



Ethnomedicinal Survey of Woody Species of Tiyin District, Warji Local Government Area of Bauchi State, Nigeria.

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Abstract

An investigation on the ethnomedicinal survey of woody species in Tiyin District of Warji Local Government Area of Bauchi State Nigeria was embarked upon with the aim of documenting the medicinal plants useful in the treatment of diseases. The survey involved a stratified random sampling method and interviews. A total of 36 species belonging to 29 genera in 19 families was obtained. The trees were dominant with 24 species while the shrubs constituted 12 species. The family Fabaceae comprising members of Caesalpinioideae and Mimosoideae had the highest number of plants (9) represented. Leaves were the most commonly used part for curing ailments such as diarrhea, fever, constipation, wounds and indigestion. Nineteen (19) species were used for the treatment of gastro intestinal disorders, twelve (12) were also used for inflammatory disease, while nine (9) were useful in the treatment of pains and fever. The most common methods used for preparation of these plants were infusion and decoction. The amount of medicinal plants and rate of dose are based on patient condition, health, age, and disease severity. In any instance, phytochemical screening of all plants is necessary to validate the local traditional knowledge and search for different compounds for the current allopathic medicines.

Keywords: Ethnomedicine, Medicinal Plant, Tiyin district, Ailment and Treatment

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Introduction

Ethnomedicinal studies have reported useful plant species in Nigeria (Chukwuma *et al.*, 2019; Soladoye *et al.*, 2018). While the knowledge on the usefulness of these plants remain height poor methods of exploitation due to fuel wood, agriculture and climate change are putting most species under pressure of local extermination (Umar *et al.*, 2020). Ethnobotanical data generated from historical, religious, literary, linguistic, and pharmacological viewpoints serve as useful information regarding indigenous flora of Nigeria (Chukwuma *et al.*, 2015). Traditional systems of medicine continue to be widely practiced on many accounts. Population rise,

low source of income, high-prices of treatments, side effects of several allopathic drugs and development of resistance to currently used drugs for infectious diseases have led to increased emphasis on the use of plant materials as sources of medicine for a wide variety of human ailments. Herbs are staging a response and herbal ‘renaissance’ is happening all over the globe. The herbal products today signify safety in contrast to the synthetics that are regarded as unsafe to human and environment. Although herbs had been priced for their medicinal, flavoring and aromatic qualities for centuries, the synthetic products of the modern age surpassed their importance, for a while. However, the over

dependence on synthetics is dwindling, and people are returning to the naturals with hope of safety and security (Bhatta and Datta 2018).

Tiyin community of Warji local government area is mainly dominated by subsistence farmers who rely mostly on raining season and dry farming, woody species are very important and useful (Legwaila *et al.*, 2011). The vegetation of the area is becoming so scarce due to anthropogenic activities, and in a short while some of the species could be extinct. Although the Tiyin community in Warji still depend on their ethnomedicinal knowledge for primary health care, it is easy to lose this attribute as the world progresses towards modernization. Therefore, by conducting proper documentation, existing ethnomedicinal knowledge could be maintained and not easily manipulated.

Traditional medicinal plants have become well-known, and many have now found their way in to western medicinal treatment and aromatherapy (Abdullahi, 2010). The World Health Organization has estimated that over 80% of the global population relies chiefly on traditional medicine (Oyebode, *et al.*, 2016). These traditional remedies with a considerable extent of effectiveness, are socially accepted, economically viable and mostly are the only available means (Salmeron and Manzano, 2020).

Ethnobotanical studies in Nigeria were initially carried out generally on the uses of plants by different ethnic groups (Bhat *et al.*, 1990; Fasola and Egunyomi, 2005; Aiyeloja and Bello, 2006; Erinoso and Aworinde, 2012; Ariwaodo *et al.*, 2012; Umar *et al.*, 2020). Later specific research works, classified as ethnomedicine, ranging from plants used in the management of arthritis (Gbadamosi and Oloyede, 2014), sickle cell anaemia (Egunyomi *et al.*, 2009; Gbadamosi *et al.*, 2012), maternal healthcare (Kankara *et al.*, 2015), sexually transmitted infections (Gbadamosi and Egunyomi, 2014), diabetics (Bello *et al.*, 2011b; Laleye *et al.*, 2015), breast cancer (Gbadamosi and Erinoso, 2016), infant illnesses (Aworinde and

Erinoso, 2015), to skin infections (Ajibesin, 2012; Gbadamosi and Oyedele, 2012; Erinoso *et al.*, 2016), malaria (Zakariya *et al.*, 2021), HIV aids (Shehu *et al.*, 2018; Kankara *et al.*, 2022) etc. were conducted and reported.

