



Traditional Medicinal plants Used for the Treatment of Cancer in Mubi, Adamawa State, Nigeria

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ABSTRACT

Medicinal plants have aided in the establishment and expansion of the modern healthcare system. Plants with medicinal potential are still the only way forward, as their acceptance and recognition spread over the globe. Ethnobotany is an interdisciplinary field that studies how people use plants in their daily lives. Nigeria accounted for roughly 20% of Africa's population and slightly more than half of West Africa's projected 681,000 new cancer cases in 2008, accounting for roughly 20% of the continent's population and slightly more than half of West Africa's. For pharmaceutical exploration and conservation, it is important to document the use of medicinal plants in a specific region across time. The study's goal was to find out which plants were used to treat Cancer in Mubi, Northern eastern part of Nigeria. An open ended interview was employed with no sampling size selection. Used Value (UV), Fidelity level (FL) and Relative frequency of citation (RFC) were used to determine the most important and effective plants used for treatment of cancer. Ten plants were documented with *Neolamarckia cadamba* has 0.9, 1 and 100 % of UV, RFC and FL, respectively. The study will serve as a foundation for subsequent research into developing natural medicine or modern medications to prevent the extinction of the species.

1. Introduction

Cancer is a condition in which cells divide uncontrollably and abnormally. In 2012, roughly 14 million new cancer cases and 8.2 million cancer-related deaths were reported worldwide [1]. Nigeria produced 15% of Africa's projected 681,000 new cancer cases in 2008, accounting for around 20% of the continent's population and slightly more than half of West Africa's [2]. In Nigeria, 100,000 new cancer cases are detected each year, with a high case fatality rate [3]. The six most frequent in Nigeria, in descending order of frequency, are breast, cervix, prostate, colorectal, liver, and non-Hodgkins lymphoma [4]. Traditional medical practitioners (TMPs) are reported to treat cancer, as well as many other diseases, in Nigeria and around the world [5]. Cancer is the second most fatal disease, after only

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cardiovascular disease, and it is a serious public health concern around the world [5]. The global incidence of cancer and cancer-related mortality continues to rise, particularly in developing and underdeveloped countries. In regions of Africa, particularly Nigeria, the frequency of cancer and cancer-related fatalities is steadily growing, which may be due to a lack of cheap healthcare for early detection and treatment [6]. Breast cancer (32.29%) and digestive system cancer (19.67%) are the most often diagnosed cancers in Ilorin, Kwara state Nigeria [7]. Breast cancer (38.1%) and prostate cancer (12.8%) are the most often diagnosed cancers in female and male Lagos, Nigeria [7]. Plants have long been known for their therapeutic properties, and people all over the world have traditionally employed them to cure a variety of maladies [8]. From the dawn of time, man has been fascinated with the knowledge and application of traditional medicinal plants, which has been passed down from generation to generation [9]. People choose to use medicinal plants because of the high expense of modern medicine [9]. According to the World Health Organization (WHO), more than 70% of the world's population relies on traditional medicinal herbs for health care [10]. WHO (2009) reported more than 80% of the world's population used traditional herbal therapy to manage infectious diseases caused by their local environment [10]. Traditional medicinal herbs are increasingly being used in various forms all over the world [11]. Ethnobotany is crucial for learning how plants are used in different cultures [11]. Natural remedies derived from plants are now widely regarded as the safest and most effective means of combating infectious infections [12]. For biological exploration and conservation, it is critical to document the use of medicinal plants in a specific region over time [13]. Documentation of anticancer medicinal plants will aid in the development of new medications or herbal products. It has been demonstrated that if the enormous plant diversity of Nigeria is studied, it will give a promising novel anticancer chemical. As a result, using quantitative and qualitative data remains the sole way to obtain information from underutilized Nigerian plants in order to develop new anticancer medication. Through qualitative and quantitative ethnobotanical data, this study attempted to identify the key medicinal plants with anticancer potential in Mubi, Adamawa State, Northeast Nigeria.

