

Medicinal plants and their traditional uses by different Tribes of Ri-Bhoi District, Meghalaya, NE India

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Abstract

The study was conducted with an objective to explore the important medicinal plants of the Ri-bhoi district of Meghalaya, India. Intensive field work was carried out to obtain the detail information on the plants and plant materials used by the local healers against the remedy of various ailments. Data were collected using standard questionnaires and group interviews. Data and information were collected through questionnaires in consultation with different local Bej's (local healers). Plant species were identified with the help of relevant standard literature and presented along with their vernacular names; part(s) used diseases and method of preparation. A total of 60 medicinal plant species were collected and identified from the study area for treating various human ailments. Leaves (48.33%) were the most commonly used part in herbal therapy; these are mainly used as in paste form. There was several method of preparation of these medicinal plants such as paste, powder, boiled, raw, juice and decoction.

Key words : Ethnobotany, conservation, indigenous, local healers.

More than 35,000 plant species are being used in different human cultures around the world for medical purposes and many of them are subjected to uncontrolled national and international trade¹⁷. From around 60,000 years ago *i.e.* the period of Paleolithic Age, medicinal plants were in use for treating different human ailments and as a source of medicine²². In African countries, 90% of population still relies

exclusively on plants as a source of medicines⁸. In India, more than 53.8 million tribal people of 5,000 forest dominated villages belonging to tribal community and comprising 15% of the total geographical area representing one of the greatest emporia of ethno-botanical wealth⁴. Ethno medicine has been playing very important role in human health care system which is mainly based on belief and experience

of the traditional people. Herbal medicines are cheap, more effective, and easily available and supposed to have no side effects and increasing the demand of herbal drug in international trade¹⁴. Tribal communities are mainly depended on traditionally used medicinal plants due to transportation and communication problem, their traditional medicinal plants are one of the most affordable to used as a source of medicinal treatment⁵. In Meghalaya, the tropical monsoonal climate is to be responsible for adaptation and growth of different plant species ranging from herbs, shrubs and trees. These regions are highly rich in biodiversity and well surrounded by various plant resources which are used by the local tribes for their special needs like food, shelter or medicinal purposes to treat various ailments¹⁸. Meghalaya, one of the rich hot spot regions of northeast, India due to occurrence of Nokrek Biosphere reserve, plants like trees, herbs, shrubs to non flowering plants such as lichens and ferns used for medicinal purposes¹.

Study area :

Ri-Bhoi is one of the district of Meghalaya which is lies between 90°15' E to 91°16'E longitude and 25°40'N to 25°21'2 N latitude and occupies an area of 2376 sq km. It is bounded on the North by Kamrup district and on the East by Jaintia hills and Karbi Anglong district of Assam and on the West by West Khasi hills district and East Khasi hills district⁹. The present study is undertaken in different selected villages under three Blocks of Ri-Bhoi district. The Ri-Bhoi district has three Blocks *i.e.* Umling CD Block, Jirang CD Block and Umsning CD Block.

Field Survey and data collection :

Ethno medicinal survey was carried out during 2020-2021 to collect plant samples with ethno medicinal claims different local tribesmen associated with them. The present study was carried out from the selected five villages of Meghalaya, including (Nongthummai, Mawnum, Umtrew, Sumer and Quinine) of Ri-Bhoi districts. Information on ethnomedicinal practice and medicinal plants has been collected from local healers (both men and women) using structured questionnaire. The local informants are mostly indigenous tribal people of the area (Khasi, Mikir, and Garo). Other than the tribes, Nepali people who resides in those areas since long and also practicing medicinal plants uses for curing different ailments. As a result, information about persons in local healing practices (Bejs) were obtained, attempts were made to come in contact with those healers, with the basic aim of documentation of knowledge. The structured questionnaire have been used to collect information's on locality, scientific and vernacular names, parts of the plant used, method of preparation and diseases for which the plants are used. Along with intensive household survey in selected villages on the use of traditional medicine practice using locally available plants of the area. The interviews were based on different parameters¹⁹. All voucher specimens were identified using relevant floras and standard literature^{12,7,10} and lastly with the help of online identification "The plant list".

