



Herbal Healing: An Old Practice for Healthy Living among Khumi, Marma and Tripura Communities of Thanchi Upazila, Bangladesh

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Authors' contributions

This work was carried out in collaboration between all authors. Field work was conducted by all authors. Author MAM designed the study and authors MAM and MMAAM wrote the first draft of the manuscript. All authors contributed during the analyses. Authors MAM and MMAAM managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Background: At present, only a limited amount of documentation exists that shed light on aspects of plants used by Traditional Healers (THs) in Bangladesh for treating general ailments. The current study is concerned with information on medicinal plants (MPs) used in Traditional Medicine (TM) by the Khumi, Marma and Tripura communities of Bangladesh.

Aims: The study attempted to collect, analyze and evaluate Traditional Knowledge (TK) of the healing powers of plants used in TM in Thanchi upazila during August 2011 to January 2013; and to classify as far as possible the plants encountered in the study.

Methodology: Semi-structured questionnaire was used to collect information through Focused Group Discussions (FGD) and one to one discussions with the selected indigenous

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community people.

Results: A total of 91 different diseases (faced by the above three communities of the study area) were recognized that were treated by the THs using 116 herbs and shrubs belonging to 50 different families. Scientific name of different plant species, parts used, preparation process including doses, and names of user communities are also mentioned.

Conclusion: This documentation will encourage the relevant stakeholders, authorities and conservationists in emphasizing the proper management of TK, including the conservation initiatives.

Keywords: Medicinal plants (MPs); Traditional Knowledge (TK); Traditional Healers (THs); Indigenous community (IC); Chittagong Hill Tracts (CHT); Khumi; Marma; Tripura.

1. INTRODUCTION

Plants, plant parts and plant products of all descriptions, particularly those with medicinal properties, have been used since time immemorial as principle ingredients of various traditional medicines [1]. The history of use of MPs for alleviating illnesses had its origin in the activities of early humans. Selection of MPs by such humans, without any prior knowledge, was largely based on intuition, guesswork or trial and error. The healing powers (HPs) of some plants were often discovered by accident. Thus, by a combination of these processes there emerged a considerable body of knowledge of MPs that was transmitted from one generation to another. At first, orally; and later, in written form as papyri, baked clay tablets, parchments, manuscripts, and finally as printed herbals, pharmacopoeias and other works [2]. Our ancestors, through trial-and-error, discovered useful natural substance that they came across to ease their discomfort and sufferings caused by various acute and chronic illnesses or injuries. Since ancient times, plants with therapeutic properties have occupied an important niche in the disease treatment practices [3].

Bangladesh a small country, occupying an area of about 147,570 sq. km, is endowed with a very favorable climate for diverse flora. A great variety of plants grow in her forests, agricultural lands, barren lands, waste lands, water bodies, homesteads, and also along the roadsides. Many of these plants are often considered as weeds which contain active substances with medicinal properties. It has been recorded that about 450 to 500 plants growing or available in Bangladesh tend to hold therapeutic values [4]. The rich heritage of indigenous knowledge associated with TMs is considered as the basis of all systems of traditional remedies in Bangladesh. Most of the medicinal plants of Bangladesh are extensively used in the preparation of Unani and Ayurvedic medicines. These plants also serve as

important raw materials for many modern medicinal ingredients [3]. Unfortunately, these valuable assets have been depleting rapidly because of unsustainable exploitation and land use changes [5].

Until now, few communities of Bangladesh, especially the indigenous people of CHT, have been traditionally using TMs. It has been unequivocally established that medicinal plants and related knowledge, that represent a part of rich local heritage, play a significant role in the general welfare of the upland communities of CHT [6, 7]. The ICs of this area traditionally rely on TM due to their belief, culture and availability of the plant resources. On top of that, due to the absence of modern treatment facilities, they fully depend upon nature for their regular treatment. But in recent time, availability of medicinal plants and associated TK fell under threat of extinction due to depletion of MPs and THs practice respectively. That is why the need for documentation of these priceless resources is very urgent. Different countries have given emphasis on this documentation namely, Srivastava and Rout [8], Parkash et al. [9], Srivastava and Adi Community [10], Zheng and Xing [11], Telefo et al. [12], Rehecho et al. [13], Ayanar and Ignacimuthu [14], Sargin et al. [15] and Ullah et al. [16].

