in the age group of 40 years and above (86%) compared to the least represented youths (4%). This is an indication that our indigenous traditional medical practice may be lost if our young generations continue to show little or no interest to the practice of our rich cultures so that they are preserved for the future generation.

The major occupation of the people is farming, trading and herbal practice which they engage in at subsistence level as represented in (Fig. 3). Aside the fact that the only aged ones above 40 years could only give details of the information about mistletoes, it was observed that although people are still familiar with the plant especially among the literates but the problem of identification and authentication still remained (Fig. 2). It has been reported that there is problem of correct identification among the herbal practitioners [20]. This same challenge was mentioned by some of the respondents that these semi-parasitic plants are commonly affected by both biotic and abiotic factors. The common practice among people of the Southwestern part of Nigeria, the 'Yorubas', is the use of a general term 'mistletoe' for all these plants just as for example, refer to them whether they are green, brown, semi-woody, bushy or perennial as '*afomo onisana*,' because the flowers resemble a match stick, or may be because of the colours of their flowers which could either be yellow with red or purple corolla tips as seen in *Phragmanthera capitata* or purple with yellow corolla tips as seen in some other mistletoe species. General information on the medicinal values of some species commonly mentioned among the respondents in this study were gathered for documentation among which are *Phragmanthera*, *Agelanthus*, *Globimetula*, and *Tapinanthus* (Loranthaceae).

Mistletoes are found on many tree crops of economic importance in West Africa; among them are shea butter tree (*Vitellaria paradoxa* Gaertn. f.), citrus species, commonly sweet orange (*Citrus sinensis* L.) and grape (*Citrus paradisi* L.), the neem tree (*Azadirachta indica* L.), rubber (*Hevea brasiliensis* Muell Arg) and cocoa (*Theobroma cacao* L.) [4-6]. The information in (Tables 2 and 3) is no difference

as it showed the types of trees on which mistletoe is mostly found and their method of harvesting. All the methods mentioned in (Table 3) are frequently used depending on the tree the parasitic plant is found. The medicinal uses of the plant by the respondents are represented in (Table 4). According to Olapade, 1995 [21], traditional medicine has higher benefits than orthodox medicine and any other health care system as it is readily available, cheaper, and could cure permanently. Apart from this, it has few or no side effect at all and could save the nation huge foreign exchange that can be converted for other uses which will help in further national development. Information gathered

showed that mistletoe is predominantly used for the treatment of hypertension and diabetes around South-western part of Nigeria. Among these respondents, apart from the fact that accessibility of the plant is found easier and cheaper than orthodox way of treatment of these diseases (Table 6), it is considered to be more effective in managing the disease than the use of the orthodox medicine (Table 5 and Fig. 1). This corroborated with the study of Adesina *et al.*, 2013 [20] that mistletoes of the Loranthaceae and Viscaceae Families, are popularly used in various cultures of the world to treat diverse array of ailments such as cancer, diabetes, hypertension, or as a diuretic agent [22-24].

Table 1. Percentages of respondents age groups

Age group (Years)	Number of respondents	Percentage of respondents(%)
(30-34)	2	4
(35-39)	5	10
Elderly (40-above)	43	86
Total	50	100

Table 2. Percentages of the type of tree(s) on which Mistletoe can be found

Types of tree	Number of respondents	Percentage of respondents (%)
<i>Theobroma cacao</i> (Cocoa)	15	30
<i>Cola nitida</i> and <i>Cola acuminata</i> (Kolanut)	34	68
All of the above	1	2
Total	50	100

Table 3. Methods of harvesting mistletoe

Methods of harvesting	Frequency	Percentage of respondents (%)
Use of cutlass	6	12
Use of long stick	8	16
Use of sickle	13	26
Pruning	2	4
All of the above	21	42
Total	50	100

Table 4. Medicinal uses of Mistletoe by the respondents

Medicinal uses	Frequency	Percentage of respondents (%)
Treat diabetes	10	20
Treat hypertension	15	30
Treat insomnia	10	20
Treat Infertility	7	14
All of the above	8	16
Total	50	100

Table 5. Effectiveness of the use of Mistletoe by the respondents

Effectiveness	Frequency	Percentage of respondents (%)
Highly effective	2	4
Very effective	20	40
Effective	25	50
Poorly effective	2	4
Not effective	1	2
Total	50	100