The present study recorded 60 numbers of medicinal plants belonging to 40 families used in the treatment of 38 common ailments (Table-1). Updated botanical name, family, local name, village name, parts used,

Table-1. List of plants documented from the selected study site

Scientific name	Local name	Habit	Family	Part used	Diseases	Method of preparation
<i>Acacia catechu</i> (L.f.) Willd	Khair (K)	Tree	Mimosaceae	Bark	Throat infection	Bark dried to prepared powder and 1-2 teaspoon boiled with water to make a juice. Juice is taken for gargle 2-3 times for few days.
<i>Achyranthes aspera</i> L.	Datain (N)	Herb	Amaranthaceae	Root	Digestive Problem, pyrrrohea	Rhizomes are ground and mixed with water, pour it overnight. It is taken ½ cup (5-10ml), 3 times for 3 days. Crushed roots are applied on infected area of teeth.
<i>Adiantum philippense</i> L.	Tykhankhyllai(K)	Herb	Adiantaceae	Leaf	Bone fracture	Leaves are ground to make a paste and applied on fractured area of the body for 2-3 days, repeated the process again within 1 week.
<i>Ageratina adenophora</i> Spreng. RM.King & H. Rob	Kynbat (K)	Herb	Asteraceae	Leaf	Cut, wounds	Leaves are ground to make a smooth paste and applied on affected area for 2-3 hours.
<i>Alpinia galangal</i> (L.) Wild	Ching (M)	Herb	Zingiberaceae	Rhizome	Bonefracture	Rhizome is used for the treatment to bone fractured diseases.
<i>Alpinia nigra</i> (Gaerten) Butt	Mahabir (N)	Herb	Zingiberaceae	Rhizome	Mouth ulcer, cough	Rhizome ground and mixed with water, honey and ginger. Juice is taken 2 times morning and evening for 7 days. Rhizome paste is applied in mouth affected area for few days.
<i>Aesculus assamica</i> Griff.	Dieng sangkenrop (K)	Tree	Hippocastanaceae	Leaf	Skin infection	Leaf paste is applied 2-3 times daily for few days against skin infection
<i>Asparagus racemosus</i> Willd.	Bat niangso hpet (K)	Herb	Asparagaceae	Root	Stomach pain (children)	The root of this plant boiled with water to make 1/4 th extract juice is

<i>Aquilaria agallocha</i> (Lour.) Roxb	Dieng akar (K)	Tree	Thymelaceae	Bark	Cough, cold, asthma, skin diseases	taken 2 (1 teaspoon) times for 1 week. It is also taken by lactate mother for 1 week. Aromatic resinous wood oil of this plant is applied on wounds 3 times for few days. Bark of this plant is ground to make a powder and boiled with water to make a concentrated extract, taken it morning and evening until it cured.
<i>Bauhinia acuminata</i> L.	Magong aphal (G)	Shrub	Fabaceae	Bark, Stem, Flower	digestive diseases	Bark, stem and flower of these plants are dried to make a powder and boiled with water to prepared extract. It is taken 2 times morning and evening for the treatment of digestive problem cured jaundice disease.
<i>Begonia roxburgii</i> (Miq) A.DC.	Kumchal (K)	Herb	Begoniaceae	Leaf, tuber	Eye problem, stomach problem	Leaf juice of this plant is used as an eye drop and tubers used to cure stomach problem
<i>Bindes pilosa</i> L.	Soh byrthit (K)	Herb	Asteraceae	Leaf, stem	Gastric problem	Leaves of this plant is ground to make a juice and taken it 2-3 times daily for few days for the treatment gastric problem.
<i>Blumea lanceolaria</i> (Roxb.) Druce	Jakari (K)	Shrub	Asteraceae	Leaf	Low blood pressure	Leaf of this plant crushed and boiled with milk, it is taken 2 times morning and evening for few days to treat low blood pressure.
<i>Bonnaya reptans</i> (Roxb.) Spreng	Neing lik (K)	Herb	Linderniaceae	Leaf	Tongue infection	Leaf of this plant is ground to make a smooth paste and applied on infected tongue for 2-3 times for few days to cure tongue infection