Documentation process on TK on medicinal plants and related issues in Bangladesh is at its initial stage. Preliminary work of Hasan and Khan [17] in ethnobotanical research is regarded as pioneer endeavour in Bangladesh. Since then, Alam [6], Uddin et al. [18, 19, 20], Yusuf et al. [21, 22], Partha and Hossain [23], Rahman et al. [24], Roy et al. [25], Rahmatullah et al. [26, 27, 28], Motaleb [30], Mohiduddin et al. [31], Malek et al. [32], Khisha et al. [33], Sarker et al. [34], Uddin and Mukul [35], Kadir et al. [36, 37], Ocvirk et al. [38] and Rahman [39] have also made significant contribution to our understanding of ethnobotany in Bangladesh. Keeping this in mind, the present attempt has been taken to

document this valuable knowledge and information from the area before its extinction.

2. RESEARCH METHODOLOGY

A team was formed with plant taxonomist, silviculturist, forester, biologist, and local herbal healers. Extensive field surveys were carried out for the last one and half year years (August 2011 to January 2013). Three relevant skilled persons from a local NGO, Bolipara Nari Kalyan Somity (BNKS), were also involved in the team who interpret the local language of the tribal people.

2.1 Study Area

The study was conducted among the Khumi, Marma and Tripura community of Thanchi

upazila (longitude 21°78' and latitude 92°42') of Bandarban that is situated in the southeastern corner of Bangladesh. *Marma* is the most dominant IC in this area; other communities included are *Khumi*, *Mro*, *Bawm*, *Chak*, *Tripura* etc. *Jhum* (shifting cultivation or slash and burn cultivation) is the traditional method of crop production in this area. Livestock rearing also makes up a significant proportion of livelihoods of the communities. Numerous traditional, religious and cultural rituals and norms bind these societies together. Compared with the entire country, Thanchi upazila ICs suffer from a high proportion of extreme poverty, with very low food security, low supplies of safe drinking water, inadequate sanitation facilities, extremely low literacy rate.



2.2 Data Collection

Species information was collected using a pretested semi-structured questionnaire (including who, what, how, when, by whom and why the plants are used) through FGD, one to one discussions with the local THs. Simultaneously, more information was gathered from local knowledgeable persons, Buddhist monks, and elderly men and women. During FGD, the informants came on mostly used medicinal herbs and shrubs and then the information of local name, parts use, herbal use, preparation process, local status and measures taken to conserve each species were recorded. A particular plant was picked up and queries were made as to how it emerges to be useful for them. After finishing interview for one particular plant, a second plant was taken up and so on. The investigation was very effective and informative because of the fact that the information were collected and recorded through consultation with various indigenous communities such as Marma, Tripura and Khumi, who use these medicinal plants mostly and finally verified by various informants at different spots. Once the information on a particular plant was considered as reliable after repeated discussions, then its local name and uses were recorded. Most of the species were identified by the taxonomist of the study team. The unidentified species were preserved in the herbarium and identified by the taxonomists of Bangladesh National Herbarium, Department of Botany of Dhaka University, Bangladesh Forest Research Institute (BFRI), Institute of Forestry and Environmental Sciences of Chittagong University. Direct field visit in the hills, streams and forests were also conducted to gain knowledge in regards to the ecology, habitat and other important issues for all the species. The authenticity of information on each species was confirmed through repeated interviews. Prior Informed Consent (PIC) was taken from the knowledge providers before collecting information. Later, the compiled information was shared with them in their own local language.

3. RESULTS AND DISCUSSION

The herbal healing techniques of Khumi, Marma and Tripura communities of the study area have been presented in Tabular form in Table 1. Diseases are arranged alphabetically by their English names. Then species that are used to treat different diseases, plant parts used for treatment, brief preparation process of the TM and IC users have been arranged in Table 1.

Besides, a short scenario of a number of plants having different pharmacological actions, frequently used plants parts to treat diseases and modes of providing herbal treatment are shown in Fig. 1, Fig. 2 and Fig. 3 respectively.

Present study revealed a total of 91 different diseases that are treated by the THs of three communities by using 116 different herbs and shrubs belonging to 50 families. The findings support the similar studies, e.g., [40] listed 60 species from 40 families used by Chakma, Marma and Tanchunga; [31] found 70 species from 36 families common among Bwam, Marma, Murang and Tanchunga tribes. The current study also found that species under Rubiaceae family (9 species) were mostly used by them; followed by Fabaceae (8 species); Asteraceae, Euphorbiaceae, Lamiaceae and Zingiberaceae (6 species each); Araceae, Caesalpinaceae and Verbenaceae (5 species each); Apocynaceae (4 species), and Amaranthaceae and Menispermaceae (3 species each).

