Original Research Article

The study of Ethnobotanical uses by local healers in Taktse *Chiwog* from Central Bhutan Dorji Penjor^{1*} Gangaram Bhattaria¹ Taw Tshering ¹ and Tshering Namgay¹ ¹Taktse Central School, Ministry of Education, Trongsa, Bhutan, ²College of Language and culture studies, Royal University of Bhutan, Trongsa, Bhutan.

ABSTRACT

Aim: To document the ethnobotanical uses in Taktse Chiwog (Village blocks) by local healers.

Study Design: Semi-structured interview and direct interview was conducted with the prior approval from the *Chiwog* official. Two local healers/informants were contacted for interview before field visits based on their popularity and experience of using medicinal plants in their locality.

Place and Duration of Study: The study was conducted at Taktse *Chiwog*, Trongsa Dzongkhag, Bhutan between July and October 2019.

Methodology: Two local healers were identified based on their experience on ethno medical practice. Multiple approaches were taken such as botanical inventories, collection of plant specimens, semi-structured and direct interviews with local healers including free listing (FL) and preference ranking (PR) to collect the information on medicinal use/s using questionnaires.

Results: Eighty Two plant species from forty nine families were recorded with their ethno medicinal uses by the local healers against various ailments and diseases.

Conclusion: This study suggests that most of the medicinal plants available within locality are commonly used by the healers for the treating different diseases, dislocation and fracture of musculoskeletal system.

Key words: Taktse Chiwog, Local healers, Traditional Knowledge (TK), Medicinal plants, local name, Ethnomedical preparation, Preference Ranking and Treatment.

1. INTRODUCTION

Bhutan is situated on the range of mountains, the Himalayas. Bhutan has a rich biodiversity of flora and fauna due to varied altitude and climatic condition. Bhutan is a biological hotspot in world with several endangered species of flora and fauna and more than 7,000 species of vascular plants. More than 600 medicinal plants have been identified in Bhutan and more than 200 of them are currently used by the Institute of Traditional Medicine Services (ITMS) in *gso-ba-rig-*pa (traditional medical system) are effective [1,2,3,4,5,6,7 , 8,9,10,11,12,15]. In 1967, the Third King of Bhutan, His Majesty Jigme Dorii Wangchuck commanded the health department to establish a traditional medicine system for the welfare of the Bhutanese people and to preserve its rich culture and tradition. Accordingly, an indigenous dispensary was opened on June 28, 1968, at Dechencholing in Thimphu, and the medicinal herbs were collected from Lingzhi in Gasa and Langthel in Trongsa [22]. Since then, traditional medical services has grown rapidly over the years. Today, there are 51 traditional medicine units attached to the district hospitals and basic health units across Bhutan. The Preservation, conservation and sustainable utilization of medicinal plants in Bhutan are guided by sound legal frameworks and acts: Forest Act 1969, Plant Quarantine Act of Bhutan 1993. Forest and Nature Conservation Act of Bhutan 1995, Environmental Assessment Act 2000 and Biodiversity Act and Framework of Bhutan 2003 and 2006 [14,25,26].

108 Medicinal plants have been reported from the low altitude areas of Bhutan [1,3,4,12,15] and 116 from high altitude [6,8,11,16]. Total of 81 medicinal plants have been reported from eastern Bhutan, Trashigang Dzonkhag (Gewog Block), 165 ethnobotinical species used by Bumdellling communities in Trashiyangtse Dzongkhag and 61 different medicinal plants were recorded from Kilikhar gewog of Mongar Dzongkhag [2,13,24]. 100 medicinal plants were also recorded from western Bhutan, Dagana Dzongkhag [8]. 134 species from Central Bhutan, Chokhor gewog of Bumthang Dzongkhag [23]. Those diverse medicinal plant species promote health, and can help to protect against diseases. The documentation of ethno pharmacological information on traditional information on traditional knowledge of medicinal plant has broader important in world [5]. Peoples from Taktse Chiwog, still practices home remedies and local healing for treating different diseases. No study of this kind was carried out earlier in these *Chiwog* as far as literature review is concerned. It was crucial to document the TK on medicinal plants from this study area.

Therefore this study was carried out to document ethnobotanical data and traditional knowledge (TK) of local healers in using medicinal plants from Taktse *chiwog* (village blocks) of Trongsa, to treat different type of diseases and also to add on to the list of medicinal plants from central elevation to be used in Bhutanese Traditional Medicines (BTM).