<i>Catharanthus roseus</i> (L.) G.Don	Dongriful (N)	Herb	Apocynaceae	Flower, leaf	Cancer, gastric problem	Raw leaf and flower is chewed/ ground to make juice, it is taken with water, 2 times for few days to cure cancer and gastric problem
<i>Chamaecostus</i> <i>cuspidatus</i> (Nees & Mart.) C. Specht & D.W. Stev	Jajawdieng (K)	Herb	Costaceae	Leaf, stem	Diabetes, kidney stone, urine infection	Leaf and stem of this plant is ground to prepared juice, taken it morning (in empty stomach) and evening for 6 days.
<i>Chassalia curviflora</i> . (Wall.) Thwaites	Sokbuiat (K)	Shrub	Rubiaceae	Leaf	Injured	Leaf paste is applied on injured part for 2-3 hours, repeated this process 2-3 days in a week.
<i>Citrus macroptera</i> Montrouz	Sohkwit (K)	Tree	Rutaceae	Fruit	Fever	Raw fruit juice is eaten 2-3 times daily morning and evening to cure normal fever
<i>Conscora alata</i> (Roth) Wall.	Kynbat- synpat (K)	Herb	Gentianaceae	Whole plant	Body swelling	Whole plant is crushed to make a smooth paste and applied a bandage around on body swelling part for 2-3 hours.
<i>Crinum</i> <i>pedunculatum</i> R.Br.	Msnikrait (N)	Herb	Amaryllidaceae	Root	Bone fracture	Rhizomes are ground to prepare a smooth paste, bandaged around on fractured part of the body for 2- 3 days.
<i>Cryptocarya</i> <i>andersonii</i> King .ex. Hook .f.	Dieng soh pdem (K)	Tree	Lauranceae	Bark and leaf	Antiseptic	Bark and leaves of this plant is crushed to make a paste and applied on affected area 2-3 times for few days until cured it.
<i>Curculigo</i> <i>orchitoides</i> Gaertn	Lakut (K)	Herb	Hypoxidaceae	Root	Deep cut	The root of this plant is mixed with the bark of dachini tree and Tiwding stem flower. The paste is applied on cut area for 2-3 days.

<i>Curcuma aeruginosa</i> Roxb	Shenrai iong (K)	Herb	Zingiberaceae	Rhizome	Diabetes	Rhizome of this plant is dried to make a powder; it is taken with water 3 times for few days until diabetes will be controlled
<i>Curcuma longa</i> L.	Shenrai stem (K)	Herb	Zingiberaceae	Rhizome	Digestive problem	Rhizomes are dried to make powder, mixed with water and take it daily 2 times for 1 week
<i>Curcuma zedoaria</i> (Christm) Roscoe	Ingblei (K)	Herb	Zingiberaceae	Rhizome	Cough, gastric problem	Rhizome of the plant is dried and makes a powder and eaten it daily 3 times for few days to treat against cough and gastric problem.
<i>Cyanthillium cinerum</i> (L.) H. Rob.	Maalchajhar (N)	Herb	Zingiberaceae	Rhizome	Cuts, wounds, headache	Leaves are crushed and bandaged around on cuts and wounds for 2-3 hours for 3 days. Leaf paste is applied on forehead, (1-2 hour) to cure headaches problem.
<i>Cymbopogon citratius</i> (DC.) Stapf	Kombatvut (K)	Herb	Poaceae	Rhizome	Gastric problem	Fresh rhizomes are crushed and mixed with water to make a juice. The juice is taken (2-3) tea spoon morning (in empty stomach) and evening for 3-4 days
<i>Cymbopogon flexuosus</i> (Ness ex Steud.)	Komeikoba (M)	Herb	Poaceae	Rhizome	Cough	Raw rhizomes are cut into pieces and take it with water for 3 times in a week to treat against cough
<i>Dendrobium aphyllum</i> (Roxb.) C.F.C. Fisch	Shintioding (M)	Climber	Orchidaceae	Leaf	Acne problem	Leaves are ground to prepare a smooth paste and applied on face once as a face pack. It is used once in week for few months or year for better result to get spotless skin.