Number of plants having differ pharmacological actions are shown in Fig. 1. It illustrates the diseases which are cured by 3 and above number of plants. It was observed that, to treat disease like headache they use maximum number of plants (12) followed by stomachache and abdominal pain (11) gastritis (9), sore (8) fever for all ages (7), asthma and allergy (6); wound, menstrual problem (irregular menstruation), ear pain, different types of cut, conjunctivitis, and burning (5). From the above results, it could be concluded that indigenous peoples like more options for their regular treatment purposes. For example, headache, stomachache, abdominal pain and gastritis are very common diseases in Bangladesh for which maximum species are used.

Among the plant parts used, leaves (98) were highly utilized followed by root (50); whole plant (41); rhizome (21); flower (14) and young leaves (13) (Fig. 2). Modes of providing treatment fall into fourteen categories. A maximum of 108 formulations were reported to be used in the juice or liquid form; whereas, 61 in paste form; 18 in bath with plants or plant parts boiled water; and 10 in powder form. The other categories were reported less frequently (Fig. 3). Commonly prescribed medicine doses (e.g. Pills, powder etc.) are rarely found for treatment due to lack of well-structured herbal healing. However, the result clearly depicted that at the primary stage these communities are fully dependant on their traditional healing system (e.g. Juice, paste etc).

Table 1. Description of herbal medical treatment process of different diseases provided by the Khumi, Marma and Tripura community of Thanchi upazila of Bandarban district along with their species used to prepare medicine, parts use, preparation process and users

Sl. No.	Disease name	Species name	Local name			Parts used	Preparation process	User group
			Marma	Khumi	Tripura			
1	Abdominal pain	<i>Alpinia conchigera</i> Griff.	Padagra	Daichikachoy	Padagra	Rhizome	Juice, extracted by smashing, is taken orally three times a day for 2-3 days.	Khumi, Marma and Tripura
		<i>Celosia cristata</i> L.	Krawmong Pai	Saiwang	Khongcha	Dried flower	Smashed flower is used over the belly and swollen area, twice a day for a week.	Marma
		<i>Emilia sonchifolia</i> (L.) DC.	Rakheibang		Chamolai	Root	Juice, extracted by rubbing roots in the stone, is taken orally two times a day for a week.	Khumi, Marma and Tripura
		<i>Helminthostachys zeylanica</i> (L.) Hook.	Choimakhankre	Achakhungpui	Singraiakong	Rhizome and fronds	Paste mixed with honey is taken orally 2 times a day for 2-3 days.	Khumi and Marma
		<i>Ixora cuneifolia</i> Roxb.	Kyamoachuie	Chi Shing Da Keu		Root and leaf	Pills prepared from leaf and root paste are sun dried, and taken thrice a day for 7-10 days.	Marma
		<i>Jasminum sambac</i> (L.) Ait.	Kyalungpai	Tangachupa	Malikum	Root	Red hot iron is dipped in root juice (extract) and taken during pain.	Marma and Tripura
		<i>Premna esculenta</i> Roxb.	Kramurauh	Ankungna	Arai	Leaf	Leaf decoction (one cup) mixed with honey (1 table spoon) is taken thrice a day for 5-7 days.	Tripura
		<i>Scoparia dulcis</i> L.	Dungangja	Daesikhlu	Samthangso	Whole plant	Juice of whole plant is taken thrice a day for a week.	Khumi, Marma and Tripura
		<i>Solanum violaceum</i> Ortega	Kajoishi	Empaithai	Khankha	Root	Root extract obtained by rubbing in stone is mixed with rice water and taken orally twice a day for 4-5 days.	Khumi, Marma and Tripura
	<i>Solena amplexicaulis</i>	Kamuu	Tho	Dupoitha	Leaf	Leaf boiled with table salt is	Tripura	