2. METHODOLOGY

The Mangmis (gup assistant) and Tshogpa (Chiwog Representative to respective village) were approached and seek the ethical approval. Key informants were identified and Prior consent was sought from each key informant before interview and they are properly acknowledged. The study was conducted in Taktse *Chiwog* under Trongsa *Dzongkhag* in central region of Bhutan between July and October, 2019.Multiple approaches were taken to collect the data for the study, which comprised of botanical catalogs; collection of plant specimens; structured and informal interviews with key informants. The mounted herbariums for each species were submitted to the Coordinators of Taktse *Nangmen* (Traditional medicine) Club.

2.1 Study Site

Trongsa *Dzongkhag* is located in the central part of the Bhutan and has an area of 1807sqKms' with elevation ranging from 800m to 4800m above sea level. Drakteng *Gewog* is the smallest of the five *Gewogs* under Trongsa *Dzongkhag* covering 84.59 sqKms. It consist of five *Chiwogs* with the population 3,617 [20]. Taktse *Chiwog* is located in the northern part Drakteng *Gewog* with the total area of 40sq Kms (fig 1). It comprises of five *Chiwogs* with the population 3,617. Taktse *Chiwog* is located in the northern part of Drakteng *Gewog* with the total area of 40sq Kms (fig 1). It comprises of two villages Eusar and Tashidhingkha with 52 households and total of 1236 populations [21].Agriculture farming is the main source of income for the majority of population and the villager enjoys a warm climate with sandyloam soil type, and an altitude ranging from 1100 meters to 2000 meters above sea level. This research is solely based on the information and data collected from the Local healer *Ap* (father) Shacha and *Ap* Jigme.





2.2. Data Presentation during and after Field Visits

Ethnobotanical data like collection number, local plant name, and parts used, their uses, ethno medicinal preparation, habitat, locality, name of the informant and explanations were recorded during field visits using direct interviews and a semi-structured questionnaire. The Free listing (FL) by informants in their local dialect, Preference Ranking (PR), Use Value (UV) of medicinal plants were carried out and interpreted [21] and carefully tabulated and analyzed after coming back from the field. The plants were identified using the Flora of Bhutan [17,18,19], internet resources and approval supports from the faculties of *Menjong Sorig* Pharmaceuticals.

3. RESULTS AND DISCUSSION

During this study, it was witnessed that apart from using modern medical facilities and performing rituals, the local healer was also consistently using medicinal plants. Many studies from have been carried out from different regions of Bhutan to document and investigate the uses of medicinal plants [1] but this report is the second time documentation from the central regions of Bhutan. This study have been carried out in from forty Nine families are recorded with their ethnomedicinal uses by the local healers against various diseases. The 14 specimens collected were domesticated by the people for their day-to-day use found in their field. This method of domesticating in their farm orchard directly helps in conserve plant diversity. But informants has the least idea about the impact of environmental change and why there is a decline in the numbers of medicinal plants. Most of the specimens were found abundantly in their locality, which is an evidence of the area with plant host pot that supports the local community's health welfare and preservation of local knowledge. It has been found that either single plant or its parts are used to treat single ailment and sometimes combinations of more than one Plants are used for the treatment. Plants are ranked to three categories as I (most preferred), II (moderate) and III (less preferred) [Table:2]. Healers used Poultice (23%) method of ethno medicinal preparations as most common method followed by decoction (18%) and rubbing on body(14%)[Fig.2]. This indicates that, patients visit healers for the first aids and to get immediate relief for minor injuries like cut/burn/headache/swelling and other ailments. Medicinal

the spotting the essentiality of locally abundant medicinal plants in villagers life. Eighty Two plant species Many of the medicinal plants are used to treat multiple aliments by the local healers. For instance, *Rubia majith* Roxb., *Artemisia vulgaris* L., *Justicia adhatoda* L.*Oxalis corniculata* L. are not only use to apply externally but also taken orally to cure the major diseases like diarrhea, sneak bites, dysentery and the respiratory ailments. More importantly the indigenous uses of this plant species were uncommon in the life of young generations in *Taktse* locality, therefore this report will encourage the younger generations to use locally available plant species for the treatment of different disease. For the reference and genes conservation of medicinal species, we have also established the medicinal habitation hub in our school by collecting frequently used species.

Table 1. List of medicinal plants used by local people with their Ethno medicinal preparation and uses.