<i>Desmodium triflorum</i> (L.) DC.	Motoi(N)	Herb	Fabaceae	Leaf	Skin diseases	Leaves of this plant crushed to prepare a smooth paste and applied on affected skin externally for 1 week to get relief from skin problem
<i>Emila sonchifolia</i> (L.) DC.ex DC.	Hurmawroh (K)	Herb	Asteraceae	Whole plant	Burn	Whole plant is crushed to prepare a smooth paste and bandaged over the burned area of the body for 3 days, repeated it for 7 to 10 days.
<i>Euphorbia trigona</i> Mill	Jakritchuh gachchak (G)	Herb	Euphorbiaceae	Whole plant	Bone fracture	The whole plant is paste with <i>cissus quadrangularis</i> , <i>peperomia obtusifolia</i> and dry fish. Paste of this plant is ready to apply on fractured area by bandage over it for 3 days.
<i>Heliotropium indicum</i> L.	Mationg blang (K)	Herb	Boraginaceae	Whole plant	Blood coagulation	Whole plant is crushed and directly applied for the treatment of blood coagulation.
<i>Helichrysum luteolum</i> (L.) Rchb	Torim (K)	Herb	Asteraceae	Leaf	Stomach haches	Leaf juice of this plant is eaten 2 times morning and evening for 3 days for the treatment of stomach pain. It will be taken for 7-10 days for better result.
<i>Houttuynia cordata</i> Thunb	Jamyrdoh (N)	Herb	Saururaceae	Leaf	Dysentery	Raw leaf juice is taken 2 times morning and evening for few days to cure dysentery problem
<i>Hypericum laxum</i> (Blume) Koidz	Zonim (K)	Herb	Hypericaceae	Whole plant	Snake bite	Whole plant of this is crushed and applied on snake bite area for 5-6 hours to relief from poisonous pain.
<i>Justicia adhatoda</i> L.	Lathdat (G)	Shrub	Acanthaceae	Leaf	Cough	Leaves are boiled with water and

<i>Justicia gendarussa</i> Burm.f	Pangman (M)	Herb	Acanthaceae	Leaf	Foot pain	take it with honey 2-3 times in one day for 1 week or more Leaf paste of this plant is applied on affected area by bandaged for 2-3 hour
<i>Kaempferia galangal</i> L.	Sying shmoh (M)	Herb	Zingibearceae	Leaf	Stomach problem	The rhizomes are dried to make a powder and take it with water to treat against stomach pain. It is eaten 1 teaspoon 2 times morning and evening in a day for 3-7 days.
<i>Lygodium flexuosum</i> (L.) Sw.	Kynbatbin (K)	Herb	Lygodiaceae	Leaf	Kidney stone	Leaf of this plant is boiled with water to prepared ¼ juice extract and taken 5-10ml for one day to cure kidney stone problem.
<i>Myrica esculenta</i> Buch. Ham. ex D. Don	Kafof (M)	Tree	Myricaceae	Bark	Stomach- aches	Bark of this plant boiled with water and ready to take ½ cup. 2 times for 3 days.
<i>Nelumbo nucifera</i> Gaertn	Kamalguti (N)	Herb	Nelumbonaceae	Seed	Menstrual problem, uterus problem	Seeds are ground to make a powder and boiled with water. It is taken ½ cup (5-10 ml) 2 times for 7-10 days.
<i>Opuntia dillenii</i> (Ker Gawl.) Haw	Shohkata (k)	Shrub	Cactaceae	Latex	Burn	Latex of this plant applied for the treatment of burned affected area.
<i>Phlogacanthus pubinervius</i> T. Anderson	Dieng soh kajut (K)	Shrub	Acantaceae	Leaf	Cough, Cold	Leaves of this plant is boiled with water and taken it (5-10ml) 2-3 times for curing cold and cough.
<i>Piper thomsonii</i> (C.D.C) Hook. f.	Lubroi (K)	Climber	Piperaceae	Leaf	Digestive problem	Raw leaf of this plant taken with piper betel daily to treat against digestive problem
<i>Plumbago zeylanica</i> L.	Samtame	Herb	Plumbaginaceae	Rhizome	Body	Rhizomes of this plant to make a

