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Review Article

A Survey of the Harvesting and Conservation Methods of Medicinal Plants Employed by Traditional Medicine Practitioners in Mubi Local Government Area, Adamawa State

Emmanuel Francis[1] and Valada Bala[2]

[1]*Mathematics Programme, National Mathematical Centre, Abuja, Nigeria.*
[2]*Department of Botany, Adamawa State University, Mubi, Adamawa State, Nigeria.*

Email: donkene.ef@gmail.com

ABSTRACT: ***This study assessed the Methods of Harvesting and Preservation of Medicinal Plants Employed by Traditional Medicine Practitioners in Mubi, Adamawa State Nigeria. The method of data collection was identification and specimen collection of the medicinal plants. This study targeted Traditional Medicine Practitioners (TMPs) in Mubi and those with related knowledge in the study area. The sample size of the study comprised of fifty (50) traditional medicine practitioner. Random sampling technique was used in selecting respondents. This study adopted a descriptive survey research design. Instrument of data collection was a structured questionnaire. Interviews were also used depending on the nature of the respondents. Data were analyzed using simple percentages and Pearson correlation analysis using SPSS 16.0, (2007). The plants were scientifically identified using reference books and comparison of plant specimen collected with voucher specimens at the Botany Department, Adamawa State University, Mubi. Results of the study indicated that 27 different species from 15 botanical families are among the common trees used by the traditional medicine practitioners in the study area. From the study, it has been observed that most of the traditional medicine practitioners used debarking of harvesting on the average some use uprooting as method of harvesting while very few use plucking of leaves as harvesting method. The study recommends that further research on a large scale should be conducted on the inventory of these plants stating their status (rare, endemic or endangered) in the state and the country at large.***

KEYWORDS: ***Harvesting, Conservation, Medicinal Plants, Traditional Medicine Practitioners, Adamawa State.***

INTRODUCTION

Plants have been used for their curative properties since antiquity (Ohja *et al*., 2020). Consequently, human medicine is so linked to plant biodiversity that most of the current modern medicines were first derived from medicinal plants (Kiguba *et al*., 2016). Medicinal plants are wild and cultivated plants used in traditional and modern medicine (Rajeswaro Rao, 2016). Across the centuries, the global rate of use of medicinal plants has been increasing, more so in developing countries (Tabuti *et al*., 2012). This is mostly attributed to the fact that medicinal plants are readily available, widely accepted by many cultures, perceived to be safe and efficacious (Chinsembu & Hedimbi, 2010). Throughout the world, local people utilize plants for medicinal purposes at an estimated prevalence of use of ranging between 50% and

95% (Pan *et al*., 2019). Higher prevalence of use estimated at 80% has been reported in rural communities in developing countries. Further still, the prevalence of use is equally traced in developed countries such as USA, where health care facilities are in place and up to date. Due to this high demand for herbal medicine, and other factors, over 150000 medicinal plant species are at risk of extinction (World Health Organization [WHO], 1993) and about 20% of the wild medicinal plants have already been nearly exhausted (Ross, 2007) majorly due to indiscriminate collection and overharvesting from their natural habitats (Phondani *et al*., 2016).

Since time immemorial, all communities have conserved their local medicinal plants using measures that restricted the amount harvested at a time, control on the harvesters and use of taboos to regulate the harvest of plants. This ensured that their health care needs were protected through all generations. The growing demand for traditional medicines has also seen the international awareness about the declining medicinal plants globally as a result of over harvesting for commercial purposes, destructive harvesting practices, loss of habitat due to deforestation and agricultural practices (Robertson 2008).

The degree of vulnerability of medicinal plants to overexploitation and disturbance largely depends on the part used be it bark, leaves, twigs, roots or stem and the life form (Fratkin, 2019). Indigenous medicinal plants are particularly vulnerable to over exploitation because they are slow growing species and partly because of their scarcity (Giday 2003). The harvesting technique employed in the prevailing area is important in the conservation of medicinal plants there is need for sustainable management, cultivation and conservation of medicinal plants. According to Giday, (2003), the conservation of African medicinal plant species is critical for local health as well as for international drug development. As much as 95% of African drug needs come from medicinal plants, and as many as 5000 plant species in Africa are used for medicinal purposes (Taylor *et al*., 2001). Therefore, this study investigated the harvesting and preservation methods of traditional medicine used among traditional medical practitioners (TMPs) and the preparation dosage of the same by determining the methods used in harvesting and preserving medicinal plants as well as the different preparation dosage.

