



# A Preliminary Ethno-medical Survey of Plants Used in the Traditional Management of Cancer and Related Diseases amongst Tarok People of Plateau State, North-Central Nigeria

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## Authors' contributions

This work was carried out in collaboration between all authors. Authors DGD, AA, HI and NI designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors TLO, UA, VAO and DCK managed the analyses of the study and the literature searches. All authors read and approved the final manuscript.

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## ABSTRACT

**Aim of the Study:** To document medicinal plant used in the treatment of cancer and related diseases amongst Tarok people of Plateau State, North-Central Nigeria.

**Study Design:** Ethno medical survey and medicinal plant documentation.

**Place and Duration of Study:** Tarok community of Plateau State, North-central Nigeria from March, 2013 - November, 2013.

**Materials and Methods:** This ethno medical survey was carried among the Tarok community to find out their traditional and cultural way of maintaining well-being especially in combating cancer and related diseases. It was observed that the ethno community uses plant recipes and other

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natural products to meet their healthcare needs. In this study, the target population includes, Traditional medicine practitioners (TMP), herbalist, informants, (young and adults), herb sellers and indigenes with knowledge base on medicinal plants used in the treatment of cancer. A structured questionnaire and a one on one direct interview method was adapted to tape recorder and a video camera were used.

**Results:** The results showed that 33 medicinal plants, representing 21 families were used. It also shows that the recipes made were mostly plants parts combination with the stem barks and stem bark/leaves combination were more often used (18.4% and 10.5% respectively). The used of root part alone amongst the Tarok people in cancer and related diseases was rated 15.8%. The major observable routes of administration were oral and topical application because cancer goes with tumour/wound, inflammation and pains which is the basis for topical application of some of the crude powder for treating the related conditions.

**Conclusion:** This study led to proper documentation of medicinal plant used in the treatment of cancer and related diseases for the first time amongst the Tarok people. These findings can also lead to the discovery of new, safe and effective anticancer drug.

*Keywords: Cancer management; Tarok people; medicinal plant; traditional medicine practitioner; Plateau- Nigeria.*

## 1. INTRODUCTION

Herbal medicines have been widely utilized as effective remedies for the prevention and treatment of multiple health conditions for centuries by almost every known culture. The first documented records of herbal medicine use dates back to 5,000 years (Shen-nung pents'ao ching) in China. About 80% of the world population in the developing nations largely depend on herbal medicine for their primary health care needs [1]. This is primarily because of the general belief that herbal drugs have minimal or no side effects, being cheap and locally available [2]. According to World Health Organization (WHO), the use of herbal remedies globally exceeds that of the conventional drugs by two to three times [3]. No wonder, the World Health Organization (WHO) supported that the usage of safe pharmaceutically and scientifically proven natural products of a given community or region be documented [4].

In the U.S. the use of herbal medicines continues to grow long ago [5,6]. Many conventional drugs originated from plant sources e.g. aspirin (willow bark), digoxin (from foxglove), quinine (cinchona bark), and morphine (from opium poppy) through the study of traditional remedies and folk knowledge of indigenous people [7,8].

Methods of folk healing throughout the world commonly used herb as component of their tradition inclusive of Tarok man. It is known that culture plays an important role in the manner in which a given people use herbs. In recognition of this, in 2009 the World Health Assembly passed

resolution 62.13 urging national governments to respect, preserve, and widely communicate traditional medicine knowledge [9]. As indigenous culture is closely maintained, the ethnomedical investigation is a pre-requisite for any developmental planning concerned with the welfare of the people and their environment. It is a well-known fact that traditional knowledge of medicinal plants forms the basis for development of new product and also known that cultural diversity is more endangered than biodiversity. It is thus a matter of urgency to document as fast as possible all information about medicinal plants and the role of tribes in their conservation [10].