The name of the plants in official Language Dzongkha are written as (Dz) and local name as (L).

SI.#	Botanical Name	Family	Local/Dzongkha Name	Ethno medicinal Preparation	Treatment [s]
1	Acorus calamus L.	Acoraceae	Zhutha (Dz) Zhuthala (L)	Sun-dry rhizome is powdered & used alone or mixed with other medicines as solution	Diarrhea and dysentery.
2	Justicia adhatoda L.	Acanthaceae	Bashaka (Dz) Khashemeto(L)	Decoction of leave and flowers are consume orally and leaves are boiled with to medicinal plants to apply externally.	Cough and cold, respiratory ailments and external cut
3	Allium wallichii Kunth.	Alliaceae	Lagop (Dz) Ram (L)	Consume raw bulb/ leaves. Leave and shoot are cooked and con- sume the soup.	Chewed to treat dysentery, cough and cold. The leave is also used for the ease of high altitude sickness.
4	Coriandrum sativum L.	Apiaceae	Whusu (Dz) Wyaisee (L)	Leaves were eaten raw and also extracted the decoction from ma- ture seeds and the fresh leaves.	Avoid vomiting, cough, sore throat and as an appetizer.
5	Centella asiatica (L.) Urb.		Taimush(L)	The decoction of fresh leaves and stem were applied externally	External cut, wound and pneumonia
6	Oenanthe javanica (Bl.) DC		Zhimtsi (Dz) Nam(L)	Leaves and stem are taken raw/cooked.	Improve the flow of blood, appetite stimulator and jaun- dice.
7	<i>Rauvolfia serpentina</i> (L.) Benth. exKurz	Apocynaceae	Thingnye Zoenma (L)	The decoction of roots (which con- tain alkaloids) are blended with warm waters and consume orally.	Reduce Blood pressure and insomnia.
8	Zephyranthes sp.	Amaryllidaceae	Meto Kumoth(Dz)	The decoction of alkaloid extracted from fresh leaves, roots and flow- ers were consume orally as well as applied externally.	Reduce Fever, remedy for headaches and Cure Teta- nus.
9	Rhus chinensis Miller	Anacardiaceae	Choka (Dz) BhramSang(L)	Mature seeds are taken orally	Vomiting, Asthma and bron- chitis
10	Amorphophallus napanesis (Wall.)Bogner & Mayo	Araceae	Dowgurow (Dz)	Young Shoots are cooked, corm are dried and powered and taken mixed with water.	Dysentery and reduce Blood pressure.
11	Colocasia esculenta (L). Schott		Dow(Dz)/ Jakpa (L)	Young stem are collected and tak- en orally. Corm are dried and tak- en with water.	Diahhrea, skin disorder and body ache.
12	Remusatia hookeriana Schott		Dow(Dz)/ Raon Jakpa (L)	Leaves, shoot and rhizomes were	Reduce High blood pressure

				dried, powdered and prepared the solution by mixing with water to consume orally.	and also cure ulcer.
13	Artemisia vulgaris L.	Asteraceae	Khempa(Dz) Dum (L)	Juice are extracted from the fresh leaves and also boiled with others medicinal herbs to apply external- ly.	Cough, cold and external cut
14	Ageratina adenophora (Spreng.) R.M.King & H.Rob.		Hyendho (D) Chakharpai Nyobay (L)	Fresh leaves and young stem were crush and squeezed to extract the juice and applied externally.	Fresh Cut (it help to form blood coagulation)
15	Bidens pilosa		Choebai Changzey (L)	Young leaves and shoot are crushed extracted the juice. The decoction of whole plants are used to apply externally.	Diarrhea, Constipation and External wound.
16	Cirsium sp		Sangchen Nyobay(L)	Young leaves can be soaked overnight in salt water and then decocted and young shoot are eaten raw	bleeding piles, external cuts and rheumatic joints
17	Galinsoga parviflora Cav		Kaywai Hendum(Dz) Jaga Yoema(L)	Leaves and stem were dried, grounded into powder to apply ex- ternally and also taken mixing with warm water.	Healing cut/wound and re- duce cough and cold.
18	Sonchus asper (L.) Hill		Takhu (Dz)	The dried leaves and latex were pulverized and used to apply ex- ternally.	External wound.
19	Asparagus racemosus Wild	Asparagaceae	Ngekhakchung(Dz, L)	Young shoots are harvested and consume by cooking. The roots are dried and powered and con- sume blending with warm water.	Constipation, ulcer, diabetes, diarrhea and Tuberculosis (TB)
20	Begonia josephii A.DC.	Begoniaceae	Jajew (L)	Decoction from whole plants were consume directly.	Reduce high blood pressure and improve constipation.
21	Cannabis sativa L.	Cannabiaceae	Kayna (Dz) Namphai (L)	The dried leaves extract were ap- plied externally or inhale the gas.	Sclerosis, nausea, vomiting and eye pain.
22	Commelina benghalensis	Commelinaceae	Korum (Dz)	Whole plants decoction are con- sume and poultice were used to apply externally.	Reduce High blood pressure, dysentery, external wound and burn.
23	Poranopsis paniculata (Roxb.) Roberty	Convolvulaceae		Fresh or dried roots were prepared into poultice and used to apply or consume	Bone fracture/dislocation.
24	Cuscuta reflexa L.		Tshelma Robjal(Dz) Baldudha(L)	Fresh stems were crush and pre-	Headache, labour pain, bone