Indigenous knowledge has been reported to be significant in the preservation of natural resources and biodiversity in Nigeria (Umar *et al.*, 2020) However, traditional knowledge on natural resource management becomes more successful when integrated with the modern conservation approaches (Lifongo *et al.*, 2014). The importance of local knowledge on natural resource management has captured global attention and various conservation organizations are now involving the locals in their management programmes (Geldman *et al.*, 2019). Therefore, exploitation of medicinal plants for sustaining health care needs by local people has a long tradition in Nigeria and is becoming increasingly popular among rural and urban communities (Chukwuma *et al.*, 2015).

This paper aimed at documenting plants used for the treatment of ailments in the study area guided by ethnomedicinal knowledge of the Tiyin community of Warji. To the best of our knowledge, no previous ethnomedicinal study has been conducted in this community. The new information gained from this study might initiate further studies to exploring the phytochemicals of the plants, supporting the sustainability of traditional herbal medicine in local community and conserving plants diversity.

Materials and Methods

Description of the Study Area

Tiyin District is located in Warji Local government area of Bauchi State (Fig 1), and located in part of the Sudan Savanna between Longitude 11° 18' 0" N and Latitude 9° 53' 0". It is located at the North Western part of Warji Local Government Area, and shares boundaries with Gwaram local government area of Jigawa State.