In rural areas, there are additional cultural factors that encourage the use of botanicals, such as the environment and culture, a "man earth relationship". It is believed that where an area gives rise to a particular disease, it will also support plants that can be used to cure it [11]. Natural plant products are considered to be healthier than orthodox medicine [12]. Knowledge of the use of medicinal plants is widespread and their efficacy is trusted based on a long history of use [13].

The Tarok people referred to cancer disease as 'vyet' while a few also called it 'arwa nzam' (endless disease). Cancer is the leading cause of death in economically developed countries and the second leading cause of death in developing countries [14,15]. Cancer is a group of more than 100 different diseases, characterized by uncontrolled cellular growth, local tissue invasion, and distant metastases

[16]. Cancer development and progression involves a series of inflammatory processes requiring cellular transformation, proliferation, invasion, angiogenesis and metastasis. Cell proliferation is important in carcinogenesis and involves the activation of cellular inflammatory processes and cell signaling mechanisms [17,18]. People living with cancer are interested in trying anything that may help them, including complementary and alternative cancer treatments. Alternative cancer treatments may not play a direct role in curing the problem, but they may help the patient cope with signs and symptoms caused by cancer and cancer treatments. Cancer can be caused by internal factors (tobacco, chemicals, radiations and infectious organisms) and external factors (mutation, hormones, and immune conditions) [19,20]. Cancer can be treated by surgery, radiation, chemotherapy, hormone therapy, and biological therapy. Plants have a long history of use in the treatment of cancer. Over 60% of

currently used anti-cancer agents are derived in one-way or another from natural sources, including plants, marine organisms and microorganisms [21]. It is estimated that more than 50% of all the patients diagnosed with cancer explore complementary and alternative medicine – especially herbal medicine [22].

## 2. MATERIALS AND METHODS

### 2.1 Study Area

Ethnomedical survey knowledge and practice within any culture is variable based on geographical origin, residence, ethnicity, religion, age, and gender [23]. The present study has been undertaken among the Tarok people. They are second largest ethnic group in the state. Their main town of Langtang is located about 186 kilometres south-east of Jos, the state capital. The study area(s) exists in-between