Sl. No.	Disease name	Species name	Local name			Parts used	Preparation process	User group
			Marma	Khumi	Tripura			
		(Lamk.) Gandhi					taken directly twice a day for 3-4 days.	
		<i>Zingiber capitatum</i> Roxb.	Phalago	Pennih	Blomoshla	Rhizome	Hot red iron is dipped in rhizome juice and taken orally twice a day for a week.	Khumi, Marma and Tripura
2	Abdominal pain of children	<i>Clerodendrum viscosum</i> Vent.	Khumejaie	Haronga	Khakoh	Leaf	Leaf juice is taken thrice a day for 3-5 days.	Tripura
		<i>Croton bonplandianus</i> Baill.	Painujaw	Leunke	Khubambam	Leaf	Leaf juice, extracted by smashing, is taken orally once a day for 2-3 days.	Tripura
3	Abdominal tumor	<i>Equisetum ramosissimum</i> Desf.	Pinlacha	Acala	Shachuri	Stem	Pill prepared by grinding the stem is taken 3 times a day for 2 weeks.	Marma
4	Abscess	<i>Atylosia scarabaeoides</i> (L.) Baker	Noemuie	Ajungmuie		Leaf	Leaf powder is used in the affected area for 3-5 days.	Tripura
		<i>Mimosa pudica</i> L.	Hrapaing	Ange	Changlachi	Leaf and whole plant	Leaf or whole plant paste is used over the sore.	Khumi, Marma and Tripura
5	Abscess in ear	<i>Kaempferia parviflora</i> Wall. ex Baker	Khimodoh	Cheilanki		Whole plant	Juice extract from whole plant is mixed with <i>Peristylus constrictus</i> (Lind.) Lindl. juice and used in ear once a day for a week.	Khumi, Marma and Tripura
		<i>Peristylus constrictus</i> (Lind.) Lindl.	Chemmodoh	Nantho	Kuthmai	Whole plant	Warm plant paste is used.	Khumi, Marma and Tripura
6	All types of pain	<i>Lantana camara</i> L. var. <i>aculeata</i> (L.) Moldenke & Moldenke	Achownai	Moichiacha	Khelakhemows ugnama	Leaf	Warmed leaf paste is spread over the pained area.	Khumi
7	Allergy	<i>Clerodendrum wallichii</i> Merr.	Teratebathoipow	Terateba	Terateba	Young leaf	Bath with leaf-boiled water.	Khumi, Marma and Tripura
		<i>Hedyotis scandens</i> Roxb.	Anuwaihoweatha	Anwaichi		Whole plant	Warm mash of whole plant is used over the affected area twice a day for a week.	Khumi, Marma and Tripura
		<i>Mycetia longifolia</i> (Wall.) O.	Taow	Mykanchi		Whole	Bath is taken with the whole	Marma and

Sl. No.	Disease name	Species name	Local name			Parts used	Preparation process	User group
			Marma	Khumi	Tripura			
		Kuntze				plant	plant boiled water for 5-10 days.	Tripura
		<i>Persicaria hydropiper</i> (L.) Spach	Mracheai	Achakachu	Sathaimcho	Leaf	Leaf is smashed to produce juice which is taken twice a day for a week.	Marma
		<i>Smilax laurifolia</i> L.	Khraikodow	Angwajjong	Sowgsowgra	Root	Taking bath by root boiled water for a week.	Khumi, Marma and Tripura
		<i>Tournefortia roxburghii</i> C.B. Clarke	Kraushow	Asaphaiacha	Kalasona	Leaf	Leaf juice is used over the affected area thrice a day for 5-10 days.	Khumi and Tripura
8	Anal tract problem	<i>Celosia cristata</i> L.	Krawmong Pai	Saiwang	Khongcha	Flower and leaf	Flower and leaf juice is taken with honey, twice a day for 2 weeks.	Marma
		<i>Euphorbia hirta</i> L.	Choimanore	Achakunu	Chingokhunjung	Whole plant	Pills from plant paste are taken orally thrice a day for a month.	Khumi and Marma
		<i>Jatropha gossypifolia</i> L.	Krasuni	Liabikamchi	Lal Verenda	Leaf	Extracted leaf juice (one table spoon) is mixed with milk and honey at the rate of 1:1 and take twice a day after meal for 15-20 days.	Khumi, Marma and Tripura
9	Any disease that creates thirst and reaction	<i>Imperata cylindrica</i> (L.) P. Beauv. var. <i>latifolia</i> (Hook. f.) C. E. Hubb.	Tacrimra	Paditaiung	Chonjaru	Rhizome	Juice, extracted by rubbing rhizome in stone, is taken twice a day for a week.	Khumi, Marma and Tripura
10	Arthritis	<i>Angiopteris evecta</i> (Forst) Hoffm.	Chagkathe	Angkskepoi	Asojaly	Rhizome	Rhizome paste is taken with honey twice a day for 2 weeks.	Tripura
		<i>Lantana camara</i> L. var. <i>aculeata</i> (L.) Moldenke & Moldenke	Achownai	Moichiacha	Khelakhemows ugnama	Leaf	Warmed leaf paste is spread over the pained area.	Khumi
		<i>Parabaena sagittata</i> Miers ex Hook.f. & Thoms.	Gaidiaanowai	Muipungpou	Angkala	Leaf	Leaf vapor is inhaled 3 times a day for 2 weeks.	Tripura