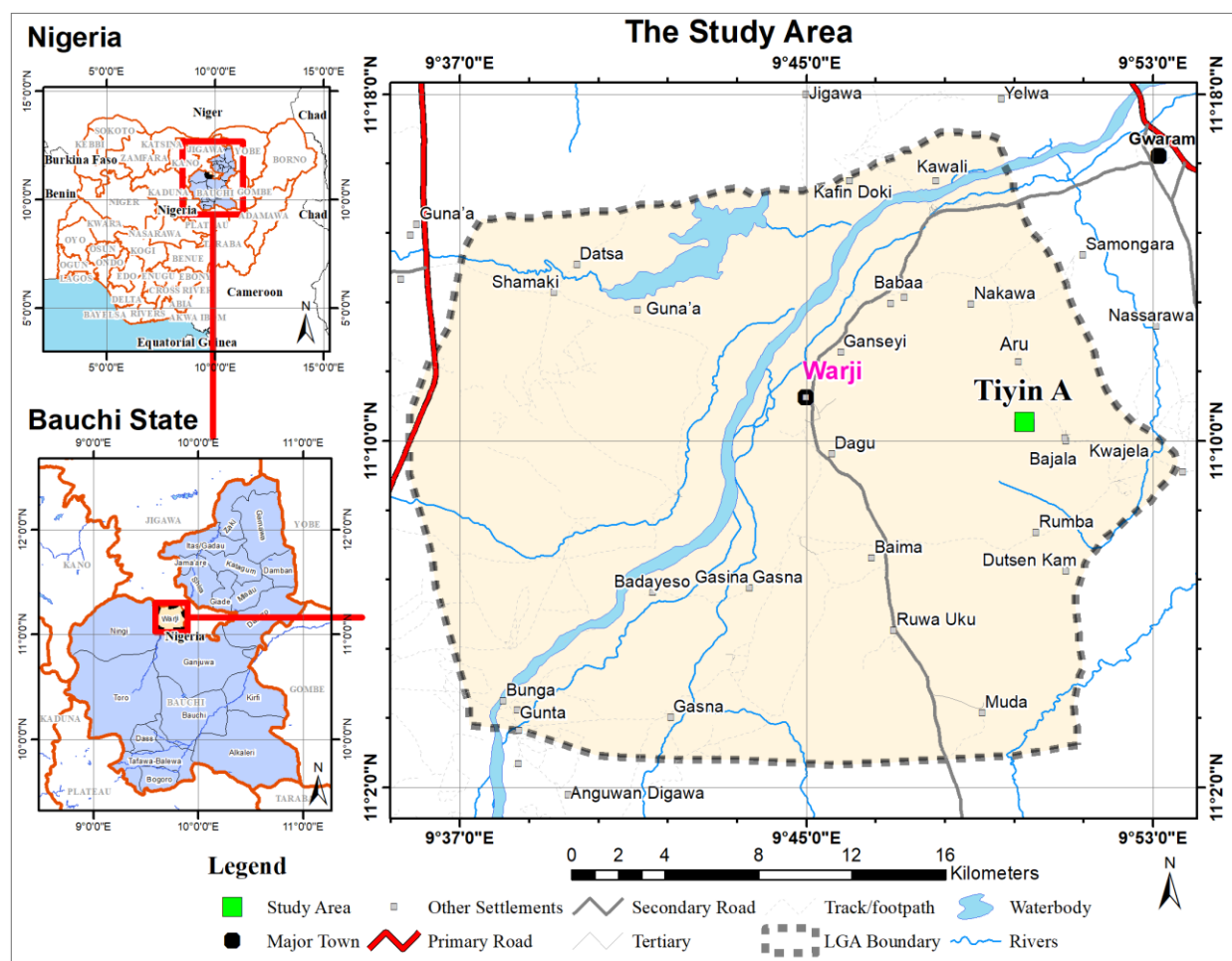


Figure 1: Map of the Study Area

Data Collection and species identification

The study was conducted following ethical guidelines from the Department of botany, Gombe state University. Fieldwork was conducted between April and May 2022. Data were collected based on Oral interview with the aid of semi structured questionnaire, and only from willing respondents whose responses were carefully noted. The authors and one community leader - -Sarkin Baka took the interviewers during day time to different places where the reported medicinal plants were collected and an account of their local names and medicinal uses were also obtained.

The plants were collected and identified using relevant literatures, and all information was properly cross-checked. Specifically, plant specimens were collected and photographed and brought to the Department of Botany, Gombe State University for

proper identification with the assistant of the herbarium curator, and voucher numbers were assigned accordingly.

Data Analysis

Tables and graphs were generated in using Microsoft Excel 2010. Data from the transcribed interviews were analysed qualitatively using descriptive statistics. Thematic analysis, which was derived from the informants, was assigned concept codes using codebook following Umar *et al.* (2020). Reported uses of the medicinal plants, their mode of preparation and administration were compared with those of previous work.

Results and Discussion

Plant Families, Habitat

The ethnomedicinal knowledge about the plants are summarised in Table 1. A total of 36 species of medicinal plants were

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documented in this study. From this study 29 genera and 19 angiosperm families were presented, indicating that the identified medicinal plants were taxonomically diversified. The most represented families were Fabaceae with nine (9) species (Caesalpinioideae -5; Mimosoideae - 4), Myrtaceae with four (4) species, and Moraceae with three (3) species respectively.

Anacardiaceae, Annonaceae, Combretaceae and Bombacaceae had two (2) species each while the remaining eleven (11) families (Rhamnaceae, Musaceae, Sapotaceae, Balnitaceae, Lythraceae, Rutaceae, Aricaceae, Caricaceae, Convolvulaceae, Apocynaceae, Oleaceae) were represented by only one species each.