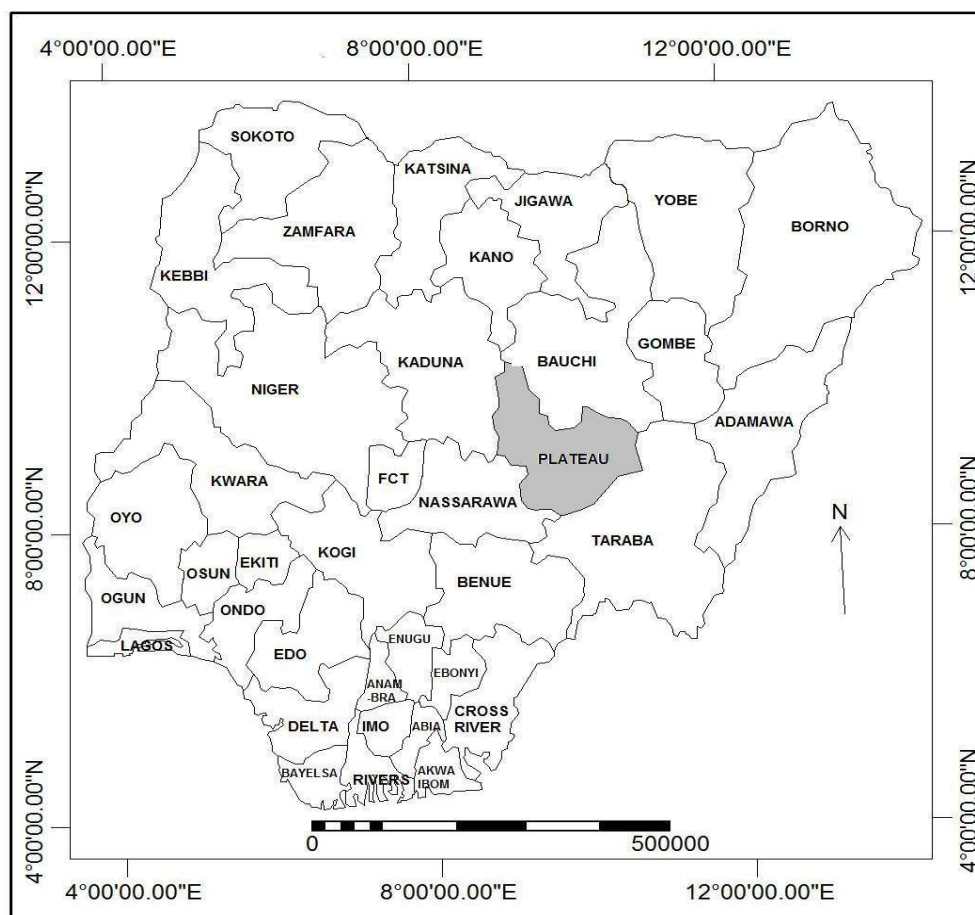


Fig. 1a. Map of Nigeria showing Plateau state

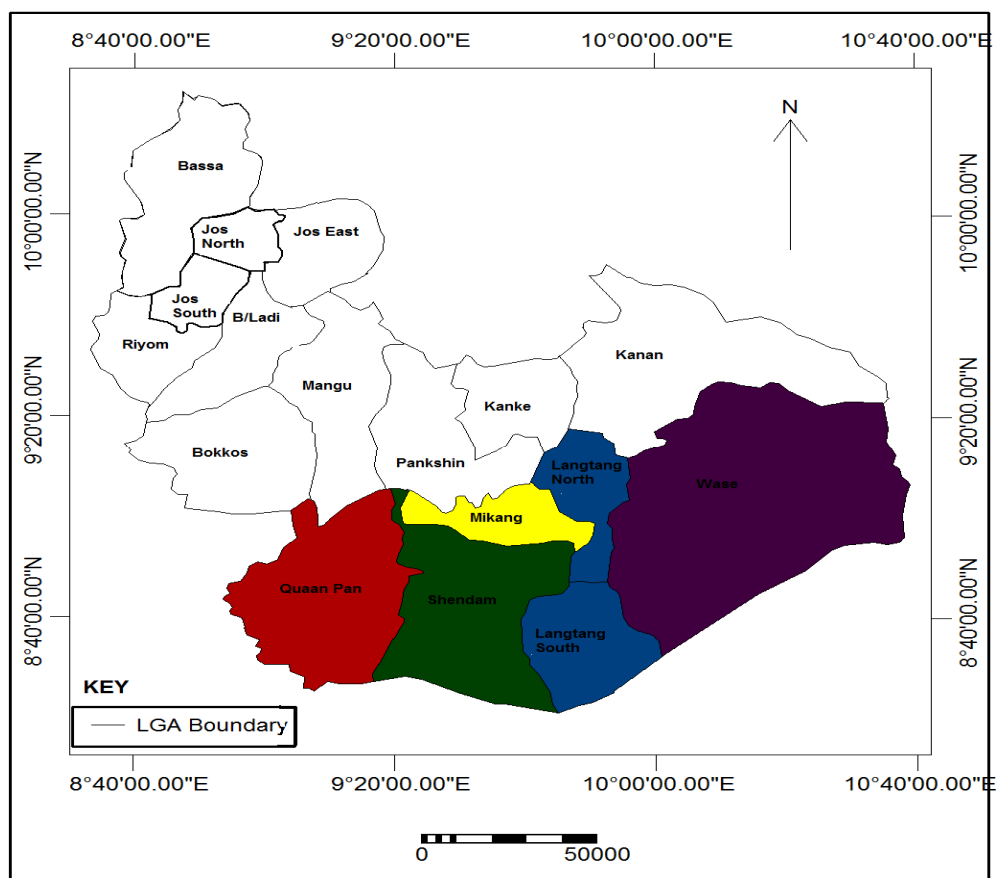


Fig. 1b. Map of Plateau state showing study area (s)

latitudes 9° 08' and 9° 15' N and longitude 9° 47' and 10° 18' E. Plateau State is characterized by two regional types of climate. The first is a near temperate type with an average temperature between 18 and 22°C which constitutes the upper part, or the Highland, in the Northern areas known as the Jos –Plateau. The second one is the lowland area, the southern part, which experiences hot and humid type of climate. Weather conditions are warm during the rainy season (April-October) and cold during the Harmatan period (December-February).