2. Materials and Methods

2.1 Study area

Mubi is a town in Adamawa State, Nigeria's Northeast, in the Northern Senatorial District. It is located at 10°16'N, 13°16'E latitude and longitude (Figure 1). Mundang (Godo-godo), Fulani, Gude Nzanyi, Hausa, Fali, Higgi and Marghi are the largest inhabitant towns [9]. Farmers, fishermen, and businesspeople made up the majority of the population. Two distinct weather seasons, rainy and dry, characterize the climatic state [9].

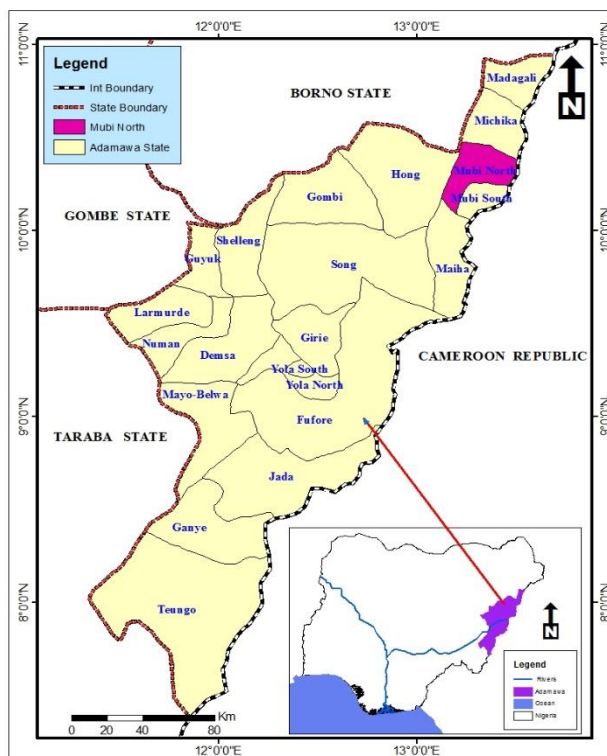


Figure 1: Map of the Study Area Identifying the Sampling Locations

2.2 Sampling and Interview Sessions

Expert sampling and non-random probability were used. No sampling size needed. A semi structured questionnaire was used to collect data from traditional medicine practitioners [9, 10]. Before being used in the study, the questionnaire was pre-tested and validated by three professional botanists. There was no prejudice in the selection of informants. Only traditional herbalist over the age of 45 were asked to participate in the study [10]. There was no prior arrangement with the informants. Informants, on the other hand, were briefed on why the studies were necessary prior to the interview. The informant desires to cooperate voluntarily.

2.3 Plant Collection, Taxonomic Identification and Herbarium Deposition

For the therapeutic plants collected from home gardens and natural environments, herbarium specimens were made. The plants were identified in the field by a botanist, validated in the Agricultural Department of the Federal Polytechnic Mubi in Adamawa State, Nigeria, and eventually put in the school herbarium. Voucher number were assigned (Table 2).

2.4 Data Analysis

For the ethnobotanical data collected, a basic descriptive analysis was used to establish the percentages and frequencies, which were then tallied based on the following information [9, 10]:

- I. Information about the informants' socio-demographics.
- II. Taxonomic profile of the plants, preparation method, administration method, plant parts used, and growth form.
- III. The perspectives of the informants on the use of traditional knowledge in the treatment of cancer
- IV. The following indexes were used to calculate quantitative data:

- a. RFC (Relative Frequency Citation)

The above characteristic was utilized to determine the plant's relative popularity within the community. $RFC = Fc/N$, where Fc is the number of informants who mentioned a certain plant species and N denotes the total number of informants interviewed.

- b. UV (Used Value)

In order to determine the relative importance of a plant the following equation was used : $UV = \sum U_i / N$. Where, U_i = is the total number of uses mentioned by each respondent and N is the total number of informants interviewed [9].