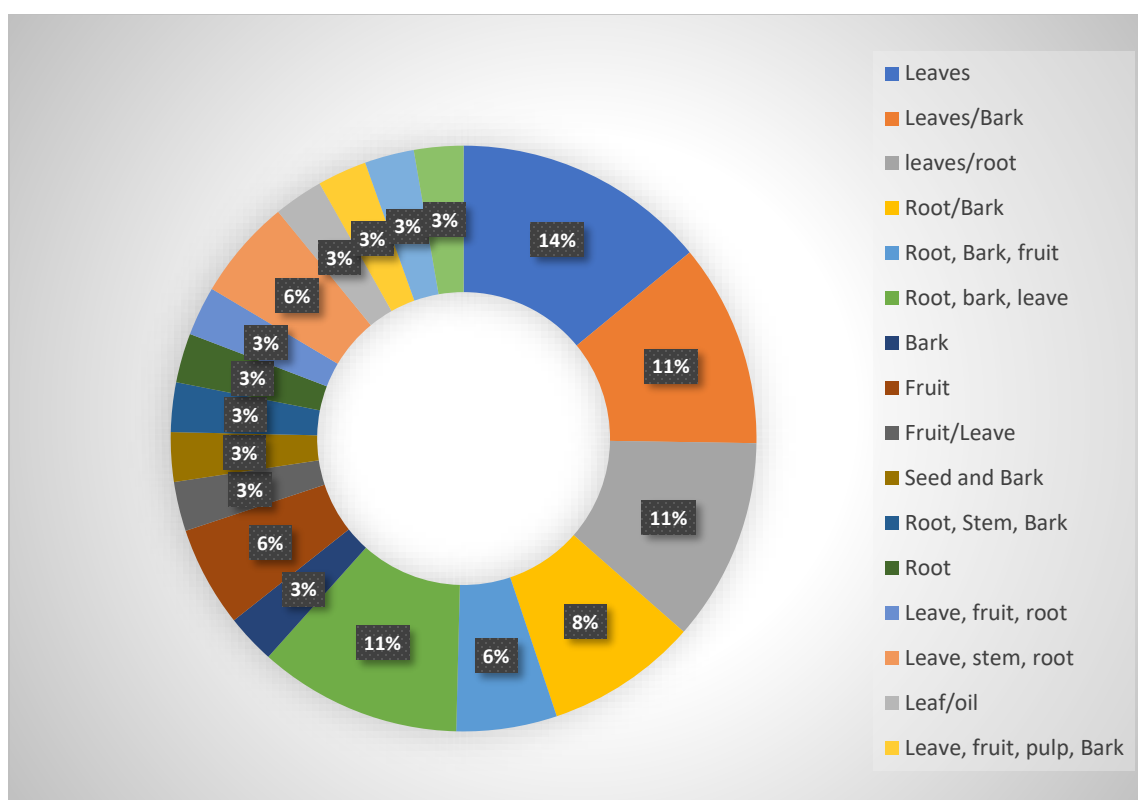


Figure 2: Plant Parts Used

In this study, various plant parts were used for the herbal preparations. Leaves were singly used in such preparations, constituting 14%. This is followed by a combination of leaves and bark, leaves and roots, roots, barks and leaves, all with 11% each. The least utilized were combinations of the leaves, roots, seeds, fruits, oil, pulp and stem barks, which accounted for only 3% of the recipes. According to the informants, the leaves are the most utilized plant part in the Tiyin traditional medicine. This may arise from the fact that leaves act as exudates or photosynthates, and has bioactive secondary metabolites with prodigious medicinal values to the human body (Umair *et al.*, 2019). 26%

of the documented species were used individually, while the remaining 17% were recommended to be used in mixtures. As observed in the present study, a single plant part may be used for the treatment of diverse ailment. For instance, bark and roots of *Mangifera indica* L. was used for the treatment of stomach cleansing and in managing hypertension. However, multiple plant parts from the same plant may be used in treatment of the same ailments. The leaf of *Citrus aurantifolia* L is reported to be used in treating bee sting, loss of appetite, kidney stone and also serve as a good source of Vitamin C respectively.

Table 1: List of Plant Species with their Families, Genera, Habit, Hausa names, Parts used, Uses and Modes of administration in Tiyin District of Warji Local Government Area, Bauchi State, Nigeria.

S/N	Family	Species	Habit	Common names	Hausa names	Uses	Parts used	Modes of administration
1	Anacardiaceae	<i>Haematostaphis barteri</i> Hook F	Tree	Blood plum	Jininkafiri	Treats Stomach Problems	Bark	By infusion with tamarind. One small cup, tree times daily.
		<i>Mangifera indica</i> L	Tree	Mangoes	Mangoro	Treats Bacterial infections to manage hypertension.	Bark and Root	Boiled in water add small potash drink the liquid content 2 cups daily for 3 days
2	Moraceae	<i>Ficus synchomorus</i> L	Tree	Sycamore	Baure	Treats Stomach Problems	Leaf	By Maceration; To be diluted with cold water and taken two times daily
		<i>Ficus sur</i> Forssk	Tree	Café fig	Uwaryara	Treats Haemorrhoids	Root	The mixture to be taken two times daily morning and night
		<i>Ficus thonningii</i> Blume	Tree	Red fig	Chediya	Cleansing after delivery. Treats ring worm in children	Leaves and Bark	Squeezed in water and sieve the liquid content, boil with water take two cups daily.
3	Annonaceae	<i>Annona squamosa</i> L	Shrub	Wild custard apple	Gwandarm asar	Treats constipation of stomach	Root and bark	Pounded mixed with water. Drink the liquid content three times daily
		<i>Annona senegalensis</i> Pers.	Shrub	Wild custard apple	Gwandard aji	Treats cough, urinary tract infections and chest pain. An Antioxidant treats respiratory diseases. Treats Eye and Skin diseases,	Leaf, root	Boiled for 45 minutes in water drink the liquid content 3 times daily for 1 week
4	Combretaceae	<i>Detarium microcarpum</i> Guill. et. Perr.	Tree	Sweet detar	Taura	Controls inflammation	Leafs	Decoction of the dried leaf through oral route. Small cups, morning and afternoon two times daily.
		<i>Guiera senegalensis</i> Gue L	Shrub	Basantom	Sabara	Used for Stomach cleansing, and abdominal pains	Leaves and bark	Boil the leaves and bark, drink the liquid content one glass cup twice daily

