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Article

Medicinal plants used by the tribal communities of Thanchi Upazila in Bandarban Hill District, Bangladesh

Md. Sah Alam[1]*, M. Mahfuzur Rahman[2], Mohammed Kamal Hossain[3] and Tusher Kumer Ray[1]

[1]Minor Forest Products Division, Bangladesh Forest Research Institute, Chattogram, Bangladesh
[2]Department of Botany, Jahangirnagar University, Savar, Dhaka, Bangladesh
[3]Institute of Forestry and Environmental Sciences, University of Chittagong, Bangladesh

*Corresponding author: Md. Sah Alam, Minor Forest Products Division, Bangladesh Forest Research Institute, Chattogram, Bangladesh. Phone: +8801719777897; E-mail: sahalam25@yahoo.com

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Abstract: Medicinal plants play in an important role in the primary health care system. The paper deals with the indigenous knowledge related to ethnomedicinal knowledge and plant parts application for curing various ailments by the ethnic community of Thanchi Upazila of Bandarban Hill District. Semi-structured questionnaires, interviews, group discussions, and specific plant sample collection were done from July 2019 to December 2021 to procure ethno-medicinal data from local herbalists and elderly villagers for this study and from the forest areas. A total of 129 plant species under 110 genera and 63 families have been documented, which have been traditionally used by the ethnic people for the treatment of different ailments. Traditional knowledge and information about medicinal plants such as local names, scientific names, families, habits, habitats, plant-parts used, names of ailments, modes of use, etc. were recorded, validated, and documented. Plant families namely, Asteraceae and Euphorbiaceae were represented by the highest (8) number of species, followed by Fabaceae, Verbenaceae, Apocynaceae, Araceae, Caesalpiniaceae, Lamiaceae, Rubiaceae and Zingiberaceae. The most widely used medicinal plants included *Anacardium occidentale, Bombax ceiba, Calotropis gigantea, Terminalia chebula, Aegle mermelos, Ageratum conyzoides, Andrographis paniculata, Aristolochia indica, Blumea balsamifera, Bryophyllum pinnatum, Celosia cristata, Centella asiatica, Melastoma malabathricum, Mimosa pudica, Musa paradisiaca, Oroxylum indicum, Plumbago indica* and *Vitex negundo*. Herbs (36%) were found to be the most used plant, followed by shrubs (33%), trees (17%), climbers (9%) and fern (5%). Most medicinal plants were used for the treatment of fever, skin diseases, cough problems, menstrual problems, body pain, indigestion, headaches, stomachaches, constipation, swelling problems, wounds and others. Among the plant parts, mostly leaves were used (43%), followed by roots (21%), whole plants (10%), stems (6%) along with fruit, rhizome, flower, bark, seed and latex for the treatment of diseases. The most common formulations prescribed to treat various diseases were juices. The findings will be useful for future research in the Bandarban Hill District.

Keywords: herbal medicine; indigenous knowledge; medicinal plants; Thanchi upazila

1. Introduction

Plants have been used to treat a variety of ailments since prehistoric times in human civilization. Plants, plant parts, and plant products of all kinds, particularly those with medicinal properties, have been used as the main ingredients of various traditional medicines since time immemorial (Motaleb *et al.*, 2013). Antibiotics, anti-

malarial drugs, cardiotonics, sympatho and para-sympathomimetics and other important modern pharmaceuticals have been derived from indigenous plants (Balick and Cox, 1996). Ethnomedicinal knowledge is essential for identifying plants as therapeutic agents (Balick, 1990). Ethnobotanical samples contain novel drug compounds and aid in the discovery of economically important plant-based drugs (Cox and Balick, 1994). Approximately 5,000 species of higher cryptogams and phanerogams have been reported to grow in Bangladesh, with over 1,000 of these being thought to have medicinal properties (Mia and Ghani, 1990). It has been reported that approximately 450 to 500 plants growing or available in Bangladesh have therapeutic properties (Yusuf *et al.,* 1994). Chowdhury *et al*. (1996) documented 42 folk formularies, Alam *et al.* (1996) documented 143 folk formularies, and Yusuf *et al*. (2007) provide information on 69 medicinal plants which are used in different diseases. Mohiuddin *et al.* (2012) documented ethnomedicinal knowledge on 70 plant species from 36 families used by the Marma, Bwam, Murang, and Tanchangya tribes in the Bandarban hills. Rahman (2010) claims that the majority of the country's tribal groups live in hilly areas and rely on herbal medicine for primary care. Motaleb *et al*. (2013) provide information on 116 medicinal plants used by the traditional herbal practitioners of Thanchi upazila of Bandarban.

The rich heritage of indigenous knowledge is regarded as the foundation of all traditional medicine systems in Bangladesh. The majority of Bangladesh's medicinal plants are widely used in the preparation of Unani and Ayurvedic medicines. Indeed, ethnomedicinal research has been a key source for the discovery of both natural and synthetic drugs (Fabricant and Farnsworth, 2001). In recent years, ethnobotanical knowledge has been used as a starting point for many successful drug screening projects (Heinrich and Bremner, 2006). According to World Health Organization (WHO) data, approximately 80% of the world's population, particularly rural people in developing countries, continue to rely primarily on traditional medicines (Islam, 2006). It is estimated that more than a quarter of all prescription drugs used in developed countries contain active principles derived from plants, including anticancer drugs (Cragg *et al.,* 1997).

The majority of people in Bangladesh, particularly in tribal communities, rely on traditional medicinal healers to treat their ailments. Traditional healers treat patients with medicinal plants and are considered experts in plant knowledge and preparation in disease-treating formulations. Ethnomedicinal information about medicinal plant uses can be a valuable resource for scientists looking for new medications, as well as having a significant bioeconomic impact in the future (Ghiselin and Landa, 2005). Because of unsustainable exploitation and land use changes, these valuable assets have been rapidly depleted (Motaleb, 2010). This valuable indigenous knowledge is dwindling as modern health care systems emerge in hilly areas (Rahman *et al*., 2003). In recent years, there has been a gradual migration of traditional medicinal healers to other jobs for a better lifestyle. Though some of the elderly men and women in the community are knowledgeable about the use of therapeutic plants, this age-old medicinal knowledge is rapidly dwindling. This is unfortunate because the medicinal plants used by healers have received little attention and could be a source of new and effective drugs. Indigenous knowledge must be documented in order to conserve and utilize biological resources (Tugume *et al*., 2016). However, there is very little information available on the ethno-medicinal plants used by tribal communities in Thanchi Upazila, Bandarban Hill District. The current study was undertaken to document traditional knowledge on herbal treatment by four tribes namely the Chakma, Marma, Tripura and Tanchangya of Thanchi Upazila, Bandarban Hill District of Bangladesh.

2. Materials and Methods

For three years, from 2019 to 2021, a series of explorations in the tribal areas of Thanchi upazila of the Bandarban district were carried out. During the study, we visited three tribal paras in Thanchi Upazila, namely Bali Para, Darsi Para, and Naidheri Para, to collect ethnomedicinal plants. The tribal herbal healers, known as Baiddaya or Kabiraz locally. Plant specimens were collected in different seasons for the study, along with the necessary information, with the assistance of herbal healers from the surrounding forest areas. The collected information was cross-checked in the field to validate the gathered information. Documentation has been made by taking random interviews of the traditional health practitioners, elderly men and women as far as possible. The interview process was chosen by using open-ended and semi-structured question techniques, then noted and recorded with a digital voice recorder. Repeated interviews confirmed the accuracy of the information on each plant. Information collected on the mentioned local names, plant parts used, and methods of use, diseases for which the formulations were used and dosages. An interpreter was involved during data collection and sharing

who had translated the local language into Bengali. Fresh plant samples were collected and brought to the informants. The common plant samples were identified in the field by the authors, and the unidentified species were preserved in the herbarium sheet and finally identified with the help of plant taxonomists of the Forest Botany Division of Bangladesh Forest Research Institute, Chattogram and Bangladesh National Herbarium, Dhaka. Voucher specimens were deposited in the herbarium of the Bangladesh Forest Research Institute (BFRI). Use Value and Relative Frequency of Citation were determined by using the following formula.

The UV was calculated using the following formula UV=∑U/N, where U= Number of uses mentioned by the informants for a given species and N= Total number of informants interviewed (Savikin *et al.*, 2013). High UV score indicates that there are many use reports for that plant and low UV score indicates fewer use reports cited by the informants.

Relative frequency of citation (RFC) of species was calculated by RFC = FC/N, where FC = The number of informants mentioning a useful species and N= The total number of informants in the survey (Vitalini *et al.*, 2013). The RFC index ranges from "0" when no informants mentioned a plant as useful to "1" when all informants mentioned a plant as useful. Local or tribal names are italicized in this paper, followed by the tribal name in parenthesis, in abbreviated form (B for Bengali, M for Marma, Ch for Chakma, Tr for Tripura, and Ta for Tanchangya).

3. Results and Discussion

The present study documented 129 plant species under 63 families in 110 genera that are traditionally used for the treatment of 100 different health conditions (Table 1). The plants are listed with their scientific name, vernacular name, tribal name, habit, plant parts used, mode of use and ailment/s treated. Among the families, Asteraceae and Euphorbiaceae represented the highest number of (8) of medicinal plant species, followed by Fabaceae and Verbenaceae (7), Apocynaceae, Araceae, Caesalpiniaceae, Lamiaceae, Rubiaceae and Zingiberaceae (5), Acanthaceae (4), Amaranthaceae, Combretaceae, Myrsinaceae and Solanaceae (3), Asclepiadaceae, Leeaceae, Malvaceae, Menispermaceae and Poaceae shared 2 species individually. The rest of the families comprised one species each (Figure 1).