Sl. No.	Disease name	Species name	Local name			Parts used	Preparation process	User group
			Marma	Khumi	Tripura			
11	Asthma	<i>Desmodium triquetrum</i> (L.) DC. subsp. <i>auriculatum</i> (DC.) Prain	Pawlogy	Chiakiniacha	Blongmykongda	Root	Juice prepared by squeezing roots is mixed with cold water, which is taken twice a day for a week.	Khumi and Marma
		<i>Eupatorium ayapana</i> Vent.	Painhuni	Shitaba	Taitong	Leaf	Leaf juice is taken orally thrice a day for a week or two.	Marma
		<i>Myxopyrum smilacifolium</i> (Wall.) Blume	Anuielabera	Keuncherayua		Root	Root extract, obtained by stone grinding, is mixed with rice water and taken two times a day after meal for 2 weeks.	Marma
		<i>Stahlianthus involucratus</i> (King ex Baker) R. M. Smith	Kyokhiang	Thithiksink	Santaokrang	Rhizome	Extracted juice is mixed with rice water (1:3) then warmed, which is then taken orally thrice a day till cure.	Khumi
		<i>Stephania japonica</i> (Thunb.) Miers	Tuwangnoae			Leaf and root	Dried leaf and root powder is taken with honey thrice a day for 1 or 2 weeks.	Marma
		<i>Senna obtusifolia</i> (L.) Irwin & Barneby	Hankheuw	Puikache	Muiktoima	Root	Half cup extracted root juice is mixed with a table spoon of honey and taken twice a day for a month.	Khumi and Tripura
12	Bleeding due to cut, bullet wound	<i>Mikania cordata</i> (Burm. f.) Robinson	Mrakhawbow	Bainyachu	Dukhelaki	Young and fresh leaves	Leaf paste is applied over the wounded area to stop haemorrhage.	Khumi, Marma and Tripura
13	Bleeding from nose	<i>Mukia maderaspatana</i> (L.) M. Roem.	Na Khongbu Nuai	Nakhonbu	Mukhra Khangkkha	Leaf	Paste, prepared by smashing the leaf, applied in nose directly.	Khumi, Marma and Tripura
		<i>Sida acuta</i> Burm. f.	Woakhipini	Chowkhodi	Mrang	Leaf	Inhaling smell of squeezed leaf.	Marma
14	Blood dysentery	<i>Centella asiatica</i> (L.) Urban	Mrangkhuikhoa	Achingkra	Sangsota	Leaf	Juice is extracted by smashing leaf of this plant and <i>Psidium guajava</i> and then taken orally 3 times a	Khumi and Tripura

Sl. No.	Disease name	Species name	Local name			Parts used	Preparation process	User group
			Marma	Khumi	Tripura			
							day up to cure.	
15	Blood purification	<i>Senna hirsuta</i> (L.) Irwin and Barneby	Painbowa	Puikaacha	Muitopi	Leaf	Extracted leaf juice is taken orally twice a day for 7-10 days.	Khumi, Marma and Tripura
16	Body pain	<i>Aidia pseudospicata</i> Ridsdale	Chiesangda Afrue	Dikyakaling		Leaf	One table spoon of extracted leaf juice is mixed with same amount of honey and taken twice a day for 3 days.	Khumi and Marma
		<i>Gouania tillaefolia</i> Lamk.	Lananowngnamya	Ayupuwin	Duaurai	Whole plant	Paste prepared by smashing the whole plant is used over the wounded area.	Khumi, Marma and Tripura
		<i>Pedilanthus tithymaloides</i> Poit.	Murunah	Kiokonaoki		Leaf	Warm leaf poultice over the painful area.	Marma
17	Body swelling	<i>Celosia cristata</i> L.	Krawmong Pai	Saiwang	Khongcha	Dried flower	Smashed flower is used over the belly and swollen area, twice a day for a week.	Marma
		<i>Spatholobus acuminatus</i> Benth.	Pownowai	Atowaaguin	Mroie	Root	Shower with root boiled water.	Khumi and Marma
18	Boils	<i>Persicaria hydropiper</i> (L.) Spach	Mracheai	Achakachu	Sathaimcho	Leaf	Leaf is smashed to produce juice which is taken twice a day for a week.	Marma
19	Bronchial asthma	<i>Myxopyrum smilacifolium</i> (Wall.) Blume	Anuielabera	Keuncherayua		Root	Root extract, obtained by stone grinding, is mixed with rice water and taken two times a day after meal for 2 weeks.	Marma
20	Burn	<i>Bryophyllum pinnatum</i> (Lamk.) Oken	Rowkyapanpow	Naproking	Naproking	Leaf	Leaf paste applied over the area.	Khumi and Tripura
		<i>Evolvulus nummularius</i> (L.) L.	Tamonai Kemonai	Dkyajuli Saiju		Whole plant	Paste prepared by smashing plant is used over the wounded area.	Khumi, Marma and Tripura
		<i>Hedyotis thomsoni</i> Hook.f.	Tasowpangpai	Angbow King	Mawblaikrwma	Leaf, root and stem	Paste of leaf, root and stem is used over the wounded area.	Khumi and Marma
		<i>Mycetia longifolia</i> (Wall.) O. Kuntze	Taow	Mykanchi		Fruit	Fruit juice is applied over burned areas 3-5 times a day	Khumi

