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Ethno-medicinal survey of tree species among the Inhabitants of zing local government area of Taraba state, Nigeria

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Abstract
An ethnomedicinal survey was conducted to document the medicinal tree species used in treatment of various ailments in Zing Local Government Area of Taraba State, Nigeria. A total of 90 respondents were interviewed and 30 copies of questionnaire was administered in each of the (3) wards (Zing B, Bitako and Monkin A) that was purposively chosen for the study on the ethno-medicinal tree species, tree parts, methods of preparation and mode of administration of treatment to various ailments. A total of 19 tree species were documented. The leaves, barks, flowers, fruits, roots of the trees were used in treatment of ailments such as diarrhea, dysentery, cough, skin burn, and liver protection. Majority of respondents 43.3% found the medicinal tree species to be very effective, 32.2% effective while 5.6% believed the plants were not effective. The frequency of citation of the tree species range from 51 to 89 indicating high acceptability, awareness and usage of the medicinal tree species among the inhabitants. Pearson Correlation test (r = 0.985) indicated a positive correlation between the age and number of medicinal trees cited $p<0.01$. This study has shown the presence of some vital medicinal tree species in the study area and documentation of the ethno-medicinal knowledge may contribute to the development of new drugs.

Keywords: Ethno-medicinal survey, tree species, inhabitants

Introduction
Medicinal plants are plants whose part such as leaves, stem, roots, seeds and flowers can be used for traditional therapeutic purposes or serve as precursors for the synthesis of modern drugs. They also include microscopic plants such as fungi used in the manufacture of certain antibiotics in traditional medicine, therapeutic preparations are made as concoction from many ingredients decoction (aqueous extract) and infusion from boiling water (Abayomi, 2006) [2]. Medicinal plants have been used since history of mankind (Odhiambo *et al.,* 2011, Meaza *et al.,* 2015) [13, 8]. From ancient times, plants have been rich resources of effective and safe medicines (Rusell *et al.,* 2006) [14]. Traditional herbal medicine has been a constant source of substances for the treatment of variety of diseases (Yuan *et al.,* 2016) [23]. Millions of people depend partially or completely on natural products harvested from natural areas for medicinal purposes. Millenium Ecosystem Assessment (MEA, 2005) [9] reported the importance of medicinal plants as fundamental elements of traditional medical practices. According to the World Health Organization, between 75 and 80% of the world's population uses traditional folks medicines (World Health Organization, 2019) [19]. And due to the efficacy of traditional herbal medicine, approximately 60-70% of the people in rural areas depends on it for their immediate medical care (World Health Organization, 1978, 2013) [22, 20]. The various parts of local tree species used for medicinal purposes includes barks, resins, fruits, foots leaves, seeds and flowers. The use of medicinal plants is common in both rural and urban areas and medicinal plants are sold by herbs vendors in public markets throughout the country and some parts of the world. Medicinal tree species will continue to play significant roles in both rural and peri-urban health care services as evident of the number of herbals practitioners in Nigeria today. The World Health Organization (2004) [21], reported that despite all advances made in orthodox medicine, traditional medicine will continue to gain renewed interest in healthcare services of Nigerians. This may be attributable to increased awareness in the portential and curative ability of this alternative medicines and in particular the various shortcomings revealed for synthetics drugs (Ugbogu and Odewo, 2004) [18].

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The vast body of indigenous knowledge concerning biodiversity is vanishing with the destruction of ecosystems, traditions and cultures throughout the world. The destruction has led to increased awareness of the necessity of ethno-medicinal research. Medicinal tree species provides health security to millions of rural people all over the world. According to World Health Organization (WHO) estimation over 80% of people in developing countries depend on traditional medicines for their primary health needs (Fansworth and Soejarto, 1991) [3].

Demand for medicinal tree species is increasing in both developing and developed countries due to growing recognition of natural products, being non-alcoholic, having no side effects, easing availability at affordable price and often the only source of health care facility available to poor communities. However, over harvesting, deforestation, agricultural encroachment, environmental degradation and alarming population growth with increasing demand and consumption are the principal problems which aggravate the rate of extinction of medicinal plants from the habitat and consequently the loss of important resources of globally significant plant species (Tesfaye *et al*, 2006) [17].