METHODOLOGY

Study Area

This study was conducted in Mubi North Local Government Area of Adamawa State. The town is located in the North Eastern region of Nigeria between latitude 100 14'N and 100 18'N of the equator and longitude 130 14' E and 130 19'E. it occupies a land of about 725.85Km2. The area has a tropical climate with an average temperature of 32 0C and lies within the Sudan Savannah vegetation zone of Nigeria. The area has an average relative humidity ranging from 28% - 45% and an annual rainfall of about 1056mm (Adebayo, 2004).

Research design

The study adopted a descriptive research design. According to Grazino and Reulin (2000), descriptive survey research method is often employed to study people's feelings, thinking and attitudes about specific aspects hence was relevant for this study.

Sample size and Instrumentation

This study targeted Traditional Medicine Practitioners (TMPs) in Mubi and those with related knowledge in the study area. The sample size of the study comprised of fifty (50) traditional medicine practitioner. Random sampling technique was used in selecting respondents. Data

were collected with the aid of a structured questionnaire. Interviews were also made depending on the nature of respondents.

Data Collection

Traditional Medicine Practitioners (TMPs) were visited in their premises for inventory and identification of plants cultivated in the study area and their home gardens. The survey instrument was administered to fifty (50) of the TMPs selected randomly as a means to ensure correct completion and high percentage return of completed questionnaire. Specimens were further collected and identified. Information concerning the distribution, propagation method, conservation strategies, uses and local names of the plant were obtained from the TMPs.

Data Analysis

Data were analyzed using simple percentages (frequencies) and Pearson correlation analysis using SPSS 16.0, (2007). The plants were scientifically identified using reference books and comparison of plant specimen collected with voucher specimens at the Botany Department, Adamawa State University, Mubi.

DATA PRESENTATION AND ANALYSIS

Different Harvesting Methods

A number of ways by which medicinal plants were harvested were investigated and the result is presented in percentages (Table 1).

Table 1: Different Harvesting Methods

Sl. No.	Methods	Number of Respondents	Percentages (%)
1.	Plucking of Leaves	17	38.6
2.	Debarking	18	40.9
3.	Uprooting	9	20.4
	Total	**44**	**100**

[Source: Field Survey, (2023)]

Form the results of the investigation presented in table 1, it is clearly shown that 40.9% of the respondents used debarking as their harvesting methods, 38.6% used plucking of leaves whereas 20.4% used uprooting methods. This implies that majority of the TMPs prefer debarking as a means of harvesting.

Harvesting with or without Conservation

From the study done it was discovered that a number of the TMPs harvest these medicinal plants with or without conservation and the statistical data is presented in percentages (Table 2).

Table 2: Harvesting with or without Conservation

Sl. No.	With or Without	Number of Respondents	Percentages (%)
1.	With Conservation	14	32
2.	Without Conservation	30	68
	Total	**44**	**100**

[Source: Field Survey, (2023)]

Results from Table 2 revealed clearly that only 32% of the respondents do their harvest of traditional medicine with conservation in view where as 68% of the respondents harvest without recourse to conservation. The implication is that a majority of the TMPs go about their practice without thinking about sustainability of the traditional medicine.

Preservation of Medicinal Plants

The study revealed that there are a number of ways by which the TMPs preserve medicinal plants as captured in Table 3.

Table 3: Methods of Preservation of Medicinal Plants

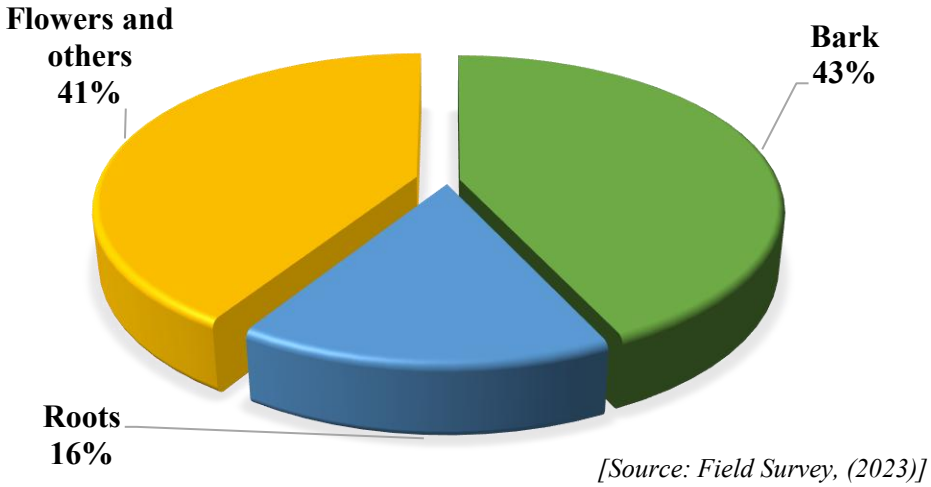
Sl. No.	Methods	Number of Respondents	Percentages (%)
1.	Drying	37	84.0
2.	Burying in the soil	-	-
3.	Others (e.g. refrigeration, Fermentation, pausterization)	7	15.9
	Total	**44**	**100**