				pared the poultice to consume.	fracture, fever.
25	<i>Kyllinga brevifolia</i> Rottb.	Cyperaceae	Kongba Azhang (L)	Fresh tubers and leaves are made into paste and eaten with rice.	Diarrhoea
26	Dioscorea bulbifera L.	Dioscoreaceae	Tsemakewa (Dz) che (L)	The fruits and tuber is boiled and taken internally.	dysentery and diarrhea, fever and tumors
27	Nephrolepis cordifolia (L.) K. Presl	Nephrolepidaceae	Pangkay (Dz) Taree(L)	Juice of root and leaves are taken orally.	Fever, headache, liver and skin disorder.
28	Euphorbia hirta L.	Euphorbiaceae	Auksak Nyobay(L)	The decoction from fresh leaves and young stem are taken orally.	Diarrhea, vomiting, constipa- tion and asthma
29	Ricinus cummunis L.		Dhenthra (Dz) Chamala (L)	Oil are extracted from mature seed to consume or apply externally.	Rheumatism, worm infesta- tion, relieve boil or skin infec- tions.
30	Euphorbia royleana Boissier		Seyshing(Dz) Lushing(L)	The extraction of juice are con- sume orally	Asthma and bronchitis
31	Erythrina arborenscens Roxb.	Fabaceae	Khelmazhosha (Dz) Sindala(L)	The decoction/paste of fresh bark are consume as well as applied externally.	Dysentery, ulcer and boil
32	Pisum sativum L.		Baesem(Dz) Nambe (L)	The dried and powdered seed are used as poultice on the skin and the also taken seed as a vegetable	Skin ace and wrinkled skin. It is a source of protein.
33	Alysicarpus sp.		Tatru (L)	The decoction from whole parts of plant is use to apply externally or taken orally.	Fever, jaundice, diarrhoea, skin diseases and kidney stones.
34	Phaseolus vulgaris		Semchum (Dz) Sema(L)	The green and dried pods are boiled and pulverized.	Diabetes and reduces the blood sugar level.
35	Quercus griffithii Miquel.	Fagaceae	Sisi Shing (Dz) Sisi sang (L)	Seeds are cooked or eaten raw. The decoction of fresh bark were applied externally and boiled leaves were taken orally.	Acute diarrhea, dysentery and haemorrhages. External- ly, it is used as a mouthwash to treat toothache or gum problems and is applied topi- cally as a wash on cuts, burns.
36	Bambusa Vulgaris	Bambusioideae	Pakshing (Dz , L)	Young shoots are cooked or fer- mented.	Healing wounds, infection and respiratory disorder.
37	<i>Molineria capitulata</i> (Lour.) Herb.	Hypoxidaceae	Cowlay Shokpa(L)	Dried leaves and roots are pow- dered and prepared the solution to consume.	Asthma, jaundice, diarrhea
38	<i>Iris domestica</i> (L.) Goldblatt & Mabb.	Iridaceae		Powdered prepared from rhizome are consume orally.	Asthma, cough and stomach ache.
39	Juglans regia L.	Juglandaceae	Tago (Dz) Taga (L)	Mature Nuts were pulverized and	Diarrhea, Asthma, constipa-