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5	Rhamnaceae	<i>Ziziphusspina christi</i> (L.N) Del	Shrub	Jujube	Kuma	Blood cleanser and it treats headaches, pain reliever for snake and scorpion venom	Root and leaf	Boil for fifteen minutes with red potash, drink two glass cup daily for three days
6	Musaceae	<i>Musa paradisiaca</i> L	Shrub	Banana	Ayaba	Promote digestion, treat cancer, hypertension, diarrhea and build tissue in the body. It is a good source of calcium and phosphorus	Leaves, fruit and root	A small cup of infusion to be taken daily morning and evening for 5 days
7	Sapotaceae	<i>Vitellaria paradoxa</i> C.F. Gaertn	Tree	Shea butter	Kadanya	Treats stomach disorders and rheumatism	Seed and bark	Boil for fifteen minutes in water with red potash ship and drink tree times daily
8	Balanitaceae	<i>Balanite aegyptiaca</i> (Linn) Del	Tree	Desert date	Aduwa	Treats cases of diarrhea fever and syphilis	Root and bark	Boiled in water for 20 minutes sieved and drink the content 1/3 cup twice daily for one week
9	Fabaceae: Mimosoidae	<i>Acacia nilotica</i> L.	Tree	White thorn	Gabaruwa	Stomach problem and dysentery	Fresh leaf and bark	Boiled the leafs, root for 30 minutes and sieved twice daily one cup morning ang evening
		<i>Acacia polyacantha</i> L.ex Del	Tree	White thorn	Fararcibiy ar	Treat menstrual problem, treat snake poison	Leaves, Stem and Root.	Boil the extract and drink the content one cup twice for five days
		<i>Parkia biglobosa</i> Jack R. Ba	Tree	Locust bean	Dorawa	Wound healing, treat dysentery	Bark root and fruit	Chew and spit on open wound to fasten the healing. Mix with water and drink the yellow content twice a day
		<i>Albizia ferruginea</i> (Guill. & Perr.) Benth.	Tree	Trade albizia	Siris	Treats dysentery	Root, Stem and Bark	Boil the extract and take a glass cup daily, for three days
	Fabaceae: Caesalpinoidae	<i>Bauhinia rufescens</i> L.	Tree	Mauritania	Jirga	It treats stomach complain and lowers blood pressure	Leaves and fruits	Pounded and boiled the leafs and fruit together with red Potash added and drink the liquid content half cups two times daily