	(M)							swelling	paste and applied on the body swelling part and cooled it after 1 hour, repeated it for keep the place cool.
<i>Plumeria pudica</i> Jacq.	Do somfek (G)	Shrub	Apocynaceae	Leaf	Bone fractured	Leaf paste of this plant applied on the affected area of the body. Bone fractured			
<i>Pogostemon benghalensis</i> Burm. f Kuntze	Rudaoli (N)	Herb	Lamiaceae	Leaf	Cough	Leaves of this plant boiled with water. Decoction of this plant is taken with a pinch of salt, 3 times for one week.			
<i>Rauvolfia canescens</i> L.	Todong (K)	Shrub	Apocynaceae	Roots	Heart	Root of this plant is crushed to make a powder and boiled with water to make a concentrated extract. The root juice is taken 2 times for few days.			
<i>Rauvolfia serpentina</i> L. Benth. ex Kurz	Todong paitpuraw (K)	Shrub	Apocynaceae	Roots	Malaria	Root of this plant is boiled with water to prepared juice extract and taken it 2 times (morning/ evening) daily for 1 week.			
<i>Senna alata</i> (L) Roxb	Dawai khniang(K)	Shrub	Fabaceae	Leaf	Skin diseases	Leaves are crushed to prepare a paste and applied on affected area of skin (external part) for 3 times in day to cure against skin problem			
<i>Smilax ferox</i> Wall ex Kunth	Shiahkrut (K)	Climber	Smilacaceae	Leaf	Sinus problem	Leaf of this plant is ground to prepared juice and it is taken in a nose drop by drop 2 times for few days until it cured.			
<i>Sonchus wightianus</i> DC.	Jalynar (K)	Herb	Asteraceae		Bone fracture	Leaves of this plant to make a smooth paste and applied on affected area of the body by			

<i>Stachytarpheta australis</i> Moldenke	Sohpart hitludi (K)	Herb	Verbenaceae	Leaf	Stomach problem, diabetes	bandaged for 2-3 times within 1 week Decoction of this plant is taken one time daily in empty stomach for the treatment of stomach and diabetes problem. It is taken 2 times daily for better result.
<i>Talinum fruticosum</i> (L.) Juss.	Sohnela (M)	Herb	Talinaceae	Leaf	Kidney stone	Leaves are taken raw for few days to treat against kidney stone diseases
<i>Tinospora cordifolia</i> (Willd.) Miers	Dogittang (G)	Herb	Menispermaceae	Stem	Stomach problem, diabetes	Decoction of this plant is taken one time daily in empty stomach for the treatment of stomach and diabetes problem. It is taken 2 times daily for better result.
<i>Toona ciliata</i> M Roem.	Meswafera (K)	Herb	Meliaceae	Bark	Burn	Bark of the plant is ground to make a paste with water on affected area for 24 hours. The affected part is keeping wet before dry it.
<i>Viscum album</i> L.	Horchur (N)	Climber	Santalaceae	Bark	Bone fracture	Bark of this plant is ground with Euphorbia trigona and Peperomia obtusifoliato make a paste and applied 3 days for one week.
<i>Vitex negundo</i> L	Simouli (N)	Herb	Verbenaceae	Leaf	Malaria fever	Leaves are boiled with water and taken it (5-10 ml), 3 times in one day for 2-3 days to cure Malaria fever.
<i>Zingiber montanum</i> (J.Konig) Link ex A. Dietr.	Sying bloi (M)	Herb	Zingiberaceae	Rhizome	Chest pain, cough	Rhizomes are crushed to prepare paste. It is taken to cure chest problem and raw rhizomes are taken to cure cough.