- c. FL (Fidelity Level)

Using the equation below, this parameter was used to determine the ability of a given plant species to cure a specific ailments.: $FL = N_s / N \times 100$. Where N_s = indicates the total number of people who said they used a specific plant species to treat a specific ailment and N = is the total number of informants who cited the plants species during interviewed [9].

3. Results and Discussion

3.1 Demographics profile of the respondents

An ethnobotanical study conducted in Nigeria's northern eastern region focuses on ethno phyto therapeutic cancer medicinal plants. Modern and traditional medicine relied on medicinal plants. Despite significant advances in synthetic organic medicinal products during the twentieth century, over 25% of prescribed medicines in the developed countries are made directly or indirectly from plants [9, 10]. Plants have been used as sources of treatments for a range of ailments since ancient times, and people from many continents, particularly Africa still depend on it [9]. In Nigeria more than 70% of the rural population relies on traditional herbalist to meet their primary health care [9, 14]. A total of thirty two traditional herbalist were interviewed but only eighteen are considered in the following study. Because the eighteen are found to be very knowledge on the treatment of cancer. The sampling method adopted in the study, consider only traditional herbalist with the versatile knowledge of using medicinal plants to treat cancer [10]. The following sampling method was adopted in many traditional

medicinal research all over the world [9, 10]. The following study found predominance of men against women (Table 2). The findings could be linked to the fact that women in Nigerian communities are solely responsible for household activities, and majority of them regard being full-time housewives to be their primary occupation. As a result, they are unable to learn more about traditional therapeutic herbs. The present is in conformity with the previous ethnobotanical research carried out in Nigeria and other part of the world [9, 15-17]. The elderly were discovered to be the community's custodians of traditional medicinal knowledge. (Table 1 and figure 2). The pre-test of the study carried out found the age group bellow 40 years are less knowledgeable or has no knowledge of the traditional medicinal plants in the community. This is due to the present generation are more attached to the urbanization. The study found possible loss of traditional medicinal knowledge in the northern eastern part of Nigeria due lack of interest of the younger generation and the demise of the old people. Similar situation was reported in at some African countries and other part of the world [18, 19]. More 50% of the interviewed informants do not attend basic education only 27.8% attended (Table 1). Despite basic education is compulsory in Nigeria. But all the informants have attended and still obtaining religious knowledge. 33.3 of the interviewed informants has more than 30 years of traditional medicinal practice (Table 2 and figure 3).

Table 1: Demographic Profile of the Informants

Gender	Frequency	Percentage
Male	13	72.2
Female	5	27.8
Age		
40-50	3	16.7
51-60	3	16.7
61-70	8	44.4
71->	4	22.2
Education		
Basic education	5	27.8
Post basic education	2	11.1
Tertiary	1	5.6
None	10	55.6

3.2 Taxonomic Domestication of Medicinal plants Used for the treatment of Cancer

Detailed information about traditional medicinal plants used to treat cancer by the people of Mubi, Adamawa State, Nigeria (Table 2). The scientific names, family names, common names, vernacular names, portion used, method of preparation, and route of administration for the plants documented

during the study period are listed in Table 2. Many plants were reported during the in depth interview but only ten were consider most effective medicinal plants in the community to treat cancer based on the quantitative indices. Only plants species with high UV, RFC and FL were reported (Table 3). The maximum value for UV and RFC is 1 [9, 10].