Therefore there is need to harness, preserve and share indigenous knowledge of medicinal tree species, especially in this modern era where emphasis is on sustainable management for posterity. This study aims to identify and document medicinal tree species, level of acceptance and how they are used to treat various ailments among the inhabitants of Zing Local Government Area of Adamawa State, Nigeria.

Materials and Methods
Study area: The study was conducted in three wards (Zing B, Bitako and Monkin A) in Zing Local Government Area of Adamawa State. It is located between 8° 43'30N, 90°'0N and longitude 11°35'59E, 11°55'OE. The Local Government has an area of $1,030_{km}{}^2$. Taraba State is a bordered on the North West by Gombe State, West by Plateau and Nassarawa boundary with Benue State. An International boundary on the east separates Taraba State from the republic of Cameroon. The state is made of 16 Local Government Areas and three major ecological zones which include, Southern Guinea Savanna located in the South Western part of the State, Northern Guinea Savanna in the North East and Montane forest in the South East. (GIS Laboratory Geography Department MAU, Yola 2021) [4]. The climate is typically of the tropical with a marked of dry and raining season. The raining season spread over a period of seven months from April to October with a mean annual rainfall that range from 819-1761mm and a dry season that span from November to March with a mean of annual temperature of about 28°C (Yusufand Ray, 2011) [24]. The vegetation of Zing Local Government Area is characterized by low grass, and medium tree, the Local Government is covered by Mountains and the ecological zone is Northern Guinea Savanna. Some of the tree species found in the study area *Anona senegalensis, Bombax costatum, Daniella olivera, Prosopis africana, Terminalia ancennoides* etc.
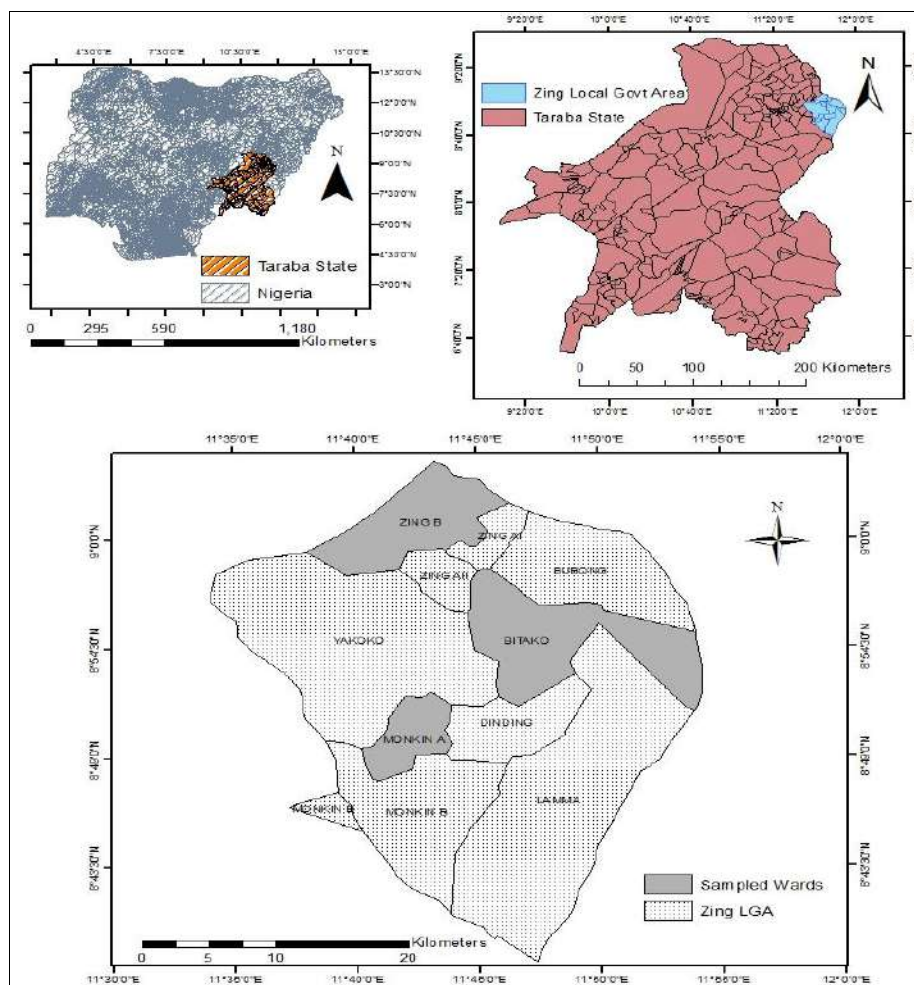