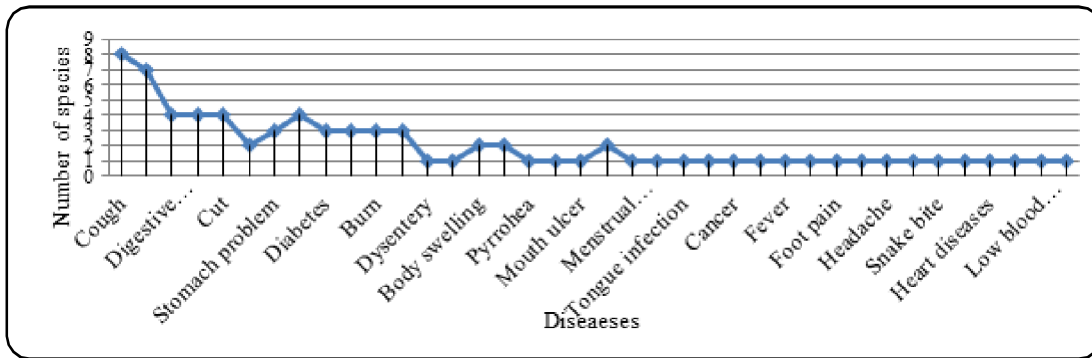


Figure 1. Medicinal plant species used for various diseases.

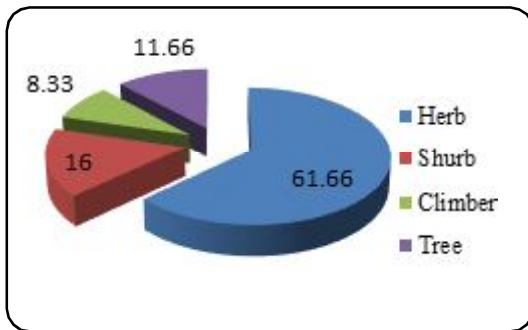


Figure 2: Percentage of plants in terms of its habits out of 39 numbers of plants.

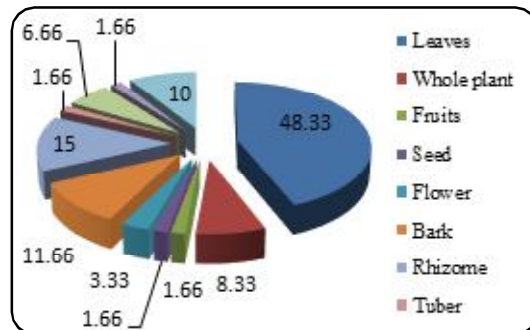


Figure 3: Percentage of plant parts used for various diseases

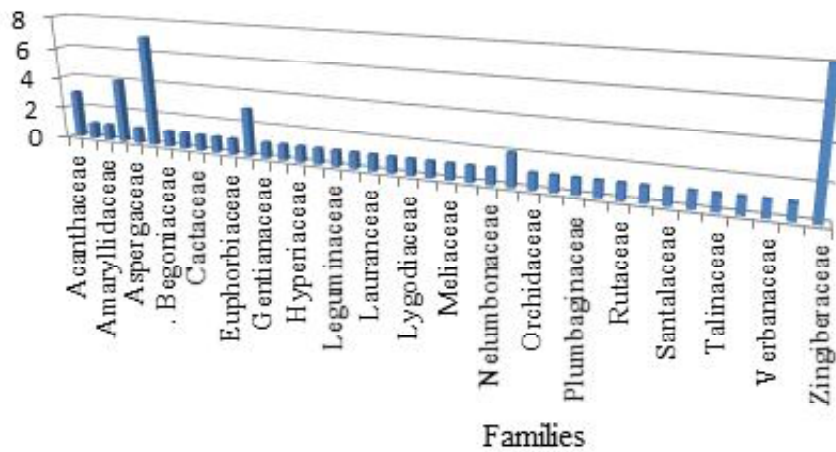


Figure 4: List of family of recorded plant species in the study area

PHOTOS OF SOME MEDICINAL PLANTS



Begonia roxburgii (Miq.) A.D.C. 2. *Alpinia galangal* (L.) Wild 3. *Kaempferia galangal* L. 4. *Achyranthes aspera* L. 5. *Myrica esculenta* Buch.Ham.ex.D.Don 6. *Cymbopogon*