The mean annual temperatures in the State, range between 20 and 25 degrees centigrade, while the mean annual rainfall figures in the Northern part is 131.75 cm and 146 cm in the Southern part [24]. The adjoining lowland areas of Plateau State, have a contrasting climate from that of the upland Plateau. The lowland areas are marked by relatively high temperatures with mean maximum temperature of 28°C and mean minimum of 22°C.

## 2.2 Methods of Data Collection of Medicinal Plants

The population sample size interacted with was 10-15 from each of the four districts of Langtang –North local government area which was comprised of Traditional medical practitioners (TMP)/ Traditional healers or Herbalists, older people or individual (s) with claims of medicinal plants knowledge, apprentices and household women/mothers [25] method was adopted as a standard. It's all about enquiring as to what ailments shall be treated with which plant species instead of vice-versa.

Tape recorder, video camera was used during the interactive session to store the data/ information from the informants by direct interview from March, 2013- November, 2013. Participant's informed consent was established orally before the interactive forum. An oral form of data collection was more preferred because most of the respondents were illiterate. A follow-

up visit was carried out to verify the gathered information. Any data variation as per the use of a medicinal plant earlier stated with respect to its indication was disqualified because of inconsistency.

The structured questionnaire should include demographic data of the Traditional healer, herb seller and Informant. Frequently asked questions for sourcing the information are;

- How do you established cancer cases and how is it called in your language?
- Does cancer occur with other diseases? If yes, what are those diseases?
- What are the medicinal plants and parts you used in the treatment of cancer and the related diseases?
- What is the duration and how often is the plants parts being used for treating cancer and the associate diseases?
- Is there any possible reason(s) why two or more plants or plant parts are used in combination with other ingredients, to effect cure?

### 2.3 Plant Collection / Identification

The plant species mentioned during the interview were collected by the respondent or the one who often makes the remedies, in order to prevent false collection of the plants [26]. Photographs of the freshly collected plants were taken in their natural habitat. The plants species obtained from the survey were identified using keys and description given in the Flora of West Tropical Africa [27] and the "Woody plant of Ghana" [28] at the college of Forestry, herbarium unit, Jos by a taxonomist, Mr. Azila, J. for the identification. The plants were further authenticated at the herbarium in the department of Biological Sciences, Ahmadu Bello University Zaria, Nigeria by a competent taxonomist, Mr. Mohammed Musa and a voucher specimen number was given.

## 3. RESULTS AND DISCUSSION

The results showed that 33 medicinal plants, representing 21 families were claimed to be used in cancer, inflammation and pains management. It also shows that the recipes made were mostly plants parts combination with the stem barks and stem bark/leaves combinations were more often used as 18.4% and 10.5% respectively. The used of root alone in cancer management constituted about 15.8%. Table 1 summarizes

medicinal plants based on families, scientific classification, local names (Tarok and Hausa), parts used, formulation, route of administration and the medicinal uses. Decoction is the commonest dosage form. Standardization was seen as a major drawback in this study because the same plant has different dosage formulation and route of administration from 2 or more traditional medicine practitioners. Most of the traditional herbalist claimed that cancer cases treated by them were once diagnosed in hospitals by the orthodox medical practitioners and that only herbal preparation can treat it. According to the traditional medicine practitioners, cancer sometimes can be detected by the presence of tumours and deep wounds being resistant to orthodox treatment.