		<i>Senna alata</i> L. Robox	Shrub	Christmas candle	Isa Yoruba	Treat dysentery and skin disease	Leaves, Stem and Bark	Decoction of the mixture to be taken two times daily
		<i>Senna italica</i> Mill	Shrub	Italian senna	Filasko	Treats intestinal worms as abortifacient. Decreases potassium level of the body	Leaves and Fruit and Seed	Decoction of the extract. Small cup to be taken morning, afternoon and evening, three times daily.
		<i>Tamarindus indica</i> L.Wileed ex Del	Tree	Tamarine	Tsamiya	Treats cases of ribs pains. Typhoid and Malaria	Fruit, Bark and Root	Peel the outer layer, soaked in water squeezed drink the liquid with small cup three times daily
		<i>Pilostigma reticulatum</i> DCHochet	Shrub	Camel foot tree	Kalgo	To treat diarrhoea	Root and leafs	Boil in water sieved the liquid content and drink twice daily with a small cup
10	Myrtaceae	<i>Eucalyptus globulus</i> L.	Tree	Southern blue gum	Zaiti	Treats arthritis and, eases cold symptoms and respiratory remedy	Leaf and bark	Added a few drops of Eucalyptus oil rubbing the mixture on to the chest and throat, boil the leaf and stem inhale
		<i>Eucalyptus citriodora</i> Hook	Tree	Lemon scented gum	Itacentur e	Treats Typhoid fever and Malaria	Leaf and root	Boil in hot water for 30 minutes drink the liquid content and bath with water for 3 days daily.
		<i>Eucalyptus camaldulensis</i> L.	Tree	River red gum	BishiyanT urare	Treats Typhoid and Malaria	Leaf and bark	Can be taken orally to hasten digestion,
		<i>Corymbia torellia</i> (F.Muenn) K.D.E Hill	Tree	Scented leaves	Cadaghi	Treats bladder inflammation	Leaves	The leaf oil can be applied to the cut and skin infection. A good source of antimicrobial resistance
11	Lythraceae	<i>Lawsonia intermis</i> L. ex Del	Shrub	Henna	Lalle	Treats skin diseases and arthritis	Leaves, Bark and Root	Soaked the bark in water for 5 hours drink the liquid content 2 cups daily for 5 days
12	Rutaceae	<i>Citrus aurantifolia</i> L.	Tree	Orange	Lemo	To treat bee sting, kidney stone and a good source of vitamin C	Fruit peel, Fruits	The juice is applied to relief pain of the bee stings, ripe fruit is taken as a good source of Vitamin C
13	Caricaceae	<i>Carica papaya</i> L. Wileed ex	Shrub	Pawpaw	Gwanda	To treat Malaria and stop vomiting, Treats Turberculosis	Fruit, latex and leaves	Take unripe fruits first in the morning and taking garlic before bed to treat tuberculosis. Treat men and women impotency

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14	Arecaceae	<i>Borassus ethiopum</i> Mart	Tree	African palm	Gigingya	Treats fresh wound and skin rashes, good source of vitamin A	Fruits kernel oil and fresh leaves	Juice from the fresh leaves is used to treat cases of hiccups, a good source of vitamin A when eaten it can also serve as a detoxification substance
15	Convolvaceae	<i>Ipomoea carnea</i> Jacq.	Shrub	Morning glory	Dumankai	Treat menstruation pain and stomach problem	Leaves	Boiled and drink the liquid content for 5 days two cups daily
16	Bombaceae	<i>Adansonia digitata</i> L.	Tree	Baobab	Kuka	Treat malaria, Asthma, diabetis	Leaf, fruit Pulp, Bark	Infusion mixture to be taken twice a day for 3 days
		<i>Ceiba pentandra</i> L. Gaertn	Tree	Kapok tree	Rimi	Treats rheumatism	Leaf and Oil	Decoction, the mixture is to be taken once daily for 5 days
17	Apocynaceae	<i>Calotropis procera</i> (Aiton) WT Aiton	Shrub	Giant milk weed	Tumfafiya	Remedy for fever, hypertension. Jaundice, gastrointestinal disorders and malaria Ectoparasite. Cures ulcers.	Leaves	Leaf powder should be taken by maceration
18	Oleaceae	<i>Olea europaea</i> Linn –Folium	Tree	European olive	Zaitun	Reduces cardiovascular risk, boost immunity	Leaf, Bark and Root	Leaves are taken orally for stomach intestinal problems. Decoction of the dried fruit and leaf, 2 times daily. 1/2 cup.
19	Meliaceae	<i>Azadirachta indica</i> A. Juss	Tree	Neem Tree	Darbejiya	Treats Malaria, Jaundice and Diabetes mellitus	Root, Bark and Leafs	Boil the extract in water for 15-30 minutes 1/3 cup twice daily

Preparations and Administrations

In Tiyin community, herbal remedies are usually prepared fresh. The most common method of preparation was infusion in water (41.6% of the listed plants), followed by decoction (38.8%), and the least common method include poultices with only 2.7%. Observations from the present study also showed that infusion in water is equivalent to aqueous extraction and it seemed to be much

favoured because it is easier to prepare. Additionally, water has been known to be the best solvent used to dissolve hydrophilic mixtures which are responsible for various antimicrobial activities (Sabran *et al.*, 2016 in Tekwu *et al.*, 2012). In this study, the most typical way of administration was oral mode with 84.6%, followed by topical application constituting 12.8%, and inhalation which accounted for 2.6%.