Table 6. Accessibility and cost of getting mistletoe by the respondents

Access to source and cost	Frequency	Percentage of respondents (%)
Easy and cheap	34	68
Difficult but cheap	10	20
Difficult and expensive	6	12
Total	50	100

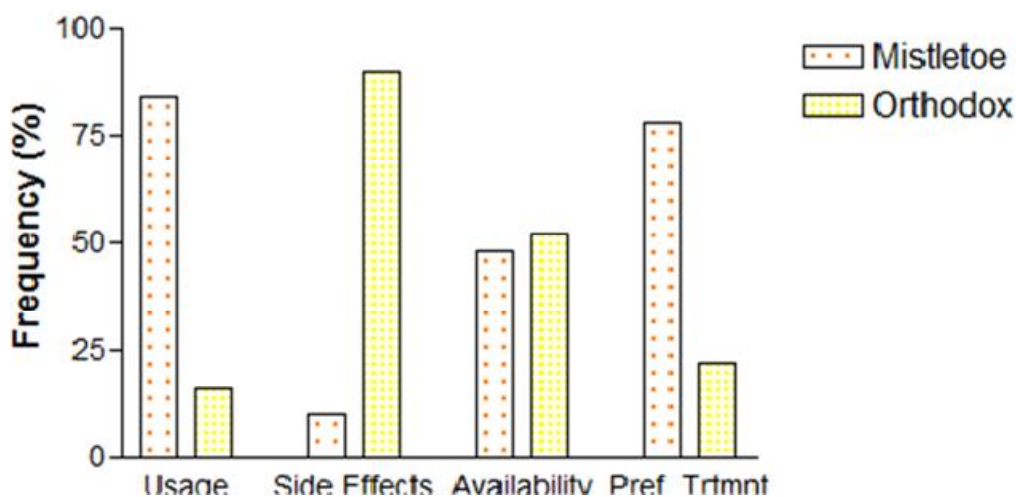


Fig. 1. Demographic comparison of use of mistletoe and orthodox medicine

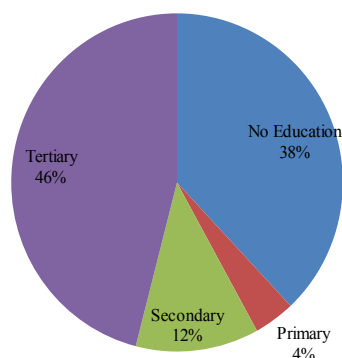


Fig. 2. Pie Chart showing the percentage level of respondent's educational status

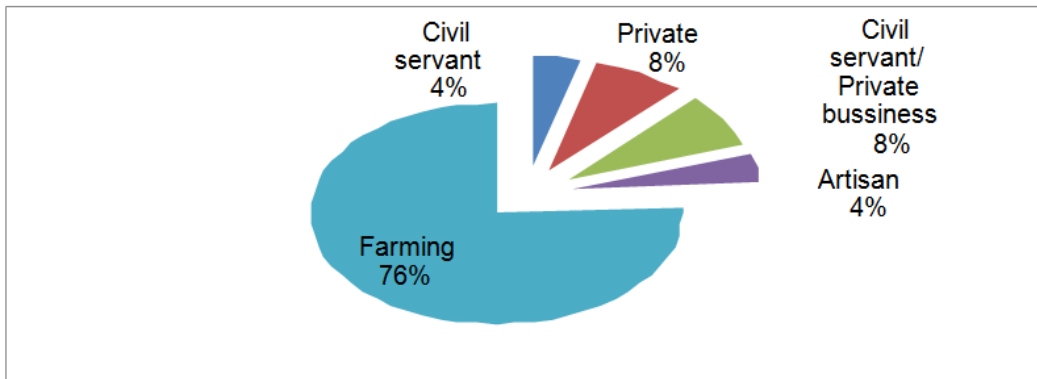


Fig. 3. Pie Chart Showing the Percentage of Respondents' Occupation

4. CONCLUSION

The results of this ethnobotanical survey on mistletoes show that it possesses a lot of ethnomedicinal asset. The plant is gaining more recognition and attention as people who have used mistletoe confirmed its effectiveness in treating various diseases like insomnia, diabetes, hypertension, infertility etc. So also its ethno pharmacology is now well known based on the toxicology and pharmacology of some of the crude or purified extracts that have been gathered from various scientific journals. There is still need for further research and improvement in the area of understanding the chemistry, ethnopharmacological specificity of various species of the hemi-parasitic plants in relation to their respective hosts and their taxonomy.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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