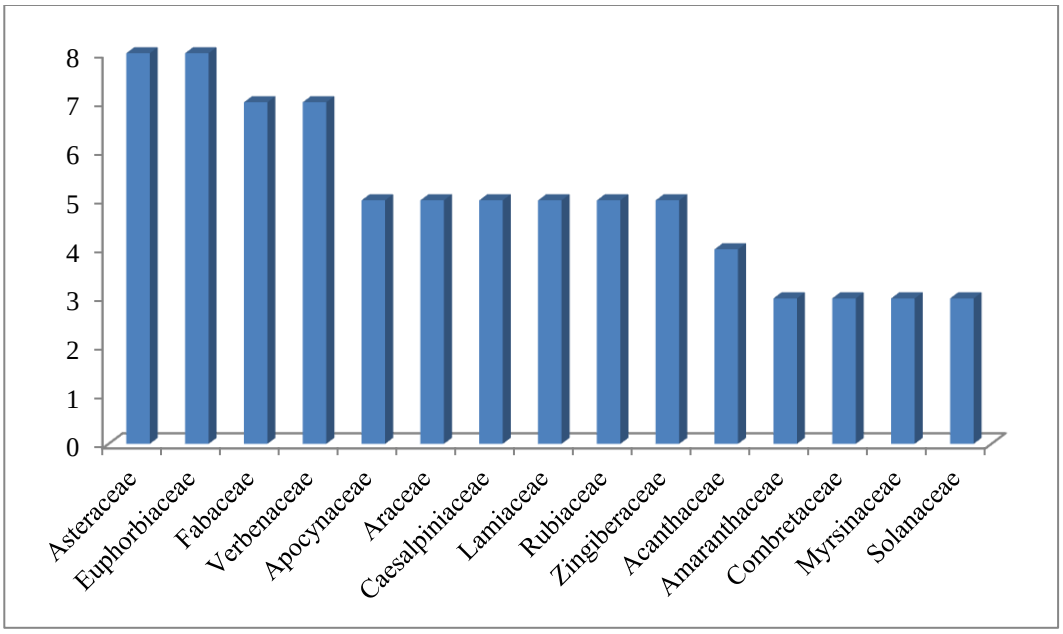

Figure 1. Ethnomedicinal plant species distribution among the dominant 15 families.

In life form, herbs (36%) were found to be the most used plant, followed by shrubs (33%), trees (17%) and climbers (9%) and Fern (5%) respectively (Figure 2). According to Baydoun *et al*. (2015), because of their medicinal properties, herbs were commonly used in herbal preparations to treat a wide range of primary human ailments and therapeutic indications.

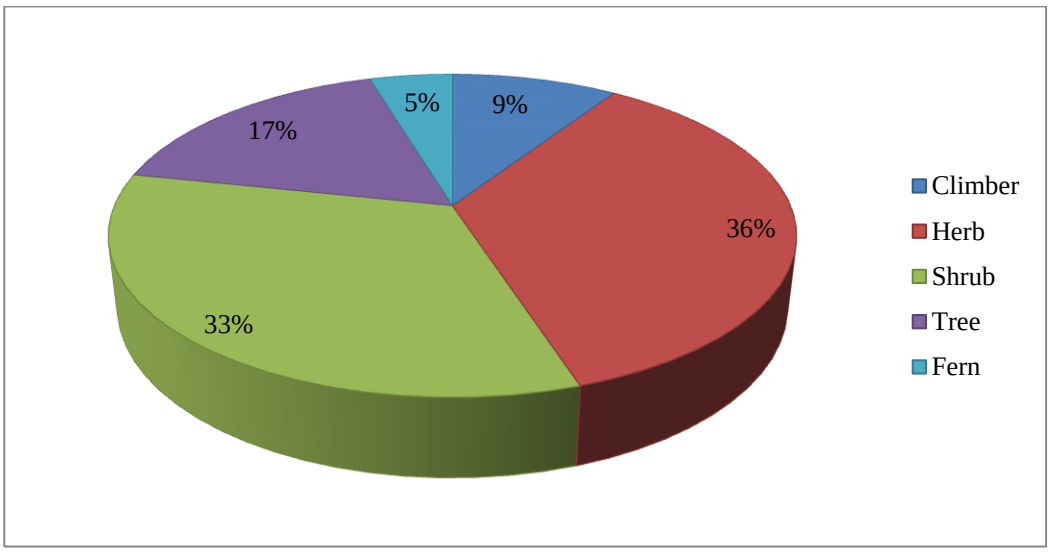

Figure 2. Habit-wise classification of ethnomedicinal plants used by the ethnic community.

The most used plant part was leaves (43%) followed by root (21%), whole plant (10%), stem (6%), fruit (5%), rhizome (5%), flower (4%), bark (3%), seed (2%) and latex (1%) (Figure 3). The simplicity of the leaf collection in comparison to other parts of the plant makes it a favourite for herbal preparation (Giday *et al*., 2003). Furthermore, in terms of metabolite production and photosynthesis, the leaves are the most active part of the plant (Ghorbani 2005). According to Baydoun *et al*. (2015) the leaves and flowering parts are popular among herbal practitioners due to their ease of collection and availability.

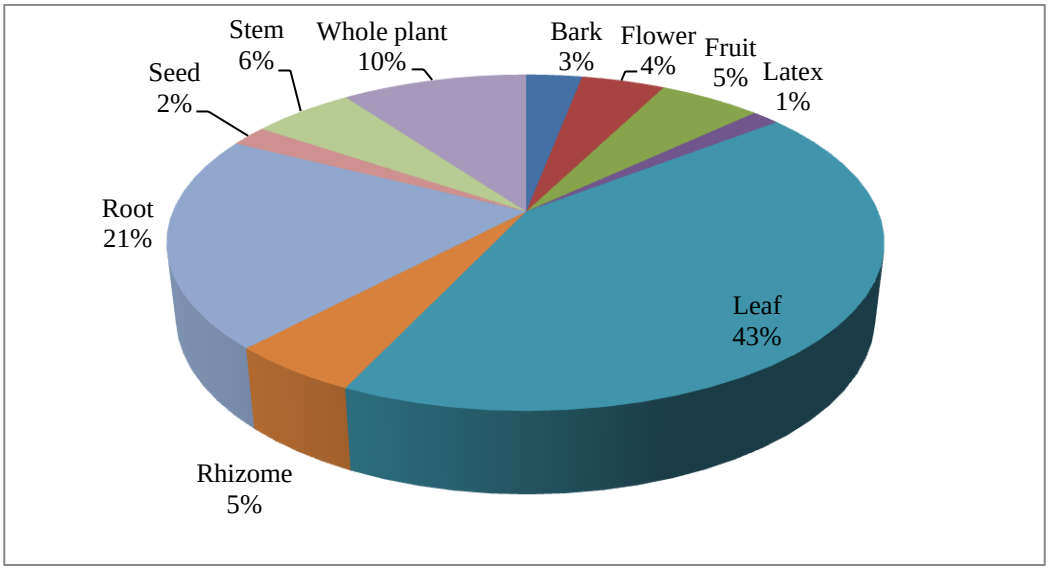

Figure 3. Proportion of different morphological parts used as herbal medicine.

To treat different diseases, the most common formulations were prescribed as juice (31%), followed by paste (24%), decoction (12%), Raw (8%), pills (6%), powder (5%), Poultice (5%), curry (4%), Extract (3%) and fermentation (2%) (Figure 4). According to Nadembega *et al*. (2011) decoction is one of the most common types of herbal formulations in traditional herbal medicine because it is very simple to prepare ethnomedicine by simply mixing plant parts with boiling water. Nevertheless, herbal healers of Thanchi upazila generally practiced juice extraction formulations. It is possible that this is due to their local adaptation to Thanchi upazila's harsh environment and the tradition they inherited from their predecessor.

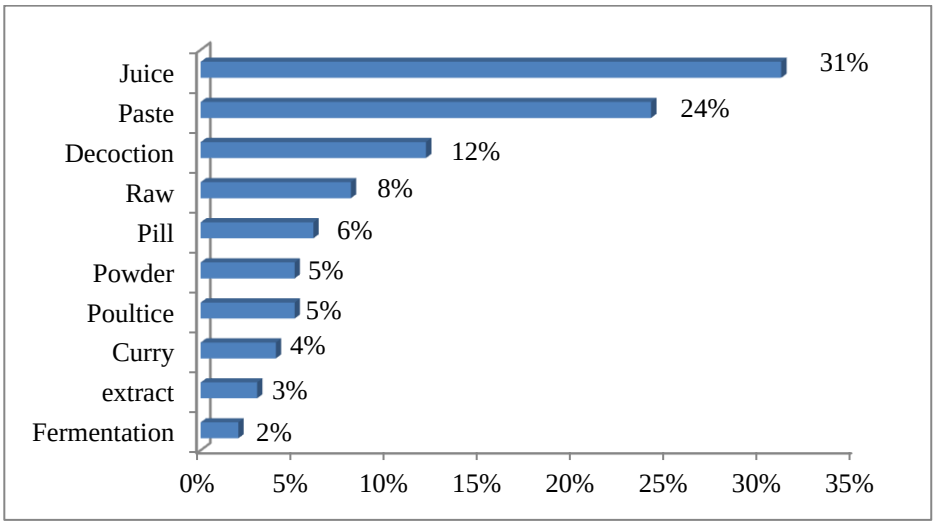

Figure 4. Preparation method of herbal remedies in the management of various human ailments.