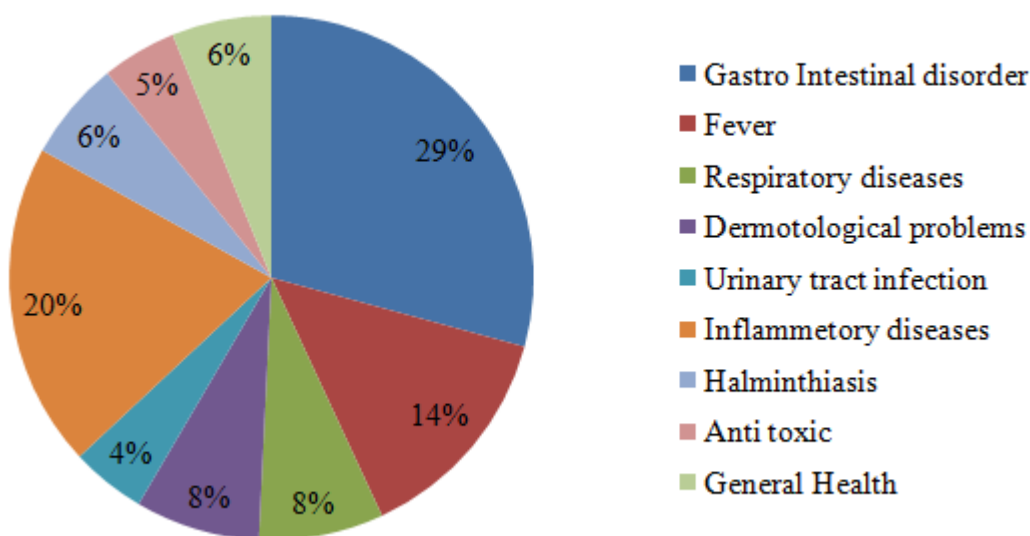


Figure 3: Common Ailments

A total of 9 groups of health conditions were recorded based on symptoms (Fig.3). The local herbalists usually diagnose a specific ailment by symptoms and signs. Most of the plants were used for digestive problems (19 species), followed by inflammatory disease (12) species) and fever (9 species). These results are in parallel with the previous findings reported by some authors (Bhatta and Dhatta 2018; Abdul Aziz *et al.*, 2018; Kankara *et al.*, 2022), in which gastrointestinal complaints were declared common. The existence of digestive disorders as a main use category in the study area may be due to lack of proper sanitation, inadequate access to clean water, and fuel wood's smoke inhalation during the process of charcoal production all of which may contribute to gastric problems. In addition, inhabitants of the study area

possess traditional knowledge due to frequent interactions with these plant species, particularly used in the treatment of digestive problems and fever conditions. The practice of oral administration may be linked to the use of some additives or solvents (water, juice and tea) that are commonly believed to serve as a vehicle to transport the herbal medicines. The additives or solvent are also important to improve taste, minimize soreness, and decrease adverse effects such as diarrhoea, vomiting, and increase the efficacy and healing conditions. These results agree with other studies (Umair *et al.*, 2019, Kadir *et al.*, 2012, Ignacimutu and Ayyernar, 2006).

Conclusion and Recommendations

The use of Traditional medicine in developed and developing countries as basis for the cure of many ailments have been in existence for

many years and there is no reservation that their significance has been widely acknowledged. The present study points out the fact that medicinal plants have continued to play vital roles in the Nigerian healthcare sector, although traditional medical practitioners have not been fully recognized. Findings from this study suggest that there should be sustainable and conservation programmes to ensure that present generation make use of the available natural resources sustainably without compromising the availability of the resources for the near future.

Acknowledgement

We wish to acknowledge the leadership of the Association of Traditional Medicine of Tiyin District, Warji Local Government Area of Bauchi State, Nigeria for their assistance in providing the uses of the medicinal plants. We declare that this work is our own, which has not been published elsewhere and that we are not willing to publish it anywhere later.

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