Based on the age distribution of the informants refer to Table 2, it was observed that the elderly people are involved in the practice and used of herbal products than any other population. That is to say as a general rule, older adult populations are more likely to use both conventional drug therapy and herbal medicines. This population is also more likely to have a higher incidence of chronic disease, which more often than not requires the use of increasingly complex conventional drug therapy. As such, the potential for herb-disease and herb-drug interactions increases with older adult populations. This age group is more likely to pass away with the knowledge of medicinal plants without the dissemination of the information. It can also be said of the younger population, age <30 that the practice is seen as a dirty business or practice that can be only good for the elderly. In Table 3, most of the gathered information about the medicinal plants came from traditional medicine practitioners (45.4%) followed by prior knowledge which must be indigenes or elders of the locality (22.7%). Very few people representing 11.4% went into the practice as a source of living and women were also seen to practice homeopathy. Table 4 shows the plant parts recipes used in the management of cancer having the stem bark as the highest part of plants most often used representing 18% while the fruit and its combination rarely used representing 2.6%. Even though some plants like *Cymbopogon citratus*, *Carica papaya*, and *Ficus thonningii* among others were not directly used in managing cancer, their claim was that they were used as adjuncts and at the same time to treat cancer related diseases like pains and inflammation.

Table 1. Medicinal plants used by the Tarok people in cancer management and related diseases

Family	Scientific name	Local name (s)	Plant parts used	Form of preparation	Mode of administration	Voucher number	Medicinal uses
Annonaceae	<i>Annona senegalensis</i> Pers	Ibelin (T)	Leaves	Decoction	Oral	ABU 90012	Inflammation, pain
Apocynaceae	<i>Carissa edulis</i> (Forssk.) Vahl.	Gwanda daji (H)	Stem bark	Powder	External	ABU 900086	Wounds
		Nlemu iyil (T)	Root	Decoction	Internal		Arthritis, cancer
Asteraceae	<i>Strophanthus sarmentosus</i> DC	lemun tsunsu(H)	Leaves	Powder	External	ABU 900160	Tumour
		Mwai (T)	Root	Decoction	Internal		Cancer/tumours
		Kwankwani(H)	Leaves	Powder	External		Snake bite
Bursaceae	<i>Launaea taraxacifolia</i> (Willd) Jeffrey.	Laukbin (T)	Leaves	Paste	External	FHJ 2600	Cancer/tumours
		<i>Boswellia diaziellii</i> Hutch	Igbem (T)	Whole plant	Powder		ABU 1314
Commiphoraceae	<i>Commiphora africana</i> (A. Rich) Engl.	Ararabi (H)	Stem bark	Decoction	Internal	ABU 2848	
		Firbap (T)	Root	Decoction	Internal		Cancer
		BISKITI (H) Bazaar (H) Danbaka (H)					Persistent wound
Caesalpinaceae	<i>Commiphora pedunculata</i> Kotschy & Peyr	Gatgong (T)	Root	Decoction	Oral	NA	Cancer and wound
		Namijin dashi (H)		Powder	Topical		
		Luban ((H)					
Deteriumaceae	<i>Piliostigma thonningii</i> (Schum) Milne-Redh	Isur (T)	Fruit	Decoction	Oral	ABU 1132	Cancer
		Kalgo (H)	Root	Powder	Topical		Pain
Caricaceae	<i>Deterium microcarpum</i> Guill & Sperr.	Agboek (T)	Root	Decoction	Oral	ABU 551	Inflammation
		Tauraa (H)					Cancer
chrysobalanaceae	<i>Carica papaya</i> Linn		Leaves	Maceration	Oral	ABU 005	Tumour
			Fruit				Pains
Combretaceae	<i>Parinari polyandra</i> Benth	Bukar rura (H)	Leaves	maceration	oral	ABU 3197	Inflammation
		Gwanja kusa (H)	Stem bark				Pains
Combretaceae	<i>Terminallia avicennoides</i> Guill & Sperr.	Korgam (T)	Stem bark	Powder	Topical	ABU 900309	Inflammation
		Baushe (H)	Root				Cancer.
							Cancer
							Tumour
							osteoarthritis.