[Source: Field Survey, (2023)]

From the result of the study in Table 3, it is obvious that majority (84%) of the respondents employ drying as a way of preserving traditional medicine. None of the respondent admitted to burying in the soil as a way of preservation. Only 15.9% reported that they use fermentation, pasteurization or refrigeration as a method of preserving traditional medicine. This implies that a large number of the TMPs either believe that drying is the best form of preservation or due to poor infrastructure and funding cannot utilize other forms of preservation like pasteurization.

Plants parts used by TMPs

This captures the plants parts that the TMPs utilize for the treatment of their patients as reported by the investigation and presented in Figure 1.



[Source: Field Survey, (2023)]

Figure 1: Plants Parts used by TMPs

Figure 1 analysis indicated that majority (43%) of the respondents from our study area used the bark of plants for their medicinal treatments, 16% used roots whereas 41% used flowers/fruits/leaves as their most vital ingredients for treatment.

Different preparation dosage of medicinal plant among traditional medicine practitioners

In order to determine the different preparation dosage of medicinal plant among traditional medicine practitioners, plants were scientifically identified using reference books and comparison of plant specimen collected with voucher specimens at the Botany Department, Adamawa State University, Mubi. Medicinal plants species for healing of various ailments, parts used and the mode of application were all identified as presented in Table 4.

Table 4: The Different Medicinal Plant Species Used in the Healing of Various Ailments

Scientific name	Family name	Vernacular name	Ailments being treated	Parts of the plant used	Mode of application
Acacia Nilotica	*Mimosaceae*	*Bagaruwa*	*Cough, cold*	*Root*	*Boiled concoction 1 cup daily*
Albizia Cariari	*Minosaceae*	*Doruwa*	*Skin disease*	*Root*	*Boiled concoction 1 cup daily*
Azadiratcha Indica	*Meliaceae*	*Neem*	*Pile/malaria*	*Bark, root & leaves*	*Boiled concoction 2 cups daily*
Angeissus Leicrppus	*Combretaceae*	*Marka*	*Chest Pain*	*Root & Bar*	*Boiled concoction 2 cups daily*
Detarium Microcarpus	*Fabaceae*	*Tawura*	*Abnormal Pain*	*Bark*	*Boiled concoction 2 cups daily*
Evolvvlus Alsiinodes	*Onvolvulaceae*	*Kafi mallam*	*Veneral disease & cough*	*Leaves*	*Boiled concoction 1 cup daily*
Eucalyptus Regnanas	*Mrtaceae*	*Dogo Yaro*	*Yellow Fever*	*Root, bark & leaves*	*Boiled concoction 1 cup daily*
Erthrina Senegaleniss	*Papilionaceae*	*Mirjiriya*	*Yellow Fever*	*Bark*	*Boiled concoction 2cups daily*
Ficus Sycomorus	*Moraceae*	*Baure*	*Swelling abnormal*	*Root & bark*	*Boiled concoction 2cups daily*
Ficus Ilteophylla	*Moraceae*	*Shediya*	*Yellow Fever*	*Root, bark & leaves*	*Boiled concoction 2cups daily*
Ficus Pilatyphlla	*Moliaceae*	*Gamji*	*Breast disease*	*Bark & root*	*Boiled concoction 2cups daily*
Guiera Senegalensis	*Combretaceae*	*Sabara*	*Diahrrhea*	*Root & bark*	*Boiled concoction 3cups daily*
Ipomoea Argentaurata	*Convolvulaceae*	*Farin gamo*	*Skin disease*	*Root*	*Boiled concoction 2cups daily*