flexuosus (Nees ex Steud.) 7. *Curcuma longa* L. 8. *Cymbopogon citratus* (D.C.) Stapf 9. *Desmodium triflorum* (L.) DC. 10. *Crinum pendunculatum* R.Br. 11. *Dendrobium aphyllum* (Roxb.) C.E.C. Fisch. 12. *Zingiber montanum* (J.Koing) Link ex A.Dietr. 13. *Houttuynia cordata* Thunb. 14. *Pogostemon benghalensis* (Burm.f.) Kuntze 15. *Vitex negundo* L. 16. *Tinospora cordifolia* (Wild.) Miers 17. *Justicia gendarussa* Burm. f. 18. *Plubago zelynica* L. 19. *Catharanthus roseus* (L.) G. Don 20. *Sonchus wightianus* DC.

diseases, preparation of medicine treated have been provided. Herb (61.66%) was considered to be the most dominant in the present study, which was followed by Shrub (18.33%), tree (13.33%), and Climber (8.33%) (figure 2). Leaves (48.33 %) were the most commonly used part in herbal therapy; these are mainly used as in paste form (figure 3). There was several method of preparation of these medicinal plants such as paste, powder, boiled, raw, juice and decoction. Medicinal plants were used to cure various ailments including bone fracture, foot pain, asthma, stomach problem, menstrual problem, skin diseases, dysentery, wound healing, cuts, cough, malaria fever, diabetes, digestive problem, pyorrhea, cancer, gastric problem, acne problem, burn, body swelling, kidney stone, eye problem, chest pain, urine infection, headaches, stomachaches and uterus problem, sinus problem, heart disease, snake bite, blood coagulation, antiseptic, viral fever, injury, tongue infection, low blood pressure, cold, mouth ulcer and throat infection etc (figure 1). Family zingiberaceae contains maximum number of plant species followed by begoniaceae (figure 4.)

In Meghalaya, a large number of indigenous and immigrant ethnic and tribal peoples are inhabit with bewildering physical and cultural features. Ethnic people have always delivered their traditional knowledge from one generation to another. This knowledge is based on their needs, instinct, observation,

long experience and comprises vital role in the daily lives of those ethnic people of Meghalaya. This study from the selected area helped to identified 60 different plant species which are used for medicinal purposes by the local healers. Previously similar study recorded 71 species belonging to 42 families from Nongkhylllem Wildlife Sanctuary located in Meghalaya by Bhuyan & Laskar² 105 ethnomedicinal plant species of 93 genera representing 62 families were found by Kar and Barthakur¹³ in Kameng district of Arunachal Pradesh. Borgohain *et al.*³ documented through semi-structured interview conducted on 17 traditional healers from nine Phake villages of dibrugarh and Tinsukia districts of Assam, 50 medicinal plants used in treatment of 36 ailments to cure a cancer patient by Late Nying Mya Chang Gohain, an herbal healer of Namphake village. In Meghalaya a preliminary Survey was undertaken by Joseph and Kharkongor¹¹ in the Khasi and Jaintia hills contributed substantially to ethnobotanical studies. Kumar *et al.*¹⁵ investigated the Jaintia and Khasi tribes of, Meghalaya and recorded 74 medicinal plants from the study area. Out of total 251 species, 145 species under 115 genera and 64 families were found in Meghalaya, documented by Samiti²⁰. Further, Singh *et al.*²¹ worked on ethnomedicinal plants utilized by the indigenous people of Garo Hills with special reference to the Nokrek Biosphere Reserve, Meghalaya.

The local tribes totally depend on the medicinal plants for primary health care and these plants are also used for different purposes like food, animal fodder, firewood, construction *etc.* Kvist¹⁶ suggested that study of use value helps to identify some useful plant species that should be considered as priorities for conservation. Similar study done by Tabuti *et al.*²³, investigated some of the plant species used for herbal medicines and other uses such as firewood, construction and traditional cultural rites. Low use value of medicinal plants has been related with the lack of the proper used of plant species for medicinal purpose and its conservation.

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