A total of 100 diseases or symptoms that were treated by the herbal practitioner were recorded from this study and it was found that fever were treated by most of the plants (14) followed by skin diseases (13), cough and menstruation problem (12 each), body pain and indigestion (11), abdominal pain, headache, stomachache (10 each), constipation, swelling problems and wounds (09 each), asthma, bone fracture, dysentery and jaundice (08), and bleeding, diarrhea, leucorrhoea and piles and rheumatic pain (07 each) (Figure 5). Sumbul *et al.* (2011) reported that *Myrtus communis* has been used to treat dysentery, rheumatism, hemorrhages, diarrhea, gastric ulcers, and vomiting. *Foeniculum vulgare* fruit was used to treat diabetes, kidney disease, stomach problems, and hypertension (Jouad *et al.*, 2001). According to Abe and Ohtani (2013) *Solanum nigrum* is used to treat hypertension. Uniyal *et al*. (2006) discussed the ethnomedicinal significance of *Agave bracteosa* for treating mouth ulcers and breathing problems in children. Diabetes is treated with the aerial parts of *Artemisia vulgaris* (Qureshi *et al*., 2007). According to Dulla and Jahan (2017), the entire plant of *Cynodon dactylon* is used in the treatment of tuberculosis and diabetes.

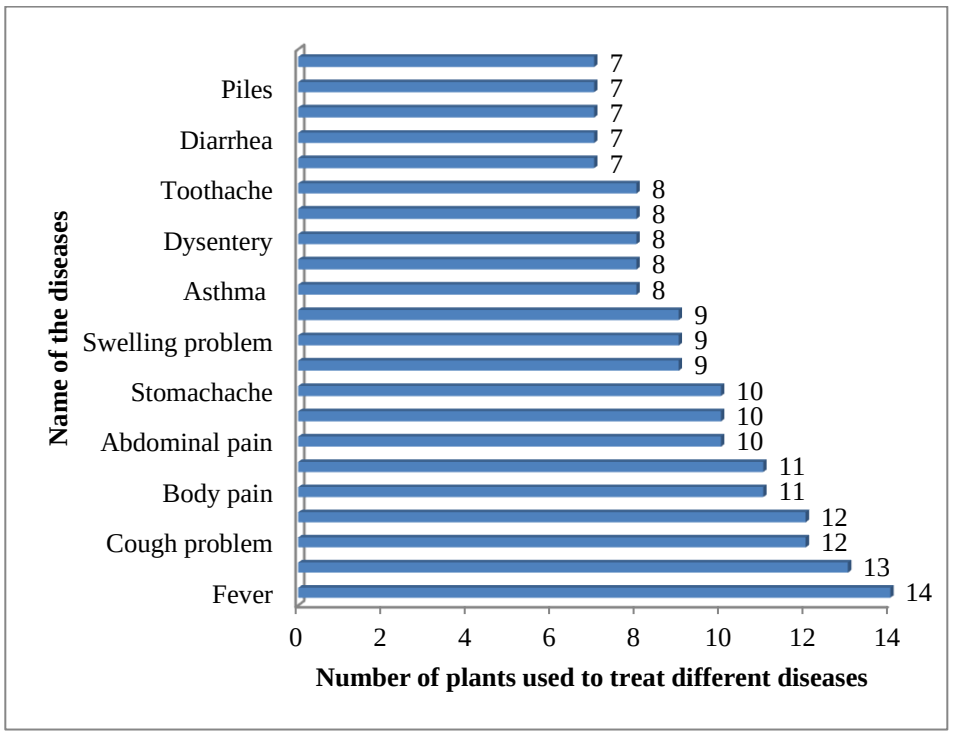

Figure 5. Number of plants with different ethno medicinal actions (Diseases that used seven and above number of plants).

The traditional knowledge on ethnomedicinal plants used in the treatment of various human ailments was analyzed using ethnobotanical indices such as UV and RFC. In the present study, UV ranged from 0.13 to 0.75. Of the 129 reported ethnomedicine species, 18 plant species were identified with UV greater than 0.5; *Anacardium occidentale, Bombax ceiba, Calotropis gigantea, Terminalia chebula, Aegle mermelos, Ageratum conyzoides, Andrographis paniculata, Aristolochia indica, Blumea balsamifera, Bryophyllum pinnatum, Celosia cristata, Centella asiatica, Melastoma malabathricum, Mimosa pudica, Musa paradisiaca, Oroxylum indicum, Plumbago indica and Vitex negundo* (Table 1). The medicinal plant species with low UV are also very important and should not be overlooked, as failing to declare them to future generations could increase the risk of their extinction. Plant species with high UV levels should be further investigated for active compounds in ethnopharmacological studies (Mahmood *et al*., 2012).

RFC is used to identify the most commonly used plant species in the study area for various human ailments. Its value ranged between 0.2 and 0.8. Twenty plant species reported in this study showed high values *Bryophyllum pinnatum, Andrographis paniculata, Begonia roxburghii, Bombax ceiba, Terminalia chebula, Anacardium occidentale, Angisopteris evecta, Aristolochia indica, Blumea balsamifera, Calotropis gigantea, Centella asiatica, Melastoma malabathricum, Mimosa pudica, Oroxylum indicum, Tamarindus indica, Vitex negundo, Aegle mermelos, Ageratum conyzoides, Alpinia conchigera* and *Amaranthus spinosus*. (Figure 6).

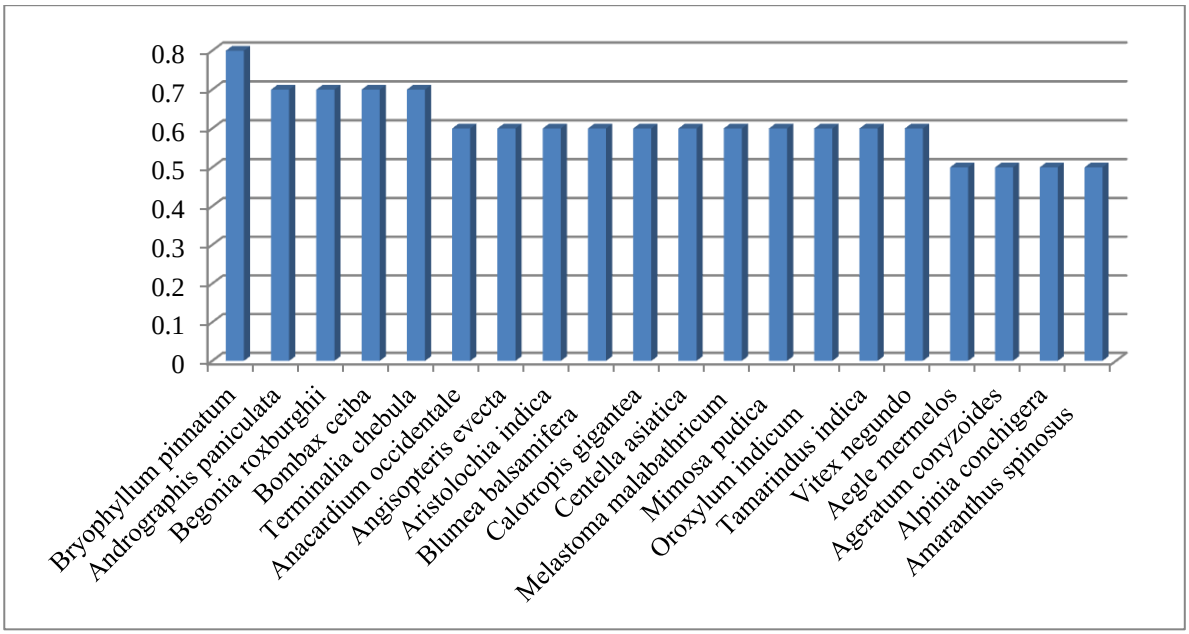

Figure 6. Relative Frequency Citations for medicinal plant species.

The ethnomedicinal plant species with higher RFC values show that the majority of the local people were familiar with these plant species (Kayani *et al.,* 2014). Medicinal plant species with high RFC should be studied further for phytochemical and pharmaceutical analysis to identify active constituents for drug extraction (Vitalini *et al.,* 2013).

Table 1. List of medicinal plant species used by the ethnic community of Thanchi upazila, along with their use values, relative frequency of citation, mode of preparation and administration.