Fig 1: Map of the study area

Data Collection and Analysis

A Semi-Structured questionnaire was used in obtaining information on medicinal tree species used in the treatment of various ailments in the study area. Interviews were conducted with a fairly open frame work that allowed for focused, conversational and two-way communication as suggested by Kayode *et al* (2009) [7]. A total number of 90 respondents were interviewed. The respondents consisted of men and women particularly traditional healers, herb sellers and buyers (Patronizer). Descriptive statistical tools involving the use frequency tables and percentages were used for analyzing socio-demographic characteristics of respondents, plant parts used, effectiveness of the medicinal tree species, methods of preparation, and mode of administration of treatment. The frequency of citation (FC) of the tree species which indicates the fidelity level of awareness and usage of species among the respondents were calculated as adopted by Koyode *et al.,* (2015) [7].

Using the formula: Fc = Nr X 100/N

Where,
Nr= the Number of respondents that mentioned the species.

N= the total number of respondents interviewed

Pearson correlation test was used in determining the correlation of medicinal tree knowledge with age.

Results and Discussion

Socio –demographic characteristics of the respondents

Gender of the respondents: The study showed that male respondents were 34.4% (Table 1). This implies that most responsibilities are carried out by males.

Age distribution of the respondents

Table 1 revealed that 27.8% of the respondents were within the age class 0f 41-45 years, while 21.1% accounted for respondents between 36-40 years, 17.8% were 31-35 years, 14.4% of the respondents 26-30 years, 12.2% were 21-25 years and 6.7% were between ages of 18-20 years. The mean age of respondents is 33.95 ± 19.28 years. This indicates that most of the respondents were in their youthful age and this could make it easier for the acceptability of any conservation programs that could be introduced to the study area to prevent the over exploitation of the medicinal tree species found in the area.

Table 1: Socio-demographic characteristics of the respondents

Variable	Category	Number of respondents	Percentage (%)
Gender	Male	59	65.6
	Female	31	34.4
	Total	90	100
Age class	18-20	6	6.7
	21-25	11	12.2
	26-30	13	14.4
	31-35	16	17.8
	36-40	19	21.1
	41-45	25	27.8
	Total	90	100
	Mean age	33.95± 19.28	
Education	Primary	28	31.2
	Secondary	26	28.9
	Tertiary	7	7.7
	Non-formal education	29	32.2
	Total	90	100
Occupation	Farmers	38	42.3
	Trading	18	20.0
	Civil servant	7	7.7
	Herbs seller	27	30.0
	Total	90	100

Education level

The study showed that 31.2% of the respondents had attained primary education as their highest level of education, 28.9% secondary school education, 7.7% tertiary while 32.2% had never gone to school (Table 1). This means awareness should be created among the users of forest about the danger of over exploitation of their resources. The awareness according to Gabon (1993) [5] will among others help in the control of poaching bush burning and indiscriminate harvest of resources.
The traditional users if fully enlightened will go a long way in creating awareness to their communities on the importance of sustaining biodiversity (Myers, *et al.,* 2001) [10]. Sinilin (2001) [16] reported that creating awareness about the importance of biodiversity conservation is important because one needs to know what he stands to gain from his action

Occupation

Table 1 showed the occupation of the respondents. Farming was found to be the major occupation with 42.3% engaged as farmers, which was followed by herb sellers with 30%, 7.7% are civil servants while traders 20%. The high number of herb sellers indicate that the inhabitant patronize or use the medicinal tree species in treating various ailments affecting them hence selling herbs is a lucrative business in the study area. Munson (1994) [11] reported that the demand for items such as rhino horns, timber varieties of herbs for traditional medicine etc. in most part of Africa and Asia, the strong Market for such items made man to over exploit this resources beyond their productive base.