Sl. No.	Disease name	Species name	Local name			Parts used	Preparation process	User group
			Marma	Khumi	Tripura			
		<i>Ocimum americanum</i> L.	Nuwboiw	Cheopra	Mada	Whole plant	Ash mixed with starch (starch extracted from rice) is used on sore.	Khumi and Marma
21	Chest pain	<i>Trevesia palmata</i> (Roxb.) Vis.	Foba	Sabang	Tripura	Leaf	Leaf paste is used externally during pain.	Marma
22	Cold and cough (all ages)	<i>Alpinia conchigera</i> Griff.	Padagra	Daichikachoy	Padagra	Whole plant	Powder, produced from dried plant, is inhaled for 3-5 days.	Khumi and Tripura
		<i>Eupatorium ayapana</i> Vent.	Painhuni	Shitaba	Taitong	Leaf	Leaf juice is taken orally thrice a day for a week or two.	Marma
		<i>Stahlianthus involucratus</i> (King ex Baker) R. M. Smith	Kyokhiang	Thithiksink	Santaokrang	Whole plant	Juice extracted by rubbing in stone is mixed with water and taken orally thrice a day up to cure.	Marma
		<i>Ocimum suave</i> Willd.	Mromahumbang			Leaf	Leaf juice, extracted by rubbing in stone, is taken twice a day for 3-5 days.	Marma
23	Cold and cough of Children	<i>Acorus calamus</i> L.	Langhi	Langhi	Lanhu	Rhizome	Rhizome powder is kept on head to inhale twice a day for 3-5 days.	Khumi, Marma and Tripura
24	Conjunctivitis	<i>Centella asiatica</i> (L.) Urban	Mrangkhuikhoa	Achingkra	Sangsota	Leaf	Extracted leaf juice is filtered and then applied (3 drops) in the eye before sleep.	Khumi and Tripura
		<i>Leucas aspera</i> (Willd.) Link	Pai Thung Sa			Whole plant	Juice extracted by boiling with water is applied in the eye thrice a day up to cure.	Marma and Tripura
		<i>Thunbergia grandiflora</i> (Roxb. ex Rottler) Roxb.	Lawchowonowai	Claicloyong	Dumangkhong	Stem	Stem sap drop is given in eyes twice a day	Khumi, Marma and Tripura
		<i>Solena amplexicaulis</i> (Lamk.) Gandhi	Kamuu	Tho	Dupoitha	Leaf	Leaf juice is used directly.	Khumi and Marma
		<i>Spermacoce latifolia</i> Aublet	Rowna	Heiupow	Shapipra	Leaf	Affected eye is washed with the leaf juice for 2-3 times a day.	Tripura
25	Constipati	<i>Musa paradisiaca</i> L.	Maldinapiow	Kotikiw	Thaileenow	Spathe	Juice, extracted by smashing	Marma