Scientific name	Local/Tribal Name	Habit	Plant parts used	Mode of preparation	Taking route	Status	RFC	UV	Ailments
Acanthaceae									
Andrographis paniculata (Burm.f.) Nees	*Kalomegh* (B), *Charta* (Ma), *Kalomeghat* (Ch).	Herb	Whole plant	Juice and decoction	Oral	Wild, cultivated	0.7	0.63	Dysentery, constipation, worms and stomach problem
*Justicia adhatoda*L.	*Basok pata* (B), *Sadioruiccha* (Ta), *Lespu pang* (Ma).	Shrub	Leaf	Juice	Oral	Cultivated	0.3	0.5	Cough, cold, fever and asthma
Staurogyne argentea Wall.	*Chemdima* (Ta), *Rmbung* (Ma), *Chongra lej* (Ch), *Woanabalai* (Tr).	Herb	Leaf	Juice	Oral	Wild	0.5	0.5	Jaundice, cancer, gout and body pain
Thunbergia grandiflora (Roxb. *ex* Rottl) Roxb.	*Neel lata* (B), *Del ludi* (Ch), *Gain dhaya* (Ma), *Botualodi* (Ta).	Climber	Leaf	Juice and paste	Oral and external	Wild	0.4	0.5	Leucorrhoea, treat swollen of the body, eye diseases and hysteria
Adiantaceae									
Adiantum caudatum L.	*Mayurshikha* (B)	Fern	leaf	Juice and paste	Oral and external	Wild	0.4	0.25	Excessive bleeding after child birth and anorexia
Agavaceae									
Sansevieria roxburghiana Schult. & Schult. f.	*Gorachaka* (B), *Grita kanchan* (Ch), *Pagaza* (Ma), *Pakharesu* (Tr).	Herb	Rhizome	Juice	Oral	Wild	0.4	0.5	Gonorrhea, glandular enlargement, bone pain and fever
Aloeaceae									
Aloe vera (L.) Burm. f.	*Grita kumari* (B), *Aloe* (Ch), *Ritakumari* (Ta)	Herb	Leaf	Juice and paste	Oral and external	Cultivated	0.4	0.38	Eczema, menopause problem and paralysis
Amaranthaceae									
Amaranthus spinosus L.	*Katanotey* (B), *Hada maresh* (Ch), *Karamaiddhari* (Ta), *Mo gooyai apang* (Ma), *Mira shak* (Tr).	Herb	Whole plant	Juice and extract	Oral	Wild	0.5	0.5	Chicken pox, fever, vomiting and burning urination
Celosia cristata L.	*Morogphul* (B), *Rangajat kuro* (Ch), *Radhachuma phul* (Ta), *Cram pang gach* (Ma), *Khongacha* (Tr).	Herb	Root, flower and stem	Juice and paste	Oral and external	Wild, cultivated	0.5	0.63	Irregular menstruation, piles, body swollen, leucorrhoea and measles
Cyathula prostrata (L.) Blume	*Shyontula* (B), *Huruan ludi* (Ch), *Ungbayoo gach* (Ma), *Otalengra* (Tr).	Herb	Root and leaf	Juice and extract	Oral	Wild	0.3	0.38	Gastric, oedema and pneumonia
Anacardiaceae									
Anacardium occidentale L.	*Kajubadam* (B), *Kresenath gach* (Ch), *Keshna* (Ta).	Tree	Leaf and fruit	Decoction	Oral	Wild, cultivated	0.6	0.75	Diarrhea, skin infection, burns, ulcer, tonsillitis and eczema
Annonaceae									
Polyalthia longifolia (Sonn.)Thwaites	*Debdaru* (B), *Rangadaru* (Ta), *Sukchan* (Ma).	Tree	Bark	Juice	Oral	Cultivated	0.2	0.25	Fever

Table 1. Cont.

Apiaceae									
Centella asiatica (L.) Urb.	*Thankuni* (B), *Menmeni* (Ch), *Mrang khua* (Ma), *Shakkumu bakla* (Tr).	Herb	Leaf	Juice and paste	Oral and external	Wild	0.6	0.63	Blood dysentery, indigestion, conjunctivitis, insomnia and healing wounds
Apocynaceae									
Catharanthus roseus (L.) G. Don	*Nayantara* (B), *Chok phul* (Ch).	Herb	Leaf and root	Decoction and powder	Oral	Cultivated	0.4	0.5	Diabetic, dysentery, asthma and cancer
Tabernaemontana recurva Roxb. *ex* Lindl.	Baka tagar (B), *Kattodogor* (Ta), *Sungchung touring* (Ch).	Shrub	Leaf	Juice and paste	Oral and external	Wild	0.2	0.25	Insect bite and acidity
Alstonia scholaris (L.) R. Br.	*Chhatim* (B), *Chenchana Gaith* (Ta), *Choilibang* (Ma), *Chailai fang* (Ch), *Chetang* (Tr).	Tree	Stem bark, leaf and latex	Paste	External	Wild, cultivated	0.4	0.38	Rheumatic pain, gout and skin diseases
Ichnocarpus frutescens (L.) W. T Aiton.	*Syamalota* (B), *Dudhnoi* (Ch), *Bhutta ludi* (Ta), *Langibkhe nuyee* (Ma).	Climber	Leaf	Paste and decoction	Oral and external	Wild	0.4	0.38	Stop bleeding, fever and ham
Tabernaemontana divericata (L.) R. Br.	*Tagar* (B), *Hastadangar* (Ch), *Tuchuru* (Ma).	Shrub	Leaf and stem	Extract, juice and pill	Oral	Cultivated	0.3	0.38	Bronchitis, rheumatic pain and abdominal pain
Araceae									
Alocasia acuminata Schoot	*Pata bokakachu* (B), *Chayara kan kachu* (Ch), *Mohra pring* (Ma)	Herb	Rhizome and stem	Decoction and paste	Oral and external	Wild, cultivated	0.3	0.25	Skin diseases and earache
Acorus calamus L.	*Bach* (B), *Bospata* (Ch), *Langyee* (Ma), *Laing gach* (Tr).	Herb	Whole plant	Paste, powder and juice	Oral and external	Wild, cultivated	0.3	0.38	Headache, cough and pneumonia
Amorphophallus bulbifer (Roxb.) Blume	*Jongle ol* (B), *Batyma* (Tr), *Gongkhapang* (Ma).	Herb	Bulbil	Paste	Oral and external	Wild	0.2	0.25	Insect bite
Homalomena aramatica (Spreng.) Schott	*Gandhobi kochu* (B), *Sarankong* (Ma), *Chongra lej* (Ch), *Woanabalai* (Tr).	Herb	Leaf, rhizome and stalk	Paste and decoction	Oral and external	Wild	0.3	0.38	Piles, insect bite and blood dysentery
Typhonium trilobatum (L.) Schott	*Ghet kochu* (B), *Mowsi* (Ma), *Alendra* (Tr), *Kharbach* (Ch).	Herb	Leaf and root	Juice and paste	Oral and external	Wild	0.3	0.38	Gastric, wound healing and liver diseases
Araliaceae									
Schefflera elliptica (Blume) Harms	*Dahina kath* (B), *Deno appo* (Ch).	Shrub	Leaf and root	Juice and paste	Oral and external	Wild	0.5	0.5	Insomnia, tumor, bone dislocation and hiccup
Aristolochiaceae									
Aristolochia indica L.	*Iswarmul* (B), *Tajiya ludi* (Ch).	Climber	Root, leaf and seed	Juice	Oral	Wild, cultivated	0.6	0.63	Stomachache, rheumatism, cough, joint pain and anemia

Table 1. Cont.

Asclepiadaceae									
Calotropis gigantea (L.) Drynad.	*Akanda* (B), *Angar pata* (Ch), *Angorpata gaas* (Ta), *Monouarowi* (Ma), *Khachkufu* (Tr).	Shrub	Leaf and latex	Fomentation, decoction and poultice	Oral and external	Wild	0.6	0.75	Bone fracture, oedema, malarial fever, ringworm, pain and cough
Hoya parasitica (Wall. *ex* Hornem.)	*Serapatahoya* (B), *Fessya gach* (Ch), *Faissa gaith* (Ta), *Samapungka lata* (Ma).	Climber	Leaf	Juice, decoction and paste	Oral and external	Wild, cultivated	0.4	0.5	Ear abscess, paralysis, headache and arthritis
Asteraceae									
Blumea balsamifera (L.) DC.	*Nagor chandal* (B), *Seratagun gach* (Ma), *Charafudung* (Ch), *Kumpala* (Tr).	Shrub	Leaf	Extract, fomentation and pill	Oral and external	Wild	0.6	0.63	Gout, oedema, leg pain, cough and chronic eye diseases
Spilanthes calva DC.	*Marhatinga* (B), *Chang hang foik* (Ch), *Hang fui* (Ma).	Herb	Leaf	Juice and paste	Oral and external	Wild	0.4	0.5	Knee pain, epilepsy, allergy and snake bite
Chromolaena odorata (L.) R.M.king & H. Rob.	*Bara shialmuti* (B), *Mugujuher* (Ch), Desmara kher (Ta), *Aga Bya* (Ma).	Herb	Whole plant	Juice, decoction and paste	Oral and external	Wild	0.4	0.38	Cough, gastric and healing wound
Conyza semipinnatifida Wall. *ex* DC.	*Adha conyza* (B), *Fyoichi* (Ma).	Herb	Leaf	Paste	External	Wild	0.2	0.13	Boils
Mikania cordata (Burn. f.) B.L.Rob.	*Refuzi lata* (B), *Asham ludi* (Ch), *Woalaban* (Ma), *Lurri puttee* (Ta).	Herb	Whole plant	Juice and paste	Oral and external	Wild	0.3	0.25	Stop bleeding and wound healing
Ageratum conyzoides L.	*Fulkuri* (B), *Monipuizza Kher* (Ch), *Wichee* (Ma), *Munpuria* (Tr).	Herb	Leaf	Juice, extract and paste	Oral and external	Wild	0.5	0.63	Cutting wounds, oedema, hiccup and headache
Emilia sonchifolia (L.) DC *ex* DC	*Sadusi* (B), *Fao ma* (Ma), *Dandha upon* (Ta).	Herb	Leaf	Juice and pill	Oral	Wild	0.4	0.38	Eye inflammations, night blindness and joint pain
Eupatorium triplinerve Vahl	*Ayapan* (B), *Paihu* (Ma), *Baishak* (Ta).	Herb	Leaf	Decoction	Oral	Wild, cultivated	0.4	0.38	Haemorrhage, ulcer and stomachache
Athyriaceae									
Diplazium esculentum (Retz.) Sw.	*Dheki shak* (B), *Mrang khowa* (Ch), *Gaing dok* (Ma).	Fern	Leaf	Mixture and juice	Oral	Wild	0.3	0.25	Swollen knee and allergy
Begoniaceae									
Begonia roxburghii A. DC.	*Gonirakto* (B), *Kayokha khine* (Ma), *Khar tetoi* (Ch).	Herb	Whole plant	Juice and paste	Oral and external	Wild	0.7	0.50	Stone in urinary tract, intestinal worms, spleen problem and jaundice
Oroxylum indicum (L.) Kurz	*Khona* (B), *Khron sha mi* (Ma), *Khona gula gach* (Ch), *Taokharong bofang* (Tr).	Tree	Bark and leaf	Juice, paste and extract	Oral and external	Cultivated	0.6	0.63	Headache, body pain, hydro-cele, jaundice and tonsillitis