Table 2: Medicinal Plants Utilisation and Domestication Status for the treatment of Cancer in Mubi, Nigeria

S/N	Species name	Family name	Common Name	Local Name	Part of the plant Used	Method of preparation	Method of administration	Domestication Status	Voucher No
1	<i>Adansonia digitata</i> L.	Malvaceae	African baobab	Kuka	Leaves	Decoction	Oral	Wild	IL 360
2	<i>Boswellia dalzielii</i> Hutch.	Burseraceae	Frankincense tree	Harrabi	Bark	Decoction	Oral	Wild	IL 358
3	<i>Commiphora africana</i> (A.Rich.) Endl.	Burseraceae	African myrrh	Dashi	Leaves	Decoction	Oral	Wild	IL 366
4	<i>Detarium microcarpum</i> Guill. & Perr	Fabaceae	sweet detar	Taura	Leaves, Bark, Root	Decoction, Infusion	Oral	Wild	IL 357
5	<i>Dialium guineense</i> Willd.	Fabaceae	Velvet tamarind	Tsamiyan biri	Leaves	Decoction, mercuration	Oral	Wild	IL 361
6	<i>Guiera senegalensis</i> J.F. Gmel	Combretaceae	Sabara	Sabara	Leaves	Decoction	Oral, Dermal	Wild	IL 362
7	<i>Leptadenia hastata</i> (Pers.) Decne	Asclepiadaceae	Anvara	Yadiya	Leaves	Decoction	Oral, dermal	Wild	IL 363
8	<i>Mangifera indica</i> L.	Anacardiaceae	Mango	Mangoro	Leaves	Decoction	Oral	Wild, Cultivated	IL 365
9	<i>Neolamarckia cadamba</i> (Roxb.) Bosser	Rubiaceae	Burflower tree	Kadam	Leaves	Decoction	Oral	Wild	IL 359
10	<i>Prosopis africana</i> (Guill. & Perr.) Taub.	Fabaceae	Iron tree	Kiriya	Leaves	Decoction	Oral	Wild	IL 364

Note: S/N =Serial Number

Table 3: Quantitative Evaluation of the Documented Medicinal Plants

S/N	Species Name	UV	RFC	FL%
1	<i>Adansonia digitata</i> L.	0.8	1	94
2	<i>Boswellia dalzielii</i> Hutch.	0.7	1	88
3	<i>Commiphora africana</i> (A.Rich.) Endl.	0.8	1	88
4	<i>Detarium microcarpum</i> Guill. & Perr	0.8	1	94
5	<i>Dialium guineense</i> Willd.	0.7	1	88
6	<i>Guiera senegalensis</i> J.F. Gmel	0.9	1	94
7	<i>Leptadenia hastata</i> (Pers.) Decne	0.8	1	88
8	<i>Mangifera indica</i> L	0.7	1	100
9	<i>Neolamarckia cadamba</i> (Roxb.) Bosser	0.9	1	100
10	<i>Prosopis africana</i> (Guill. & Perr.) Taub.	0.9	1	94