				taken orally. Decoction of Young leaves were used to apply exter- nally.	tion and external wound.
40	Mentha Spicata L.	Lamiaceae	Usila (Dz) Kushila (L)	Fresh leaves are consume orally and decoction of dried leaves and stems were taken.	Asthma and reduce blood pressure
41	Pogostemon amarantaiodes Benth		Namdha (Dz) Namna (L)	Young leaves were cooked and also extract the juice to apply ex- ternally	Headache, diarrhea, appetiz- er and snake bite
42	Sida rhombifolia L.	Malvaceae	Phiksang Nyobay(L)	Whole plants are dried and pounded into powder. The powd- ers decoction is used to apply ex- ternally and taken orally.	Relieve swelling, headache and rheumatism.
43	Paris Polyphylla SM	Melanthiaceae	Thogtsampa(Dz, L)	Rhizomes were dried and pulve- rized for external use and to con- sume orally.	Diarrhea, dysentery, poison- ing, burn and external cut.
44	<i>Tinospora sinensis</i> (Lour,) Merr.	Menispermaceae	Laytay(Dz) Rok Robche(L)	The thin bark of stem are removed and cut into small pieces to dry. The dried the stems are pulverized into fine powder.	Piles, liver complaints, chron- ic rheumatism and also as muscle relaxant.
45	Stephania glabra (Roxb.) Miers		Pawserp(Dz) Dumang(L)	The decoction of Rhizome are tak- en orally	Poisoning Clematis buchana- niana DC
46	<i>Ficus semicordata</i> Buch Ham. ex Sm.	Moraceae	Omm Shing (Dz) Tsang Shing(L)	The juice extracted from fruits as well as from leaves are used to apply externally. The raw ripened fruits are eaten directly. leaf decoc- tion in combination with other plant extract is taken orally	Headache and scabies (Apply externally) Diarrhea and jaundice (oral- ly)
47	Leucas ciliata Benth.	Lamiaceae	Phabaidum(L)	The crushed leaves are applied externally or taken orally.	Wounds, sores and chronic skin disease (Apply external- ly). mild fevers, colds, rheumat- ism and snake bites (Orally)
48	Gmelina arborea Roxb.		Japta Sang(Dz)	The juice extracted from the leaves are taken orally or applied externally.	Cough, ulcers and wounds.
49	Calanthe plantaginea Lindl	Orchidaceae	Wangpeimo (Dz) Sai olasey(L)	Young stem and flower were de- cocted and consume orally. The rhizome were dried, powdered and mixed with milk.	Headache, appetizer and poi- sonous.

50	Otochilius lancitabius Seibenfaden		Pusheltse(Dz) Pesinggucha(L)	The dried stem are pulverized and taken orally.	Tuberculosis
51	Oxalis corniculata L.	Oxalidaceae	Chunpa(Dz) Gagun(L)	Young leaves and shoot were tak- en orally. The juice of the plant, mixed with butter and applied ex- ternally.	Diarrhea, Fever, snake bites, muscular swellings, boils and pimples.
52	Plantago asiatica (Wall.) Z.Yu Li	Plantaginaceae	Japtajay(L)	The mature seed are dried and prepared poultice. The freshly col- lected leaves are smashed to ex- tract juice.	Liver disease, stomach prob- lems and Shivering
53	Piper pedicellatum C. DC	Piperaceae	Pepeling (Dz) Pepla(L)	Mature leaves are eaten betel-nut.	Tuberculosis and improve breathing.
54	Cynodon dactylon (L.) Pers	Poaceae	Saram(Dz) Kaga Nyobay(L)	The mature stem are tied around the nerves dislocation and also the decoction of leaves are taken oral- ly as well as applied externally.	Bleeding and skin troubles, heart problem.
55	<i>Polypodiodes lachnopus (</i> Wall. ex Hook.) Ching	Polypodiaceae	Bayjang(Dz) Pesingtaree(L)	Rhizome are dried and prepared decoction with warm water and also the freshly collected rhizome were eaten orally.	Rheumatism, breathing prob- lem and Subside thirst.
56	<i>Pyrrosia mollis</i> (Kunze) Ching		Taree(L)	The fronds are pounded and mixed with gypsum to make a poultice and use to apply externally.	skin rashes
57	<i>Microsorum membranaceum</i> (D.Don) Ching		Colwlay Taree(L)	The decoction is used orally or applied externally.	Rheumatism and skin dis- eases
58	Drynaria propingua (Wall.ex Mett.)		Bayjang(Dz) Pesingsha(L)	The crushed rhizome and ex- tracted juice were taken orally	Poisoning
59	Aconogonon Molle (D.DON) H.		Chuchu(Dz) Aii Chump(L)	Young leaves and shoots are con- sume orally. Extract juice and con- sume with warm water	Astringent and Shivering
60	Fagopyrum Cymosum	Polygonaceae	Thuyoep(Dz) Chumchum (L)	Young leaves and shoot were de- cocted and consume orally	Astringent and supply of iron.
61	<i>Persicaria rucinata</i> (D.Don) H. Gross.	\sim	Lalob(Dz) Zhulum(L)	Freshly prepared juice and taken orally	Urinary tract infection (UTI)
62	Polygonum persicaria		Chulob(Dz) Zholum(L)	A decoction of the whole plant, mixed with flour, has been used as a poultice.	Relieve stomach pain and whole body pain
63	Pteris biaurita L.	Pteridaceae	Nakay(Dz) Tankay Zhima (L)	Young stem were boiled and con- sume orally and also use as sea- sonal vegetable	Rheumatism