Sl. No.	Disease name	Species name	Local name			Parts used	Preparation process	User group
			Marma	Khumi	Tripura			
	on						the spathe, warmed with table salt is taken orally twice a day for 2-3 days.	
		<i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz	Abomaraja	Mahaga	Khungchak	Root and leaf	Root: Juice, extracted by rubbing in stone is taken directly three times a day for 2 weeks; Leaf: Juice is extracted by smashing and taken directly as above dose.	Khumi
		<i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz	Abomaraja	Mahaga	Khungchak	Leaf	Juice, extracted by smashing the leaf, is taken directly three times a day for 2 weeks.	Marma
		<i>Senna alata</i> (L.) Roxb.	Pou Chi Bang	Ciklaikinga	Khasowa	Flower	Powdered flower is taken orally with honey.	Marma, Khumi and Tripura
26	Cough	<i>Bryophyllum pinnatum</i> (Lamk.) Oken	Rowkyapanpow	Naproking	Naproking	Leaf	Warm leaf juice taken twice a day with honey for 3-5 days.	Marma
		<i>Clerodendrum indicum</i> (L.) O. Kuntze	Taratoba	Taratoba	Taratoba	Leaf and root	Roots and leaves are pasted separately and then taken with honey for 3 days.	Khumi, Marma and Tripura
		<i>Curcuma longa</i> L.	Nanhuo	Amchi	Sotowi	Rhizome	Extracted juice is mixed with salt, and then heated by dipping heated iron which is taken once a day up to cure.	Khumi, Marma and Tripura
		<i>Leucas aspera</i> (Willd.) Link	Pai Thung Sa			Whole plant	Boiled juice mixed with table salt and taken 3-4 times a day up to cure	Marma and Tripura
27	Any type of cut	<i>Centella asiatica</i> (L.) Urban	Mrangkhukhoa	Achingkra	Sangsota	Leaf	Heated leaf juice is mixed with salt and applied over the cut area in every 3-5 minutes.	Marma and Tripura
		<i>Chromolaena odorata</i> (L.) King & Robinson	Pachi	Oila	Khelaki	Young leaf	Leaf paste is used over the cut area.	Khumi, Marma and Tripura
		<i>Combretum ternatum</i> (Wall.)	Kyawnglongbai	Tancachupa	Mali	Leaf	Leaf paste is used in the	Khumi,

Sl. No.	Disease name	Species name	Local name			Parts used	Preparation process	User group
			Marma	Khumi	Tripura			
		<i>ex Clarke) O. Lecompte</i>					wounded area.	Marma and Tripura
		<i>Mucuna pruriens</i> (L.) DC.	Yang Khrenua	Likuajong	Bamphe	Leaf and shoot	Leaf and shoot paste is applied over cut area.	Marma
		<i>Spermacoce latifolia</i> Aublet	Rowna	Heiupow	Shapipra	Leaf	Smashed leaf is used in the cut area.	Marma
28	Cut in vein	<i>Ficus hederacea</i> Roxb.	Atrosarchi			Leaf	Leaf paste is applied over the cut area.	Marma
29	Dandruff	<i>Equisetum ramosissimum</i> Desf.	Pinlacha	Acala	Shachuri	Bulb/stem	Dried bulb/stem powder mixed with coconut oil is used in head.	Tripura
30	Dehydration	<i>Stahlianthus involucratus</i> (King ex Baker) R. M. Smith	Kyokhiang	Thithiksink	Santaokrang	Whole plant	Juice extracted by rubbing in stone is mixed with water and taken orally thrice a day up to cure.	Marma
31	Delivery problem	<i>Musa paradisiacal</i> L.	Maldinapiow	Kotikiw	Thaileenow	Leaf	<i>Nigella sativa</i> paste is applied on the forehead and then blow is given by mouth by the warm leaf blade in case of headache during delivery.	Khumi
		<i>Sida acuta</i> Burm. f.	Woakhipini	Chowkhodi	Mrang	Leaf and shoot	Paste rubbed on belly for early delivery.	Khumi
		<i>Curcuma longa</i> L.	Nanhua	Amchi	Sotowi	Rhizome	Rhizome paste is applied over the whole body once a day for a week for early delivery.	Khumi, Marma and Tripura
32	Diarrhoea	<i>Ixora cuneifolia</i> Roxb.	Kyamoachuie	Chi Shing Da Keu		Root	Juice is mixed with water and taken orally twice a day for 3 days.	Marma
		<i>Mussaenda roxburghii</i> Hook. f.	Sungphaifla	Nakaling	Samuimu	Root	For pain in teeth and mouth, root paste is used and/or chewing the root directly for 2-3 days. Root juice is taken twice a day for 2-3 days to treat diarrhoea.	Khumi, Marma and Tripura