Table 1. Cont.

Bombacaceae									
Bombax ceiba L.	*Shimul* (B), *Chamful gaith* (Ta), *Lakh Pine* (Ma).	Tree	Gum, root and flower	Powder, paste and juice	Oral and external	Cultivated	0.7	0.75	Diarrhea, leucorrhoea, dysentery, boils, sores and gonorrhea
Caesalpiniaceae									
Senna hirsuta (L.) H.S. Irwin and Barneby	*Gandhosena* (B), *Mring chi* (Ma), *Jed ketrang* (Ch), *Muitopi* (Tr).	Shrub	Leaf and root	Juice and paste	Oral and external	Wild	0.3	0.38	Snake bite, blood purify and boils
*Bauhinia acuminata*L.	*Shet kanchan* (B), *Dhub kanchan* (Ch), *Thangba pang* (Ma)	Tree	Leaf, root and bark	Juice and decoction	Oral	Wild, cultivated	0.3	0.38	Epilepsy, jaundice and leprosy
Senna alata (L.) Roxb.	*Dadmardhan* (B), *Delong pata* (Ch), *Dotlong* (Ta), *Pouchibang* (Ma), *kochakbalai* (Tr).	Shrub	Leaf	Juice and paste	Oral and external	Wild	0.5	0.5	Ringworm, eczema, hookworm and constipation
Senna tora (L.) Roxb.	*Chakunda* (B), *Danggeya* (Ma), *Echirgaith* (Ta), *Abe hamalley* (Ch).	Shrub	Leaf	Curry and decoction	Oral	Wild	0.5	0.5	Insanity, cough, eczema and ringworm
Tamarindus indica L.	*Tentul* (B), *Tedoy* (Ch), *Teroi gaith* (Ta), *Mohoisipang* (Ma), *Arang katra* (Tr).	Tree	Fruit and leaf	Juice and poultice	Oral and external	Cultivated	0.6	0.5	High blood pressure, general weakness, inflammatory swelling and sore throat
Clusiaceae									
Mesua ferrea L.	*Nageshwar* (B), *Naksaful* (Ch), *Kaingoba* (Ma).	Tree	Seed, root and flower	Paste, juice and pill	Oral and external	Cultivated	0.5	0.5	Nasal polyp, weakness, leucorrhoea and piles
Combretaceae									
Terminalia arjuna (Roxb. *ex* Dc.) Wight &Arn	*Arjun* (B), *Arjuun* (Ma), *Arjun gach* (Ch).	Tree	Bark	Decoction and powder	Oral	Cultivated	0.3	0.25	Leucorrhoea and cardiac weakness
Terminalia bellirica (Gaertn.) Roxb.	*Bahera* (B), *Bora-gach* (Ch), *Ka sing ba* (Ma), *Boya gula* (Ta).	Tree	Fruit	Decoction	Oral	Cultivated	0.4	0.38	Cough, piles and anorexia
Terminalia chebula Retz.	*Horitaki* (B), *Oittal* (Ch), *Ajubang* (Ma).	Tree	Fruit	Decoction	Oral	Cultivated	0.7	0.75	Leucoderma, constipation, ulcer, flatulence, enlarged spleen and diarrhea
Commelinacaeae									
Commelina diffusa Burm. f.	*Monayna kanshira* (B), *Bat boitta shak* (Ch), *Kanaiya aga* (Ma).	Herb	Whole plant	Decoction and curry	Oral	Wild, cultivated	0.3	0.38	Anemia, leucorrhoea and urinary burning
Costaceae									
Costus speciosus (J. Koenig) Sm.	*Keu* (B), *Premdaba* (Ma), *Madagong lak* (Ta), *Keo* (Ch).	Herb	Whole plant	Decoction, curry and juice	Oral and external	Wild	0.4	0.5	Evil spirit, indigestion, paralysis and earache

Table 1. Cont.

Crassulaceae									
Bryophyllum pinnatum (Lamk.) Oken	*Pathorkuchi* (B), *Roah-kapanghey* (Ch), *Rokkapang bang* (Ma), *Geos* (Tr).	Herb	Leaf	Juice and paste	Oral and external	Cultivated	0.8	0.63	Whooping cough, pneumonia, removing stone from kidney, burn problem and dysentery
Cucurbitaceae									
Coccinia grandis (L.) Voigt	*Telakucha* (B), *Ludi ishwarmuli* (Ch), *Sangbuai pang* (Ma).	Climber	Leaf	Juice and decoction	Oral	Wild	0.4	0.38	Diabetes, skin eruptions and hypertension
Cycadaceae									
Cycas pectinata Buch.-Ham.	*Cicas gaas* (B), *Monirajphul gach* (Ch), *Moidya safai* (Ma), *Bardhoman gach* (Ta).	Tree	Leaf, fruit and flower	Juice and paste	Oral and external	Wild	0.5	0.5	Asthma, breast tumor, menstruation problem and insect stings
Euphorbiaceae									
Euphorbia hirta L.	*Dudhiya* (B), *Kanphul gach* (Ch), *Saima mungye* (Ma), *Dutta kher* (Tr).	Herb	Whole plant	Decoction and pill	Oral	Wild	0.4	0.38	Bronchial affections, dysentery and piles
Breynia retusa (Dennst.) Alston	*Silpati* (B), *Mech-chok-bichi* (Ch), *Taipak* (Ma).	Shrub	Leaf and stem	Juice and extract	Oral	Wild	0.3	0.38	Conjunctivitis, ulcer and toothaches
Croton bonplandianus Baill.	*Nakphul* (B), *Pai hiya* (Ma).	Herb	Whole plant	Juice, extract and paste	Oral and external	Wild	0.4	0.38	Gastric ulcer, abdominal pain and eczema
Jatropha gossypifolia L.	Laljeol (B), *Ranga bhedal gach* (Ch), *Karachuni* (Ma), *Lal Bherenda* (Tr).	Shrub	Leaf and root	Juice and paste	Oral and external	Wild	0.4	0.38	Fistula, hydrocele and excessive menstruation
Pedilanthus tithymaloides (L.) Poit.	*Rangchita* (B), *Mornak* (Ma), *Dandarkut gach* (Ta).	Shrub	Leaf	Paste	External	Wild	0.4	0.38	Bone fracture, body pain and eczema
Phyllanthus emblica L.	*Amloki* (B), *Amloti* (Ch), *Kalamabagula* (Ta), *Chachabang* (Ma).	Tree	Fruit	Powder and juice	Oral	Cultivated	0.5	0.5	Anorexia, dyspepsia, flatulence and hair fall
Phyllanthus niruri L.	*Bhuiamla* (B), Grukhri (Ma), Kura amluki (Ta), *Bamuri bangha kher* (Ch), *Louko amlai* (Tr).	Herb	Whole plant	Pill, juice and powder	Oral	Wild	0.4	0.5	Stomachache, tetanus, gonorrhea and vomiting
Phyllanthus reticulatus Poir.	*Chitki* (B), *Ghung-nel* (Ma), *Bospai* (Tr), *Lodi pata* (Ch).	Shrub	Leaf and root	Paste and juice	Oral and external	Wild	0.4	0.38	Boils, diabetes and malaria
Fabaceae									
Flemingia macrophylla (Willd.) Merr.	*Bara salphan* (B), *Kludongba* (Ma), *Khas kora* (Ch), *Myumo kambo choke* (Tr).	Shrub	Leaf and root	Paste and extract	Oral and external	Wild	0.3	0.25	Polio and irregular menstruation
Mucuna pruriens (L.) DC.	*Alkushi* (B), *Eng rhi noi* (Ma), *Bamphe* (Tr).	Herb	Leaf and root	Juice and paste	Oral and external	Wild	0.4	0.38	Bone fracture, stop bleeding and cholera
Pueraria tuberosa (Willd.) DC.	*Botrajineem* (B), *Aidot tang alu* (Ch), *Yang thrih* (Ma).	Climber	Leaf and flower	Juice	Oral	Wild	0.3	0.25	Stop bleeding and leprosy

Table 1. Cont.