Note: S/N =Serial Number

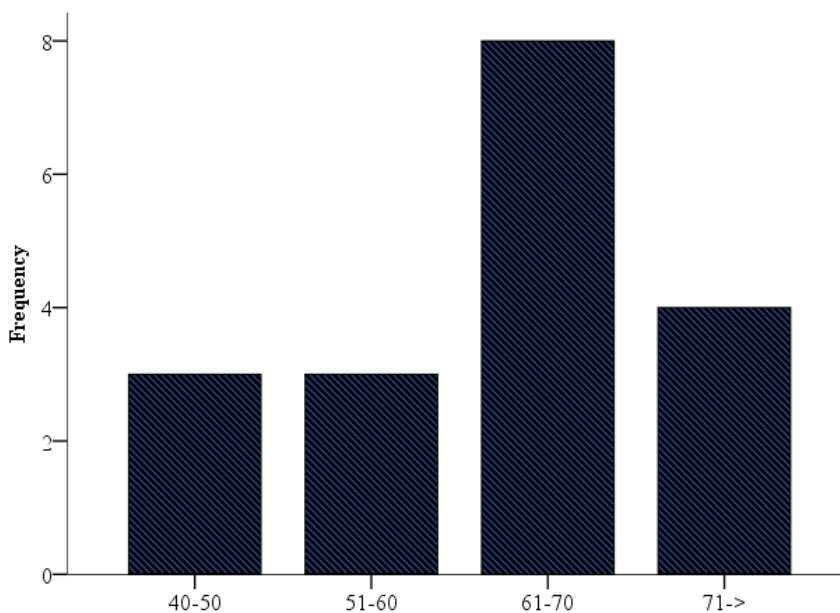


Figure 2: Age distribution of the informants in Mubi, Nigeria

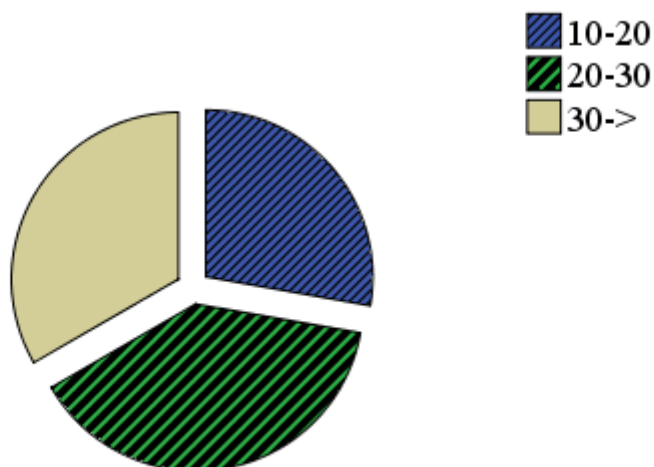


Figure 3: Experience of the informants in Traditional medicinal practice in Mubi, Nigeria

3.3 Parts of the plants Used, Method of Preparation, Dosage, Administration and Domestication status

Excessive use of plant parts has the potential to lead to the extinction of medicinal plants in Nigeria [15]. Leaves were found to be the most utilised plants parts (57.1) followed by bark (28.6%) and root (14.3%) (Figure 4) This study discovered that the leaves are frequently used, most likely because secondary metabolites are predominantly produced in the leaves, where photosynthesis occurs, and then transferred to other sections of the plant. It could also be because the leaves are easier to harvest than other parts of the plant, such as the root and bark. The study did not correspond on the ethno botanical studies carried out in other part of Nigeria [16, 20]. They reported root as the most utilised part of medicinal plants and this caused a serious challenge to the biodiversity. Decoction is most utilised form of preparation of the medicinal plants parts collected for the management of cancer (57.1%) while infusion (33.3%) and maceration (9.5%) all with aid of water (Figure 5). Decoction utilisation is as a results of the hot water extraction, which enable extractions of more substances from plant pars, including the elements that give the plant its therapeutic potential. Doction have mostly reported as the most prepared method [15, 20].

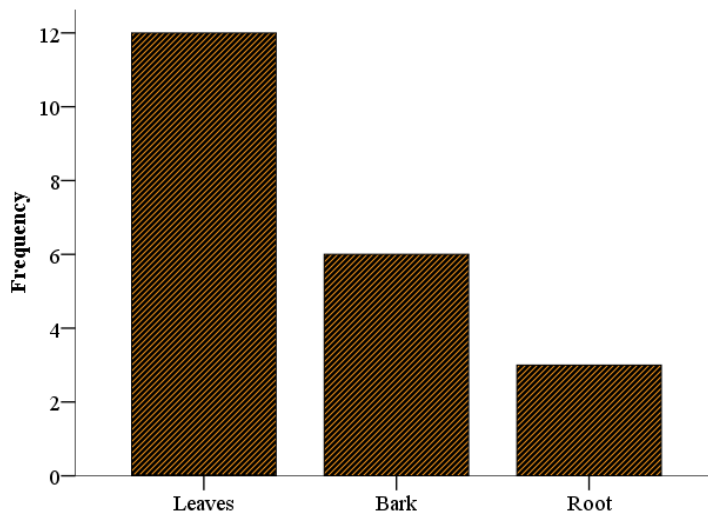


Figure 4: Parts of the plant Utilised in Traditional medicinal practice in Mubi, Nigeria