Cost of medicinal tree species

The study showed that majority of the respondents 47.8% got the medicinal part of the tree species difficultly and

cheap, 31.1% easy and cheap while 21.1% difficult and expensive (Table 2). This indicate that due to the over exploitation/unsustainable harvest of the resources in the study area, the medicinal tree species are increasingly becoming difficult to be found hence the urgent need for conservation of biodiversity.

Table 2: Access/Cost of part(s) of medicinal tree species and their effectiveness

Variables	Category	No. of respondents	Percentage (%)
Access/ Cost	Easy and cheap	28	31.1
	Difficult and cheap	43	47.8
	Difficult and expensive	19	21.1
	Total	90	100
Effectiveness	Very effective	39	43.3
	Effective	29	32.2
	Poorly effective	17	18.9
	Not effective	5	5.6
	Total	90	100

Effectiveness of the medicinal tree species
The study showed that 43.3% of the respondents observed that the medicinal tree species in the study area are very effective, 32.2% effective while 5.6% not effective (Table 2). The medicinal tree species have few or no side effect and cure permanently than orthodox medicine and could save the nation huge foreign exchange that can be converted to other use which will help further national development (Arowosegbe *et al*., 2015, Kayode *et al*., 2015) [1, 6].

Medicinal Tree Species used in treatments of various ailments
Table 3 showed the different medicinal tree species, used for treatment of ailments, preparations and mode of administration of the treatments among the inhabitants in the study area. Leaves and roots of *Vitex doniana* were used for treatment of diarrhea and dysentery, fruit and bark of *Bitryospermum paradoxum* were used for treatment of skin condition such as burn. The root, gum, flower and seeds of *Moringa oleifera* were used for liver protection, aneamia, and asthma. The traditional use of some parts of medicinal tree species in treating ailments by the rural dwellers is a common practice that has been and found effective even when the used of orthodox has failed. It was reported by Yakubu *et al.,* (2007) [25] in an ethno botanical survey where it was revealed several reason for using medicinal plants in the management of diseases in Nigeria.

Table 3: List of medicinal tree species used for the treatment of various ailments in zing local government area of Taraba State

S. No.	Tree Name	Family Name/ Common Name	Local Name (Hausa)	Part used	Preparation/Mode of treatment	Disease treated
1	*Vitex doniana*	*Lamiaceae/*Black plum	Dinya	Leaves, Roots	Sundried, powdered/oral	Diarrhoea and dysentery
2	*Ficus polita*	*Moraceae/*Rubber plant	Durumi	Bark, Leaves	Sundried, powdered/oral	Infectious disease, abdominal pain. Diarrhoea
3	*Balanite aegyptiaca*	*Zygophyllacea/*Desert date	Aduwa	Bark, Fruit, Leaves	Boiled/oral	Jaundice, intestinal worm infection, and asthma
4	*Butyrospermum paradoxum*	*Sapotaceae/*Shea butter	Kadanya	Fruit, Bark	Sundried, powdered/topical	Skin condition such as burn
5	*Ficus thonningii*	*Moraceae/*Strangler fig	Chediya	Leaves, Roots	Boiled/oral	Urinary track infection, diabetes
6	*Eucalyptus Camaldulensis*	*Myrtaceae/*River red gum	Bishiyar turare	Roots, Leaves	Boiled/oral	Cough remedy, Anti septic
7	*Parkia biglobosa*	*Fabaceae/*African locust beans	Dorowa	Leaves	Boiled/oral	Severe cough and bronchitis
8	*Azadirachta indica*	*Meliaceae/*Neem tree	Bishiyan maina	Bark, Leaves, Seeds	Boiled/oral	Treat fungal infection increase immunity
9	*Tamarindus indica*	*Fabaceae/*Tamarind	Tsamiya	Leaves, Fruit	Boiled/oral	Abdominal pain, Fever
10	*Adonsonia digitata*	*Bombaceae/* Baobab tree	Kuka	Leaves, Bark, Seeds	Sundried, powdered/oral	Tuberculosis, Aneamia, Fever, Microbial infection
11	*Piliostigma reticulatum*	*Fabaceae/*Purple orchid tree	Kalgo	Stem, Bark, Leaves	Boiled/topical	Anti-bacterial properties
12	*Ziziphus–spina-chriti*	*Rhamnaceae/*Christ thorn jugube	Magarya	Bark, stem	Sundried, powdered/topical	Dandruff, Wound ulcer, cure eye diseases
13	*Detarium miccrocarpum*	*Fabaceae/* Sweet detar	Taura	Roots, Bark, Leaves	Boiled/oral	Tuberculosis, Diarrhea, meningitis
14	*Fardherbia albida*	*Fabaceae/*Apple-ring acacia	Gawo	Roots, Bark	Boiled/oral	Respiratory infection, Digestive disorder
15	*Magnifera indica*	*Anacardiaceae/*Mango	Mangwaro	Leaves, Bark, Fruit, Flower	Sundried, powdered/boiling oral	Bleeding haemorrhages, Antibiotic activity
16	*Moringa oleifera*	*Moringaceae/*Horseradish tree	Zogale	Root, Gum, Flower, Seeds	Boiled/oral	Liver protection, Anaemia, Asthma,
17	*Annona senegalensis*	*Annonaceae/*African-custard apple	Gwanda Daji	Bark, stem, Leaves	Boiled/oral	Respiratory, eye and skin diseases
18	*Prosopis africana*	*Malvaceae/* African mesquite	Kiriya	Leaves, Bark	Boiled/oral	Headache and toothache
19	*Bombaz costatum*	*Malvaceae/*Red kapok tree	Kurya	Bark and Leaves	Sundried, powdered/oral	Fever, Diarrhoea and Gonorrhoea