64	Viscum album L.	Santalaceae	Nayshaythup(Dz) Jashi (M)	Leaves are dried and consume orally by blending with warm water and the decoction are mended for external use.	Body aches and bone frac- tures and joint dislocation.
65	<i>Houttuynia cordata</i> Thunb	Saururaceae	Gaytsho (Dz) Drang (L)	Fresh leaves are consume with pickle and the decoction of roots are consume orally.	Constipation and appetizer and Tuberculosis
66	<i>Thalictrum</i> sp.	Ranuculaceae	Khoe Nyobay(L)	The decoction from whole plant were eaten directly.	Jaundice and fever
67	Clematis buchananiana DC.		Tsaja(Dz) Tsaja Rusee(L)	Juice extracted from root are used to inhale as well applied externally.	Ulcer and swelling
68	Rubia majith Roxb.	Rubiaceae	Saoth (D) Tshuth (L)	Fresh leaves and stem were crush and used to apply externally. The dried stem were cut into pieces, boiled to extract the juice and con- sume orally.	Cure skin infection, diarrhea, dysentery, and chronic fever.
69	<i>Bergenia ciliata</i> (Haw.) Sternb.	Saxifragaceae	Langmche Namchu meto(Dz)	The decoction from Rhizome are used to apply externally also eaten directly.	Skin disease, diarrhea, Vomit- ing and Fever
70	Agrimonia pilosa Ledeb.		Nyobay Puchen(L)	The juice extracted are applied externally or eaten.	Eczema, boil and allergy
71	Fragaria nubicola Lindl	Rosaceae	Tsheloo Meto (Dz) Moelobe	Berries are chewed and extract the juice from leaves and consume with the mixture of <i>Berberis lyceum</i>	Constipation and Stomach ulcer
72	<i>Prunus cerasoides</i> BuchHam. ex D.Don		Kham (Dz) Lee (L)	The extract juice from bark and fruit are applied externally. As well as consume orally.	Backaches, stimulates respi- ration and improves diges- tion.
73	Rubus ellipticus		Taktsar Meto(Dz) Tser Moelobe(L)	Berries are taken orally and extract the juice from bark. It is consume adding warm water	Renal tonic, cough and cold
74	Brugmansia suaveolens (Humb. &Bonpl. exWilld.) Bercht. &J.Presl	Solanaceae	Daw Gumju(L)	Plant parts can be smoked, eaten, drunk as a tea or taken as an enema.The decoction of leaves are applied externally.	Treat wounds, rashes, men- strual pain and snakebites.
75	Daphne bholua D.Don	Thymelaeaceae	Dhayshing(Dz) Shokshing(L)	The decoction of roots and bark are taken orally.	Fever and intestinal problem
76	<i>Girardinia diversifoli</i> a (Link) Friis		Zocha(Dz) kuoi (L)	The decoction of roots are taken orally and fresh juice extracted from the leaves are applied exter- nally.	Constipation, poisonous, headache and swollen joint.
77	Elatostema Lineolatum		Damroo (Dz, L)	Leaves and stems were cooked	Supplement iron to improve