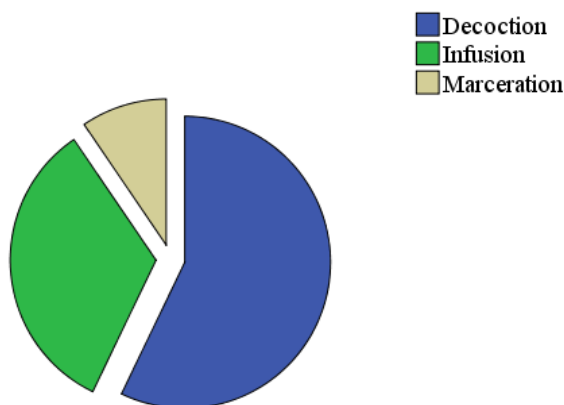


Figure 5: Method of Preparation of Traditional Medicinal Plants in Mubi, Nigeria

Although some traditional herbalists have reported that the factor of age and the severity of the disease, the discrepancy or variation may be as a result of learned traditional knowledge from the elders or experience gained from the community, there is no specific dosage recommended for patients to take. Despite the fact that it was certified safe for consumption by the traditional herbalist, this created a serious dilemma; it may still be hazardous because it had not been properly validated. The informants reported using medicinal plant parts largely in dried form, however this is due to the fact that the plants are wild, and they are sometimes frightened that the plant will dry entirely after the rainy season, so they harvest in excess to save for future use. The effectiveness of the oral (71.4%) and dermal (28.6%) methods was reported by the informants, respectively (Figure 6). The extract's synergistic action on the targeted tissue was the source of its effectiveness [9, 15].

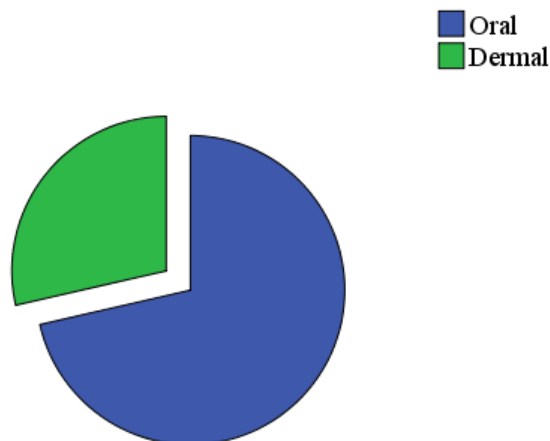


Figure 6: Method of Administration of Traditional Medicinal Plants in Mubi, Nigeria

3.4 Medicinal Plants toxicity

The ethnomedicinal data collected from the respondents provide light on the toxicity of medicinal herbs used to cure cancer. According to their experience with traditional plant knowledge, using plants to treat diseases has no negative side effects. However, some people believe it can be hazardous if consumed in large quantities or if the wrong prescription is taken. The findings are in line with those of many other traditional medicinal plant studies [9, 21]. Before certifying therapeutic plants to be nontoxic, proper scientific validation must be completed.

4. Conclusion

Mubi, Adamawa state, Nigeria's north eastern region, is well-versed in their culture's use of traditional medicinal plants for cancer therapy. Despite the younger generation's interest on the traditional medicinal plants utilisation, the study found that only the elderly are the custodians of knowledge. As a result, the study suggests conducting a comprehensive ethnobotanical examination of the community on other ailments before the demise of the elderly. The findings will serve as a foundation for subsequent research into developing natural medicine or modern medications to prevent the extinction of the species.

5. Acknowledgements

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6. Conflict of interest

Author do not have any conflict of interests to declare. The author alone are responsible for the content of the paper.

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