Fidelity level index
The respondent frequency of citation of the medicinal tree species ranged from 51 and 89 (Table 4). The result showed high acceptability, awareness and usage of the medicinal trees among inhabitants of the study area. This agrees with the findings of Olanipekun *et al.,* (2016) [12] and Kayode *et al.,* (2015) [6] who reported a high level of awareness, importance and acceptability of medicinal species among the respondents.

Table 4: Fidelity level index of the medicinal tree spices in the study area

S. No.	Tree species	Frequency of citation
1	*Vitex doniana*	73
2	*Ficus polita*	56
3	*Balanite aegyptiaca*	65
4	*Butyrospermum paradoxum*	67
5	*Ficus thonmingii*	80
6	*Eucalyptus camaldulensis*	81
7	*Parkia biglobosa*	86
8	*Azadirachta indica*	75
9	*Tamarindus indica*	59
10	*Adonsonia digitata*	66
11	*Piliostigma recticulatum*	53
12	*Ziziphus spina chriti*	51
13	*Deterium microcarpum*	72
14	*Fardherbia albida*	60
15	*Magnifera indica*	79
16	*Moringa oleifera*	89
17	*Annona senegalensis*	82
18	*Prosopis africana*	56
19	*Bombax costatum*	54

Medicinal plant knowledge versus age classes of the respondents

This study showed that the Pearson correlation (r= 0.985) test, from Table 5, showed a positive correlation between age of the respondents and the number of medicinal trees reported $p < 0.01$. This agrees with the findings of Seid and Tsegay (2011) [15] who reported the presents of significant correlation between age and medicinal plant knowledge.

Table 5: Age classes of the respondents and average medicinal trees reported in the study area

Age class	Average medicinal trees reported
18-20	6.7
21-25	7.1
26-30	7.2
31-35	7.5
36-40	7.6
41-45	8.0

Correlation .985 is significant at the 0.01 level (2 tailed)

Conclusion

The communities of Zing Local Government Area used medicinal trees for maintaining their primary healthcare. A total of nineteen (19) medicinal tree species used for treating various human ailments were documented. However, despite all these benefits, the future existence of medicinal trees and associate knowledge is under serious threat because of ongoing practice of deforestation, over exploitation, free grazing, and fire. Therefore, there is need for sustainable management and conservation of biodiversity in the study area.

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