		Utricaceae		/decocted to consume.	blood, jaundice, snake bite and factures
78	<i>Boehmeria hamiltoniana</i> Wedd.		Jagartsukpa (Dz) Naseymo(L)	The decoction from the fresh leaves as well as from the fiber use orally	urination problems and Rheumatism
79	<i>Urtica parviflora</i> Roxb.		Zocha (Dz) Kuei(L)	The decoction of leaves, stem are boiled with other plants apply ex- ternally. The juice extracted from the roots are also consume orally.	Arthritis, lower back pain an poison.
80	<i>Aloe vera</i> (L.) Burm.f.	Xanthorrhoeaceae	Agaru(Dz)	The jelly extracted from the leaves are used to apply externally.	Skin lotion and heart probler
81	Roscoea tibetica Batalin	Zingiberaceae	Luiyee Meto (L)	The root is chewed directly and the Juice extracted from the roots of the plant is also taken.	Dysentery and diarrhea.
82	Zingiber officinale Roscoe		Gamuk (Dz) Saga (L)	Rhizome are made into pieces, boiled and extracted the juice to consume orally.	Nausea, Gout, cough and cold.



Fig.2. Frequency of Ethno medicinal Preparation

Table 2. Preference ranking (PR) of the uses of medicinal plants for treating common diseases preferred by the healers, Categorized into as I (Most preferred), II as (moderate) & III as (less preferred)

Discorea bulbifera L. III Agrimonia pilosa Ledeb III Acorus calamus L. III Zingiber officinale Roscoe III Allium wellichii Kunth. III Bidens pilosa 1 2. Jaundice (Thri Neth) Rank Timospora sinensis (Lour.) Merr. I Ficus hispida Linn II Mentha Sp III Oenanthe javanica (BL) DC II Flaiterum sp. II 3. Tuberculosis (Bay ken Neth) Rank Sonchus aspert I Polygonum persicaria II Eubiorbia Natura III Cannabis sativa III Cannabis sativa III Centella coriacea I Houtuynia cordata Thunb III Asparagus racemosus Wild III Asparagus racemosus Wild III Asparagus racemosus Wild II Sta chombiolia L. I Tinospora sinensis (Lour.) Merr. II Polypoctore thereinsensis (Lour.) Merr. II Sta chombiolia L. I Sta chombiolia L. I Sta chombiolia L. II Polypoctores technopus (Mall. Ext Hock.) Ching III Microsoran membran	1. Dysentery (Thrak Shel Neth)	Rank
Agrimonia pilosa Ledeb II Acorus calamus L. II Zingiber officinale Roscoe II Allium walikchii Kunth. III Bidens pilosa I 2. Jaundice (Thri Neth) Rank Tinospora sinensis (Lour.) Merr. I Ficus hispida Linn II Mentha Sp II Oenanthe javanica (BI, DC II Ficus semicordata BuchHam. ex Sm. I Thatierrum sp. II Stuberculosis (Bay ken Neth) Rank Sonchus asper L. I Polygonum persicaria II Euphorbia hirta III Rubia majith Roxb. III Cannabis sativa II Centella coriacea I Houtuynia cordata Thunb III Aggius racemosus Wild III 4. Muscle Cramps (zuk sheth neth) III Stat hombifola L. I Threspora sinensis (Lour, Merr. II Polypound mensionsus (Wall. Ex Hook.) Ching II Microsonum membanaceum (D. Don) Ching I Stat hombifola L. I Theory seprentina (L.) I Benth, exKurz II Rank Rank	Dioscorea bulbifera L.	III
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4. Muscle Cramps (zuk sheth neth)RankRicinus cummunis L. Sida rhombifolia L. Tinospora sinensis (Lour,) Merr. Polypodiodes lachnopus (Wall. Ex Hook.) Ching Microsorum membranaceum (D.Don) ChingII III III III5. Blood Pressure (Thrashuk Neth)RankRauvolfia serpentina (L.) Benth. exKurz Remusatia hookeriana SchottII III III	Asparagus racemosus Wild	
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Polypodiodes lachhopus (Wall, EX Hook.) Ching III Microsorum membranaceum (D.Don) Ching I 5. Blood Pressure (Thrashuk Neth) Rank Rauvolfia serpentina (L.) I Benth. exKurz II Remusatia hookeriana Schott III	Tinospora sinensis (Lour,) Merr.	II
S. Blood Pressure (Thrashuk Neth) Rank Frank Rauvolfia serpentina (L.) I Benth. exKurz II Remusatia hookeriana Schott III	Polypodiodes lachnopus (Wall. EX Hook.) Uning	III
5. Blood Pressure (Thrashuk Neth) Rank Rauvolfia serpentina (L.) I Benth. exKurz II Remusatia hookeriana Schott III		
Rauvolfia serpentina (L.) I Benth. exKurz II Remusatia hookeriana Schott III	5. Blood Pressure (Thrashuk Neth)	Rank
Benth. exKurz II Remusatia hookeriana Schott II	Rauvolfia serpentina (L.)	I
Remusatia hookeriana Schott	Benth. exKurz	
	Remusatia hookeriana Schott	
Commelina benghalensis	Commelina benghalensis	
Phaseolus vulgaris III	Phaseolus vulgaris	III.
Mentha Spicata L.	Mentha Spicata L.	1