Mucana Pruriens	*Fabaceae*	*Karara*	*Reduce stress*	*Root*	*2 Tea spoonful twice daily*
Moringa Oleifera	*Morinceae*	*Zogalai*	*Fever*	*Leaves*	*Boiled concoction 2cups daily*
Pseudocedrela Kotchii	*Meliaceae*	*Tunnas*	*Pile & ulcer*	*Leaves & flower*	*Boiled concoction 3cups daily*
Prosophis Africana	*Mimosaceae*	*Kiriya*	*Typhoid & pile*	*Bark*	*Boiled concoction 2cups daily*
Pilostigma Thonningii	*Caesalphiniacea*	*Kargo*	*Ulcer & fever*	*Bark*	*2 Tea spoonful of the grinded,twice daily*
Phoenix Dactylifera	*Palmae*	*Dabino*	*Arthritis, diabetes cancer, hypertension*	*Fruits*	*Take 12-16 daily*
Swetenia Mahogany	*Meliaceae*	*Madachi*	*Fibroid*	*Bark*	*Boiled concoction 2cups daily*
Sterculia Setigera	*Sterculiaceae*	*Kukuki*	*High blood pressure*	*Bark & root*	*Boiled concoction 1 cup a day*
Terminalia Glauensense	*Combretaceae*	*Baushe*	*Swelling & abnormal Pain*	*Root*	*3 Tea spoonful of the grinded, thrice daily*
Tamarindus Indica	*Caesalphiniacea*	*Tsamiya*	*Measles, cold*	*Leaves*	*Boiled concoction 3 cups daily*
Vittellaria Paradoxa	*Sapotaceae*	*Kadanya*	*Swelling*	*Bark*	*Boiled concoction 2 cups daily*
Vitex Doniana	*Verbenaceae*	*Dinya*	*Toothache*	*Bark*	*Boiled concoction 2 cups daily*
Ximenia Americana	*Olacaceae*	*Tsada*	*Eye sore*	*Bark*	*Boiled concoction 1 cup daily*
Ziziphus Spinachristi	*Rhamnaceae*	*Kurna*	*Skin disease*	*Bark*	*Boiled concoction 1 cup daily*

[Source: Field Survey, (2023)]

DISCUSSION

The result of the study indicated that 27 different species from 15 botanical families were among the common trees used by the traditional medicine practitioners in the study area. This agreed with the findings of Sofowuro, (2017), though some of the tree species were not mentioned by the traditional medicine practitioners, this could be as a result of over exploitation

of these plants, thus making them not to be readily available. Some also reported that they have to travel to far places to obtain some of their plants.

The method of harvesting the plants were by uprooting of the roots, plucking of fruits, leaves as well as debarking of the bark and it has been observed that most of the traditional medicine practitioners use debarking (40.9%) on the average, some use uprooting (20.4%), while very few use plucking (38.6%) of leaves as harvesting method. Some of the methods use in the harvesting is deleterious to the plant, which sometimes results in the death of the plants especially when it has to do with roots and debarking which is injurious to the plants. (Cunningham, 2002).

From the result obtained in this study, it was revealed that the most common method of preserving medicinal plants among traditional medicine practitioners in Mubi was drying. This has to do with lack of enough preserving materials in the community. This also agreed with the work of Rahimi & Farrok, (2019) who reported drying is the most common method of storing medicinal, aromatic plants and protecting their biochemical compounds. While the uncommonly used ones are refrigeration, pasteurization and fermentation were among the methods used.

It was revealed that the most used method of preparation/dosage of medicinal plant among traditional medicine practitioners in Mubi was boiling of concoction and two cups daily. This also agreed with research reported by Fongang *et al*., (2021) which recommended boiled concoction method of preparation as the method suitable for preparing thermostable and water-soluble compound, plant materials and commonly resulted in more oil soluble compound than maceration. While only few specifically 2 plants were prepared by grinding, only one fruits was consumed (12 – 16 piece) daily. The dosage also followed by 1 cup daily with also 7 different plants administered as a dosage.

CONCLUSION

The research was able to establish that there are 27 different species from 15 botanical families that are used by the TMPs in study area. Also, the debarking method was the common method used for harvesting medicinal plant among traditional practitioners in Mubi. This research also found out that the preservation method of medicinal plant among traditional practitioners in Mubi was poor due to lack of knowledge and awareness. Hence the need for regular workshops and trainings to properly educate and enlighten the traditional medicine practitioners for the purpose of sustainable development of the practice.

Recommendations

Based on the findings of this study, it was recommended that:

- Government should encourage communities to establish medicinal plants gardens either at family level or community levels to curtail the extinction of some species as a result of over exploitation.
- Government should organize workshops for traditional medicine practitioners on the methods of harvesting medicinal plants for sustainable use.
- Traditional medicine should be incorporated into Nigerian health care system as some of the plants possessed substances that will be used in the synthesis of drugs.
- Further research on a large database should be conducted on the inventory of these plants stating their status (rare, endemic or endangered) in the state and the country at large.

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