Crotalaria pallida Aiton	*Jhunjhuni* (B), *Kudug junjhuni* (Ch), *Tha sim noi* (Ma), *Easy gass* (Ta).	Shrub	Leaf and root	Juice and decoction	Oral	Wild	0.5	0.5	Stomachache, indigestion, piles and prostate enlargement
Desmodium triquetrum (L.) DC.	*Kising sina gach* (Ch), *Pawlogy* (Ma), *Blongmykongda* (Tr).	Shrub	Leaf and root	Juice, extract and paste	Oral and external	Wild	0.5	0.5	Asthma, jaundice, bone fracture and tuberculosis
Flemingia stricta Roxb.	*Charchara phan* (B), *Sai kheu* (Ma), *Asarna* (Ta).	Shrub	Leaf and root	Powder, juice and paste	Oral and external	Wild	0.5	0.38	Stop bleeding, digestive problem and chest pain
Uraria crinita L. DC.	*Bilai lengur* (Ch).	Shrub	Leaf and root	Juice and decoction	Oral	Wild	0.3	0.38	Tetanus, evil spirit and hysteria
Flacourtiaceae									
Hydnocarpus kurzii (King) Warb.	*Chalmugra* (B), *Balgach* (Ch).	Tree	Bark and seed	Paste, seed oil and juice	Oral and external	Wild, cultivated	0.5	0.5	Tumor, fever, leprosy and skin diseases
Lamiaceae									
Ocimum americanum L.	*Bon tulsi* (B), *Nung aprou* (Ma), *Jer sabar-ang* (Ta), *Sabarang* (Ch), *Romba* (Tr).	Herb	Leaf	Pill, paste and decoction	Oral and external	Wild	0.4	0.38	Bronchitis, abdominal pain and nose bleeding
Leucas zeylanica (L.) W. T. Aiton	*Shetadrone* (B), *Pai thung sa* (Ma), *Gassa dagor* (Ch), *Khun* (Tr).	Herb	Whole plant	Juice	Oral and external	Wild	0.3	0.38	Fever, gout and blistery
Leucus aspera (Willd.) Link.	*Dondakolos* (B), *Gussya dangor* (Ch), *Pi tung cha* (Ma), *Goissa jangol* (Ta).	Herb	Whole plant	Juice, paste and decoction	Oral and external	Wild	0.4	0.38	Tonsillitis, cough and headache
Ocimum gratissimum L.	*Ram tulsi* (B), *Sang haphoi* (Ma), *Midar roshi gaith* (Ta), *Kobi sabrang* (Ch).	Shrub	Leaf	Juice	Oral	Cultivated	0.3	0.38	Burning urination, skin diseases and flatulence
Ocimum tenuiflorum L.	*Kalo tulsi* (B), *Nunggri* (Ma), *Ramal* (Ta), *Tulosi* (Ch),	Shrub	Leaf	Decoction and juice	Oral	Wild, cultivated	0.5	0.5	Cold, cough, influenza and gastric problem
Lauraceae									
Cinnamomum tamala (Buch.-Ham) T.Nees.	*Tejpata* (B), *Garuifung* (Ch), *Shifru* (Ma).	Tree	Leaf	Powder and pill	Oral	Cultivated	0.4	0.38	Cough, cardiac weakness and sexual weakness
Leeaceae									
Leea indica (Burm. f.) Merr.	*Dubjat* (B), *Aitgach* (Ma), *Kuraboksara* (Ch), *Kuraboksara* (Ta).	Shrub	Leaf	Juice and paste	Oral and external	Wild	0.3	0.25	Jaundice and bone fracture
Leea aequata L.	*Kakjangha* (B), *Sine sa apang* (Ma), *Boksara gach* (Ch), *Tintatia pata* (Ta).	Shrub	Leaf and root	Juice and paste	Oral and external	Wild	0.3	0.38	Carbuncle, rheumatism and sores
Liliaceae									
Asparagas racemosus Willd.	*Shotomuli* (B), *Shaktichara* (Ch), *Sattis chara* (Ta), Sattirsora (Tr).	Climber	Tuber	Juice and mixture	Oral	Wild, cultivated	0.5	0.5	Fever, cough, general weakness and gonorrhea
Malvaceae									
Sida acuta Burm. f.	*Ban methi* (B), *Eng balo lang* (Ma), *Mrong* (Tr), *Oakhi paney* (Ch).	Shrub	Root, leaf and stem	Juice and paste	Oral and external	Wild	0.4	0.5	Acne, blistery, early delivery and abscess

Table 1. Cont.

Sida rhombifolia L.	*Lal Berela* (B), *Prodolulang* (Ch), *Preduang lulang* (Ma), *Belbliharm* (Tr).	Shrub	Leaf and root	Juice and paste	Oral and external	Wild	0.5	0.5	Pain, quick delivery, burning urination and carbuncle
Marantaceae									
Maranta arundinacea L.	*Ararut* (B), *Fai ruoi uo* (Ma), *Siksa dery* (Ch), *Thalairu* (Tr).	Herb	Rhizome	Extract and raw	Oral	Wild	0.3	0.25	Cough and urinary problem
Angisopteris evecta (G. Forst.) Hoffm	*Dhekia Shak* (B), *Marang khowa* (Ch), *Chang kashay* (Ma).	Fern	Leaf and rhizome	Paste	External	Wild	0.6	0.5	Carbuncle, wound, knee pain and tumor
Melastomaceae									
Melastoma malabathricum L.	*Bantezpata* (B), *Bum bium bam* (Ma), *Moghpilumgulo* (Ch), *Taitong* (Tr).	Shrub	Leaf and root	Decoction, pill and paste	Oral and external	Wild	0.63	0.6	Toothache, boils, dysentery, scabies and gynecological problem
Meliaceae									
Azadirachta indica A. Juss.	*Neem* (B), *Tamakha* (Ma), *Nim gaith* (Ta), *Toimotahk* (Ch).	Tree	Leaf and root	Juice, pill and extract	Oral	Cultivated	0.4	0.38	Scabies, chest pain and itching
Menispermaceae									
Stephania japonica (Thunb.) Miers	*Akanadi manik* (B), *Thandamanek* (Ch), *Thya nuya* (Ma).	Climber	Leaf and root	Juice and paste	Oral and external	Wild, cultivated	0.4	0.38	Hydrocele, irregular menstruation and constipation
Tinospora cordifolia (Willd.) Miers	*Guloncho* (B), *Fa bro noi* (Ma), *Geol ludi* (Ch), *Sikri* (Tr).	Climber	Stem and root	Decoction and pill	Oral	Wild, cultivated	0.4	0.5	Syphilis, gonorrhea, gastric and scabies
Mimosaceae									
Mimosa pudica L.	*Lajjaboti* (B), Lasjuk gaith (Ta), *Hrapaing* (Ch), *Khrapaing* (Ma), *Changlachi* (Tr).	Shrub	Whole plant	Paste and decoction	Oral and external	Wild	0.6	0.63	Abscess, filaria, measles, pyorrhea and hydrocele
Moraceae									
Ficus hispida L.f.	*Kakdumur* (B), Dhumur gulu (Ch), Tammang gaas (Ta), *Fah-shai-ba* (Ma).	Tree	Fruit and root	Juice	Oral	Wild	0.4	0.38	Stop vomiting, epilepsy and menstrual hemorrhage
Musaceae									
Musa paradisiaca L.	*Kola* (B), *Anazi kola* (Ch), *Nwpupi* (Ma).	Herb	Flower and fruit	Juice	Oral	Cultivated	0.5	0.63	Dysentery, menorrhagia, indigestion and constipation
Myrsinaceae									
Ardisia humilis Vahl.	*Ban jam* (B), *So kra pong* (Ma).	Shrub	Leaf and root	Smash, paste and extract	Oral and external	Wild	0.5	0.38	Muscle pain, snake bite and heal sores
Maesa indica (Roxb.) A. DC.	*Ramjoni* (B), *Ludi sara* (Ch), *Thah mong shu* (Ma), *Chagol ladi bhomor* (Ta).	Shrub	Root and leaf	Juice, extract and paste	Oral and external	Wild	0.4	0.38	Fever, body pain and paralysis
Maesa ramantacea (Roxb.) A. DC.	*Maricha* (B), *Lodi sibang* (Ch), *Mesa-dai* (Ma), *kotoma* (Tr).	Tree	Leaf, stem and flower	Paste and juice	Oral and external	Wild	0.5	0.5	Headache, gout, cutting wound and urine infection

Table 1. Cont.