6. Fracture and broken limbs (kam labh Tsik truk)	Rank
Cirsium sp	
Poranopsis paniculata (Roxb.) Roberty	T
Cuscuta reflexa L.	III
Pteris biaurita L.	I
Boehmeria hamiltoniana	Ш
Wedd.	П
7. Ulcer (<i>Ju ma Neth</i>)	Rank
Remusatia hookeriana Schott	
Asparagus racemosus Wild	III III
Erythrina arborenscens Roxb.	П
Clematis buchananiana DC.	П
8. Shivering (Drangsong)	Rank
Aconogonon Molle (D.DON) H.	
Plantago asiatica (Wall.) Z.Yu Li	
9. Against witch-craft/Poisoning (Dug jo ni)	Rank
Pogostemon amarantaiodes Benth	
Stephania glabra (Roxb.) Miers	I
Oxalis corniculata L.	
Urtica parviflora Roxb.	III
Girardinia diversifolia (Link) Friis	III
40 External human and ext (Telling Dans Ten ma)	
10. External burn and cut (<i>Isik ma Dang Tog ma</i>)	Rank
Sonchus asper (L.) Hill	III
Ricinus cummunis L.	
Justicia admandada L.	
Agerauna adenophora (Spreng.) K.M.King & H.Kob.	
Artomisio vulgoris	
Alternisia vuigaris L.	lii Bonk
Asparagus racemosus Wild	III
Roscoea tibetica Batalin	
Alvsicarnus sn	
Paris Polyphylla SM	
12 Skin Infaction	 Pank
Rubia maiith Royh	
Rergenia ciliata (Haw) Stern	
Purosoda mollies/Kunde) China	



Fig.3. Medicinal Plants (1) Acorus calamus L. (2) Euphorbia hirta. (3) Houttuynia cordata Thunb. (4) Rubus ellipticus. (5). Ageratina adenophora (Spreng.) R.M.King & H.Rob. (6) Rubia majith Roxb. (7) Erythrina arborenscens Roxb. (8) Artemisia vulgaris L. (9) Sonchus asper. (10) Girardinia diversifolia (Link) Friis. (11). Oxalis corniculata L. (12) Galinsoga parviflora Cav.



Fig.4. Medicinal Plants. (13) Bergenia ciliate (Haw.) Sternb. (14) Leucas ciliate Benth. (15)Plantago asiatica(Wall.) Z.Yu Li. (16) Aconogonon Molle (D.DON) H.. (17)Commelina benghalensis. (18) Nephrolepis cordifolia (L.) K. Presl. (18) Molineria capitulate. (20) Centella coriacea. (21) pteris sp. (22) Justicia adhatoda L. (23) Diosco-rea bulbifera L. (24). Ricinus cummunis L.



Fig.5. Taktse Nangmen (Medicinal) Garden. (2&5). Butea parviflora Roxb, and Phyllanthus emblica Linn. (Exotic from lower elevation). (1, 3, 4, 6, 7, 8, 9, 10) Native Medicinal plants.

4. CONCLUSION

Our finding specify that, there is very good ethnomedicinal knowledge still prevailing in the traditional society of central Bhutan particularly among the traditional healers and elderly persons without any scientific knowledge. The some specimens collected were domesticated by the people to conserve the species due to more threat in frequent collection for treating. Therefore, need for documenting TK on ethnomedicines used by local healers could prove to be method to preserve our plant diversity and addition of new plant species of therapeutic potential in Bhutanese Traditional Medicine System. Additionally it could be useful for carrying phytochemical studies in future and to add on to list of Bhutanese traditional medicine.

5. CONSENT

Prior consent was sought from each key informant before interview and they are properly acknowledged.

6. ETHICAL APPROVAL

It is not applicable.

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