Family	Scientific name	Local name (s)	Plant parts used	Form of preparation	Mode of administration	Voucher number	Medicinal uses
Euphorbiaceae	<i>Anogeissus leiocarpus</i> (DC.) Guill. & Perr	Izur (T) Marke (H)	Leaves	Decoction Powder	Oral External	ABU 900389	Cancer Tumour Tuberculosis
	<i>Guiera senegalensis</i> J. F. Gmel	Foufouwu (T) Sabara (H)	Leaves Stem bark	Decoction Powder	Oral Topical	ABU 900165	Tumour
	<i>Jatropha gossypifolia</i> Linn	Kwali nasira (T)	Leaves Root	Decoction Powder	Oral Topical	FHJ 2500	Inflammation Cancer wound
Fabaceae	<i>Euphorbia tirucalli</i> Linn	Fifak (T)	Whole	Paste	Topical	ABU 1496	Cancer, tumour Inflammation Cancer and pains
	<i>Abrus precatorious</i> L	Nbau (T)	Whole	Decoction	Internal		
Meliaceae	<i>Entanda africana</i> Guill & Perr	Zhatar (T) Taawatsaa (H)	Stem bark	Decoction	Internal	ABU 1906	Tumour Cancer pains
	<i>Pterocarpus erinaceus</i> Poir	Ibil (T) Kadobbiya (H) Shanjini (H)	Stem bark	Decoction Powder	Oral Topical	FHJ 2700	Cancer and Persistent wound
	<i>Tamarindus indica</i> L	Itulum (T) Tsamiyar (H)	Stem bark	Powder Decoction	External Internal	ABU 900265	Inflammation
	<i>Acacia sieberiana</i> DC	Zulam (T) Farin kaya (H)	Root	Oral	Internal	ABU 90032	Tumour Inflammation
Malvaceae	<i>Pseudocedrela kotschyi</i> Schweinf Harms	Inyap (T) Tuna'a (H)	Stem bark Leaves	Oral Powder	Internal External	ABU 960243	Cancer Pains Inflammation
	<i>Hibicus rostellatus</i> Guill & Perr.	Agbandar rizang (T)	Fruit	Powder Paste	External	ABU 1774	Tumour Deep wound
Mimosaceae	<i>Parkia biglobosa</i> (Jacq) R.Br	Ilur (T) Dorowa (H)	Stem bark	Decoction Powder	Oral Topical	ABU 2846	Inflammation Pains