Oleaceae									
Jasminum sambac (L.) Aiton	*Beli* (B), *Kyaklung pai* (Ma), *Ludi maloti* (Ch).	Shrub	Leaf and root	Decoction, juice and paste	Oral	Wild, cultivated	0.5	0.5	Fever, insect bite, abdominal pain and urinary tract infection
Orchidaceae									
Peristylus constrictus (Lindl.) Lindl.	*Bhuinora orchid* (B), *Chemmodoh* (Ma), *Bhuinora* (Ta), *Kuthmai* (Tr).	Herb	Leaf	Extract and paste	Oral and external	Wild	0.3	0.25	Gonorrhea and earaches
Oxalidaceae									
Oxalis corniculata L.	*Amrul* (B), *Mring blu, Pa su* (Ma), *Amilani* (Ch).	Herb	Whole plant	Decoction	Oral	Wild	0.3	0.25	Fever and dysentery
Passifloraceae									
Passiflora foetida L.	*Jumkolata* (B), *Pokgula* (Ch), *Aanuakma* (Ma), *Mathrigula* (Ta), *Bulumni pukki* (Tr).	Herb	Leaf and root	Juice, pill and paste	Oral and external	Wild, cultivated	0.5	0.5	Asthma, hysteria, menopause and ringworm
Plumbaginaceae									
Plumbago indica L.	*Raktachita* (B), Aguni tita (Ch), *Aguni tida*, *Kiang khao* (Ma), *Agunitida* (Tr).	Shrub	Leaf	Decoction, juice, paste and pill	Oral and external	Wild, cultivated	0.5	0.63	Paralysis, hyper acidity, leprosy, insect stings and contraceptive
Poaceae									
Imperata cylindrica (L.) Raeusch.	*Ulu* (B), *Tachreema* (Ma), *Chonjaru* (Tr).	Herb	Whole plant	Juice	Oral	Wild	0.4	0.38	Burning urination and fever
Coix lacryma-jobi L.	*Tosbi dana* (B), *Kesh bizi* (Ch), *Gei chi* (Ma), *Kakariguch* (Tr).	Shrub	Root and seed	Juice and powder	Oral	Wild	0.4	0.38	Strangury, menstrual complaints and inflammation of the urinary passage
Polygonaceae									
Persicaria hydropiper (L.) Delarbre	*Biskatali* (B), *Bish Katali* (Ch), *Oak tong* (Ma), *Sathimacho* (Tr).	Herb	Leaf	Juice	Oral	Wild	0.4	0.38	Joint pain, carbuncles and stomach pain
Polypodiaceae									
Drymoglossum piloselloides (L.) C. Presl.	*Pasha dhekia* (B), *Chigon tenga* (Ch).	Fern	Whole plant	Juice and paste	Oral and external	Wild	0.4	0.38	Liver inflammation, asthma and knee pain
Microsorum punctatum (L.) Copel.	*Fishtail tree* (B)	Fern	Leaf	Juice and paste	Oral and external	Wild	0.3	0.25	Knee pain and stomach pain
Rhamnaceae									
Gouania tiliaefolia Lam.	*Harjen gagota* (B), *Bodu ranga sibang* (Ch), *Luri chbang* (Ma).	Shrub	Leaf	Poultice	External	Wild	0.2	0.25	Sores

Table 1. Cont.

Rubiaceae									
Ixora cuneifolia Roxb.	*Beophul rangan* (B), *Sigon chula* (Ma), *Biju phul* (Ch).	Shrub	Root and leaf	Juice and paste	Oral and external	Wild	0.3	0.38	Cholera, gallstone and tonsillitis
Mussaenda roxburghii Hook. f.	*Silchaonri* (B), *Chung-faing-la* (Ma), *Gach ranitak* (Ch), *Ranirtak* (Ta).	Shrub	Leaf and flower	Paste and extract	Oral and external	Cultivated	0.3	0.38	Breast pain, headache and fever
Morinda persicifolia Buch.-Ham.	*Cefo bena* (Ch), *Rerough* (Ma).	Shrub	Root and leaf	Juice and powder	Oral	Wild	0.3	0.25	Irregular menstruation and jaundice
Psychotria adenopyhlla Wall.	*Baro bhuta* (B), *Bara sudama* (Ch).	Tree	Root	Juice and extract	Oral	Wild	0.3	0.25	Indigestion and tetanus
Hedyotis thomsoni Hook. f.	*Tasowpangpai* (Ma), *Mawblaikrwma* (Tr).	Herb	Whole plant	Paste	External	Wild	0.2	0.13	Wound healing
Rutaceae									
Aegle mermelos (L.) Correa	Bel (B), *Uraikfang* (Ch), *Siplaw bofang* (Tr).	Tree	Root, fruit and leaf	Juice and paste	Oral and external	Cultivated	0.5	0.63	Weakness, constipation, headache, dysentery and gastric problem
Schizaeaceae									
Lygodium altum (C. B. Clarke) Alderw.	*Dheki shak* (B), *Ashpada gach* (Ch), *Miaumakla* (Ma), *Mukhratala* (Tr).	Fern	Whole plant	Extract	Oral and external	Wild	0.3	0.25	Swellness of leg and headache
Scrophulariaceae									
Scoparia dulcis L.	*Bandhane* (B), *Midareissa* (Ch), *Ruparahe* (Ta), *Young boi pru* (Ma).	Herb	Whole plant	Juice, paste and pill	Oral and external	Wild	0.4	0.5	Breast pain, gallstone, earaches and jaundice
Smilaceae									
Smilax zeylanica L	*Kumari lata* (B), *Kumuzzaludi* (Ch), *Krak-khrow* (Ma), *Kosu keirong* (Tr).	Climber	Root and stem	Decoction and juice	Oral	Wild	0.4	0.5	sores, abscess, general weakness and gonorrhea
Solanaceae									
Datura metal L.	*Dhutra* (B), *Dhutura gaith* (Ta), *Kala dhutura* (Ch), *Dutra gach* (Ma).	Shrub	Leaf and fruit	Extract and paste	External	Wild, cultivated	0.5	0.5	Headache, skin diseases, dislocated bone and tumor
Solanum torvum Sw.	*Tit Begun* (B), *Titar Berul* (Ta), *Borshibo-rduk* (Tr), *Bigal biji* (Ch), *Kharaing* (Ma).	Shrub	Root and leaf	Juice and paste	Oral and external	Wild	0.5	0.5	Haemorrhage, ear pain, leucorrhoea and tonsillitis
Solanum violaceum Ortega	*Brihati begun* (B), *Tida begul bichi* (Ch), *Titgula* (Ma), *Ved bhayun* (Ta).	Shrub	Leaf and fruit	Juice	Oral	Wild	0.3	0.38	Stop vomiting, intestinal worms and gastric problem
Sterculiaceae									
Byttneria pilosa Roxb.	*Harjora lata* (B), *Ludi sola* (Ch), *Chaala ludhi* (Ta), *Choloyang mrong* (Ma).	Climber	Leaf and root	Paste	External	Wild	0.3	0.38	Bone fracture, boils and dandruff

Table 1. Cont.

Verbenacaeae									
Clerodendrum wallichii Merr.	*Tara tabah bhat* (B), *Keyamusi* (Ch), *Tara tabo gach* (Ma), *Terateba* (Tr).	Shrub	Root and leaf	Juice	Oral and external	Wild	0.3	0.25	Fever and skin allergy
Lantana camara L.	*Guayganda* (B).	Shrub	Leaf	Decoction	Oral	Wild	0.3	0.25	Tetanus and malaria
Clerodendrum indicum (L.) Kuntze	*Bamunhatti* (B), *Nuli gach* (Ch), *Sibrecha gach* (Ma).	Shrub	Leaf and root	Pill, juice and paste	Oral and external	Wild	0.5	0.5	Gynecological complexity and rheumatic pain and fever
Clerodendrum viscosum Vent.	*Bhat* (B), *Vec gaas* (Ta), *Beg gach* (Ch), *Khon kha bong* (Ma), *Khu ung kha* (Tr).	Shrub	Leaf	Decoction and juice	Oral	Wild	0.5	0.5	Abdominal pain, boils, impotence and itching
Gmelina arborea Roxb.	*Gamari* (B), *Remeniba* (Ma), *Gamber* (Ch), *Gamari gaith* (Ta).	Tree	Leaf, root and flower	Juice and paste	Oral and external	Cultivated	0.5	0.5	Gonorrhea, anemia, burning sensation and scabies
Lippia alba (Mill.) N.E. Br. *ex* Britton & P.Wilson	*Bhui okra* (B).	Shrub	Leaf	Juice, powder and pill	Oral	Wild	0.4	0.38	Diarrhea, stomachache and bronchitis
Vitex negundo L.	*Nishinda* (B), *Soyin ma pata* (Ta), *Nirganda* (Ch), *Thoaibai gach* (Ma).	Tree	Leaf	Juice and paste	Oral and external	Cultivated	0.6	0.63	Abdominal pain, black fever, headache, cough and asthma
Vitaceae									
Cissus repens Lam.	*Marmaria lata* (B)*,Shekor shak* (Ta), *Oarong khaen* (Ma), *Mukhoipape* (Tr).	Climber	Leaf	Curry and paste	Oral and external	Wild	0.3	0.25	Jaundice and boils
Zingiberaceae									
Alpinia conchigera Griff.	*Konchi elachi* (B), *Khetranga* (Ch), *Kettyr-anga* (Ta), *Padagrah* (Ma), *Gadhang* (Tr).	Herb	Rhizome	Paste and juice	Oral and external	Wild	0.5	0.5	Gastric pain, dyspepsia, stomach pain and diarrhea
Curcuma longa L.	*Halud* (B), *Olod* (Ch), Nanhuo (Ma), *Sudai* (Tr).	Herb	Rhizome	Paste and juice	Oral and external	Cultivated	0.5	0.5	Wound healing, dysentery and stomachache
Kaempferia galanga L.	*Sugandi bach* (B), *Ada kamala* (Ch), *Miri sig a* (Ma).	Herb	Leaf and rhizome	Juice and paste	Oral and external	Wild, cultivated	0.4	0.38	Sore eyes, headache and flatulence
Zingiber capitatum Roxb.	*Jongly ada* (B), *Phalago* (Ma), *Blomoshla* (Tr).	Herb	Rhizome	Juice	Oral	Wild, cultivated	0.4	0.5	Gastric, indigestion, flatul-ence and chronic dysentery
Zingiber montanum (J. Koenig.) Link *ex* A. Dietr	*Bonada* (B), *Paley* (Tr), *Playu* (Ma), *Panich gach* (Ta), *Murada* (Ch).	Herb	Rhizome	Pill and juice	Oral	Wild	0.5	0.5	Gastric, stomachache, constipation and amenorrhoea

4. Conclusions

Bangladesh has an abundance of medicinal plants scattered throughout its forests, especially in the hill forests. To save and conserve medicinal plants, both *in-situ* and *ex-situ*, immediate action is required. Herbal healers and the local population should be educated on sustainable methods of harvesting plants for disease treatment today without jeopardizing their availability for future use. Proper scientific research may lead to the identification of novel compounds that can be used to treat both old and new diseases. A well-organized motivational and awareness-raising campaign involving local herbal healers and community religious leaders should be carried out. It is necessary to document the indigenous traditional knowledge of medicinal plants before it lost forever from the community. The research work should be expanded to other areas of the hill district in order to identify any previously unknown medicinal plants that have been used for centuries to cure a number of demanding situations.

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Data availability

All relevant data are within the manuscript.

Conflict of interest

None to declare.

Authors' contributions

Md. Sah Alam: methodology, data collection, analysis and draft manuscript writing; Tusher Kumer Ray: data analysis and revision; M. Mahfuzur Rahman and Mohammed Kamal Hossain: conceptualization, supervising the draft writing and final editing. All authors have read and approved the final manuscript.

References

Abe R and K Ohtani, 2013. An ethnobotanical study of medicinal plants and traditional therapies on Batan Island, the Philippines. J. Ethnopharmacol., 145: 554-565.

Alam MK, JU Chowdhury and MA Hasan, 1996. Some Folk Formularies from Bangladesh. Bangladesh J. Life Sci., 81: 49-69.

Balick JM, 1990. Ethnobotany and identification of therapeutic agents from the rainforest. In: Chadwick, D.J. and Marsh J. (eds), Ethnobotany and the Search for New Drugs (Ciba Foundation Symposium 185). Wiley, Chi Chester, pp. 22-32.

Balick JM and PA Cox, 1996. Plants, People and Culture: The Science of Ethnobotany. Scientific American Library, New York. p. 228.

Baydoun SL, D. Chalak, Helena and AN Apostolides, 2015. Ethnopharmacological Survey of Medicinal Plants Used in Traditional Medicine by the Communities of Mount Hermon, Lebanon. J. Ethnopharmacol, 173: 139-156.

Chowdhury JU, MK Alam and M A Hasan, 1996. Some Traditional Folk Formularies against Dysentery and Diarrhea in Bangladesh. J. Econ.Tax. Bot., 12: 20-23.

Cox PA and MJ Balick, 1994. The ethnobotanical approach to drug discovery. Sci. Amer., 270: 60-65.

Cragg GM, DJ Newman, KM Snader, 1997. Natural products in drug discovery and development. J Nat Prod, 60: 52-60

Dulla O and FI Jahan, 2017. Ethnopharmacological survey on traditional medicinal plants at Kalaroa Upazila, Satkhira District, Khulna Division. Bangladesh. J. Intercult Ethnopharmacol, 6: 316-325.

Fabricant DS, and NR Farnsworth, 2001. The value of plants used in traditional medicine for drug discovery. Environ. Health Perspect, 109: 69.

Ghiselin M and J Landa, 2005. The economics and bio economics of folk and scientific classification. J. Bioecon, 7: 221-238.

Ghorbani A, 2005. Studies on pharmaceutical ethnobotany in the region of Turkmen Sahara, North of Iran: (part 1): general results. J. Ethnopharmacol, 102: 58-68.

Giday M, Z Asfaw, T Elmqvist and Z Woldu, 2003. An ethnobotanical study of medicinal plants used by the Zay people in Ethopia. J. Ethnopharmacol, 85: 43-52.

Heinrich M and P Bremner, 2006. Ethnobotany and ethnopharmacy-their role for anti-cancer drug development. Curr. Drug Targets, 7: 239-245.

Islam R, 2006. "Role of plant medicine in health care and improving nutritional standard in rural area of Bangladesh," in National Seminar on Diversity of Medicinal Plants and Their Sustainable Utilization in Health Care and Improving Nutritional Standard in Rural Areas (Kolkata), 1-30.

Jouad H, M Haloui, H Rhiouani, J Hilaly and M Eddouks, 2001. Ethnobotanical survey of medicinal plants used for the treatment of diabetes, cardiac and renal diseases in the North centre region of Morocco (Fez–Boulemane). J. Ethnopharmacol, 77: 175-182.

Kayani S, M Ahmad, M Zafar, S Sultana, MP Khan, MA Ashraf, 2014. Ethnobotanical uses of medicinal plants for respiratory disorders among the inhabitants of Gallies - Abbottabad, Northern Pakistan. J Ethnopharmacol, 156: 47-60.

Mahmood A, A Mahmood and NR Malik, 2012. Indigenous knowledge of medicinal plants from Leepa valley, Azad Jammu and Kashmir, Pakistan. J Ethnopharmacol, 143: 338-346.

Mia AW and A Ghani. In : Ghani, A. (ed), 1990. Traditional Medicine, Jahangirnagar University, 10-12 pp.

Mohiuddin M, MK Alam, SR Basak and MK Hossain, 2012. Ethno-medico Botanical Study among the Four Indigenous Communities of Bandarban, Bangladesh, Bangladesh J. Plant Taxon., 19: 45-53.

Motaleb MA, 2010. Approaches to Conservation of Medicinal Plants and Traditional Knowledge: A Focus on the Chittagong Hill Tracts. IUCN (International Union for Conservation of Nature), Bangladesh Country Office, Dhaka, Bangladesh. viii+30.

Motaleb MA, MK Hossain, MK Alam, MMAA Mamun and M Sultana, 2013. Commonly used Medicinal Herbs and Shrubs by Traditional Herbal Practitioners: Glimpses from Thanchi upazila of Bandarban. IUCN (International Union for Conservation of Nature), Dhaka, Bangladesh. i-xii + 294.

Nadembega P, JI Boussin, JB Nikiema, F Poli and F Antognoni, 2011. Medicinal plants in Baskoure, Kourittenga Province, Burkina Faso: an ethnobotanical study. J. Ethnopharmacol, 133: 378-395.

Qureshi, RA, MA Ghufran, SA Gilani, K Sultana and M Ashraf, 2007. Ethnobotanical studies of selected medicinal plants of Sudhan Gali and Ganga Chotti hills, District Bagh, Azad Kashmir. Pak. J. Bot., 39: 2275-2283.

Rahman MA, SB Uddin and CC Wilcock, 2003. Indigenous knowledge of herbal medicine in Bangladesh 2: diarrhoea, dysentery, indigestion and stomach pains. J. Med. Arom. Pl. Sci., 25: 1001-1009.

Rahman M.A, 2010. Indigenous Knowledge of Herbal Medicines in Bangladesh: Treatment of Skin Diseases by Tribal Communities of the Hill Tracts Districts, Bangladesh J. Botany, 39: 169-177.

Savikin K, G Zdunic, N Menkovic, J Zivkovic, N Cujic, M Terescenko, D Bigovic, 2013. Ethnobotanical study on traditional use of medicinal plants in SouthWestern Serbia, Zlatibor district. J Ethnopharmacol., 146:803-810.

Sumbul S, MA Ahmed, M Asif and M Akhtar, 2011. *Myrtus communis* Linn - A review. Indian J. Nat. Products and Resources, 2: 395–402.

Tugume, P, EK Kakudidi, M Buyinza, J Namaalwa, M Kamatenesi, P Mucunguzi *et al*. 2016. Ethnobotanical survey of medicinal plant species used by communities around Mabira Central Forest Reserve, Uganda. J. Ethnobiol. Ethnomedicine, 12: 1-28.

Uniyal SK, KN Singh, P Jamwal and B Lal, 2006. Traditional use of medicinal plants among the tribal communities of Chhota Bhangal, Western Himalaya. J. Ethnobiol. Ethnomedicine, 2: 14.

Vitalini S, M Iriti, C Puricelli, D Ciuchi, A Segale, G Fico, 2013. Traditional knowledge on medicinal and food plants used in Val San Giacomo (Sondrio, Italy): an alpine ethnobotanical study. J Ethnopharmacol, 145: 517-529.

Yusuf M, JU Chowdhury, MA Wahab and J Begum, 1994. Medicinal Plants of Bangladesh. Bangladesh Council of Scientific and Industrial Research, Dhaka, Bangladesh.

Yusuf M, MA Wahab, JU Chowdhury and J Begum, 2007. Some Tribal Medicinal Plants of Chittagong Hill Tracts, Bangladesh, Bangladesh J. Plant Taxon. 14: 117-128.