Family	Scientific name	Local name (s)	Plant parts used	Form of preparation	Mode of administration	Voucher number	Medicinal uses																																																										
Moraceae	<i>Ficus platyphlla</i> Del	Ituron (T)	Leaves	Decoction	Oral	FHJ 0195	Inflammation Pain																																																										
		Gamji (H)	Stem bark						<i>Ficus thoningii</i> Blume	Ikpem (T) Chediya (H)	Stem bark	Decoction	Internal	ABU 651	Inflammation Pain	Papilionaceae	<i>Mucuna pruriens</i> (L) DC	Gadayee	Leaves Root	Powder Decoction	Topical Oral	ABU 669	Cancer Inflammation	Poaceae	<i>Cymbopogon citratus</i> (DC.) Stapf	Nshi-shi (T) Lemon grass (C)	Whole (leaves/root)	Decoction Decoction	Oral Oral	NA	Inflammation Rheumatism	Polygalaceae	<i>Securidaca longipedunculata</i> Fers	Nashang (T)	Whole Root	Decoction Powder	Oral Topical	ABU 900141	Inflammation Pains	Rhamnaceae	<i>Ziziphus mucronata</i> Willd	Firga agoi (T) Tancwan (T) Magarya (H)	Root	Powder Decoction	Oral Topical	NA	Cancer Inflammation Pain	Sapotaceae	<i>Vitellaria paradoxa</i> C. F. Gaertn	Ikini (T) Kadanya (H)	Stem bark Fruit oil	Decoction Ointment	Internal External	FHI 90709	Inflammation Pain	Sterculiaceae	<i>Waltheria indica</i> L	Vitri (T) Hankufa (H)	Leaves	Decoction Paste	Oral Topical	FHJ 2300	Inflammation Pain	Zygophyllaceae	<i>Maytenus senegalensis</i> Lam
	<i>Ficus thoningii</i> Blume	Ikpem (T) Chediya (H)	Stem bark	Decoction	Internal	ABU 651	Inflammation Pain																																																										
Papilionaceae	<i>Mucuna pruriens</i> (L) DC	Gadayee	Leaves Root	Powder Decoction	Topical Oral	ABU 669	Cancer Inflammation																																																										
Poaceae	<i>Cymbopogon citratus</i> (DC.) Stapf	Nshi-shi (T) Lemon grass (C)	Whole (leaves/root)	Decoction Decoction	Oral Oral	NA	Inflammation Rheumatism																																																										
Polygalaceae	<i>Securidaca longipedunculata</i> Fers	Nashang (T)	Whole Root	Decoction Powder	Oral Topical	ABU 900141	Inflammation Pains																																																										
Rhamnaceae	<i>Ziziphus mucronata</i> Willd	Firga agoi (T) Tancwan (T) Magarya (H)	Root	Powder Decoction	Oral Topical	NA	Cancer Inflammation Pain																																																										
Sapotaceae	<i>Vitellaria paradoxa</i> C. F. Gaertn	Ikini (T) Kadanya (H)	Stem bark Fruit oil	Decoction Ointment	Internal External	FHI 90709	Inflammation Pain																																																										
Sterculiaceae	<i>Waltheria indica</i> L	Vitri (T) Hankufa (H)	Leaves	Decoction Paste	Oral Topical	FHJ 2300	Inflammation Pain																																																										
Zygophyllaceae	<i>Maytenus senegalensis</i> Lam	Nkwar (T) Namiji tsaada (H)	Root	Powder Decoction	Internal External	NA	Cancer wound Inflammation																																																										

N.B. T: Tarok, H: Hausa, NA: Not available



**Table 2. Age distribution of informants**

Age (years)	Frequency	% distribution
< 30	6	13.6
30-39	9	20.4
40-49	8	18.2
50-59	6	13.6
60-69	10	22.7
>70	5	11.4
Total	44	100

**Table 3. Medicinal plants source of information**

Informants	Distribution	% distribution
TMP	20	45.4
Household/women	5	11.4
Apprentices	4	9.1
Prior knowledge	10	22.7
Sellers	5	11.4
Total	44	100

**Table 4. Medicinal plant part used in the management of cancer**

Part used	Frequency	% occurrence
Leaves	4	10.5
Leaves/stem bark	4	10.5
Leaves/fruit	1	2.6
Leaves/whole plant	1	2.6
Leaves/root	5	13.2
Root/whole	2	5.3
Root/stem bark	1	2.6
Root	6	15.8
Stem bark	7	18.4
Stem bark/fruit oil	1	2.6
Whole plant	4	10.5
Fruit/root	1	2.6
Fruit	1	2.6
Total	38	100

#### 4. LIMITATIONS

The study conducted could not cover all the areas occupied by the Tarok speaking community because of the following reasons;

1. There were political and ethno-religious unrest as of the time the work was carried out hence some places were no go areas.
2. Financial constraint was another limiting factor.

#### 5. CONCLUSION

This study has provided first-hand information for researchers in the area of phytomedicine in the treatment of cancer and related diseases. It has also helped to document medicinal plants recipes for cancer treatment for future reference. It is also good to recommend that government should try and co-integrate alternative medicine to pave way for the cultivation and conservation of these medicinal plants since they all gotten from the wild source before they undergo total extinction. The co-integration will also bring about the standardization and quality control of the herbal preparation.

#### 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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