Sl. No.	Disease name	Species name	Local name			Parts used	Preparation process	User group
			Marma	Khumi	Tripura			
33	Dizziness of mothers after child birth	<i>Maesa indica</i> (Roxb.) A. DC.	Kramafruem Apang	Dikyanang	Balai	Whole plant	After child birth, vapor-bath of the whole plant is taken for 2-3 days.	Khumi and Marma
34	Dog bite	<i>Pedilanthus tithymaloides</i> Poit.	Murunah	Kiokonaoki		Leaf	Smashed leaf is used over the bite area.	Khumi
35	Dysentery	<i>Clerodendrum wallichii</i> Merr.	Teratebathoipow	Terateba	Terateba	Root	Juice extracted by rubbing root in stone is taken thrice a day until cure.	Khumi, Marma and Tripura
		<i>Homalomena aromatica</i> (Roxb. ex Sim.) Schott	Saranggang	Nowbang	Kamathri	Petiole	Petiole is burnt with chili and eaten with rice for 3-5 days.	Khumi
		<i>Homalomena aromatica</i> (Roxb. ex Sim.) Schott	Saranggang	Nowbang	Kamathri	Whole plant	Plant decoction is taken orally twice a day for a week.	Marma
36	Ear pain	<i>Campsis radicans</i> (L.) Seem.	Egro	Achama	Achachuloi	Leaf	Warm leaf juice is given to the ear.	Khumi, Marma and Tripura
		<i>Costus speciosus</i> (Koenig ex Retz.) Smith	Kraingtomboi	Chitomboi	Mynomakotmai	Whole plant	Extracted juice is used in the ear twice a day for 2-3 days.	Khumi, Marma and Tripura
		<i>Hoya parasitica</i> (Roxb.) Wall. ex Wight	Anuimeba	Nangtho	Chokible	Leaf	Leaf juice is used in ear once a day during night for 7-10 days.	Khumi, Marma and Tripura
		<i>Sida rhombifolia</i> L.	Owakhipena			Leaf	Juice extracted from warm leaf is put in ear during pain.	Marma
		<i>Solanum torvum</i> Swartz	Kajaswe	Empaithai	Khankha	Leaf	Leaf juice is put directly in the ear thrice a day for a week.	Khumi, Marma and Tripura
37	Eczema	<i>Pavetta tomentosa</i> Roxb. ex Smith	Waipoichipang	Kiwngkamnoking	Khungshuw	Leaf	Leaf paste is used over the affected area three times a day for a month.	Khumi, Marma and Tripura
		<i>Senna alata</i> (L.) Roxb.	Pou Chi Bang	Ciklaikinga	Khasowa	Leaf	Leaf paste is applied externally on the affected area.	Khumi, Marma and Tripura
38	Fever (all ages)	<i>Acacia farnesiana</i> (L.) Willd.	Waiya	Hoiaki	Awaia	Flower, leaf and root	Bath with leaf, flower and root boiled water for a week.	Khumi and Marma

Sl. No.	Disease name	Species name	Local name			Parts used	Preparation process	User group
			Marma	Khumi	Tripura			
		<i>Clerodendrum indicum</i> (L.) O. Kuntze	Taratoba	Taratoba	Taratoba	Leaf and root	Roots and leaves are pasted separately and then taken with honey for 3 days.	Khumi, Marma and Tripura
		<i>Clerodendrum wallichii</i> Merr.	Teratebathoipow	Terateba	Terateba	Young leaf	Bath with leaf-boiled water.	Khumi, Marma and Tripura
		<i>Curcuma longa</i> L.	Nanhuo	Amchi	Sotowi	Rhizome	Dried rhizome is powdered and mixed with kerosene oil which is massaged in the hand and feet.	Khumi, Marma and Tripura
		<i>Musa paradisiacal</i> L.	Maldinapiow	Kotikiw	Thaileenow	Root	Juice of this plant root and that of <i>Papayais</i> mixed and given with rice- water to children three times a day for 3-5 days.	Khumi and Tripura
		<i>Mussaenda roxburghii</i> Hook. f.	Sungphaifla	Nakaling	Samuimu	Whole plant	The Marma people rub the plant on body during Fever. The Khumi people use the boiled water with the plant for bathing to reduce body temperature.	Khumi and Marma
		<i>Sansevieria roxburghiana</i> Schult.f.	Neingsha	Neingsha	Pakharesu	Whole plant	Affected person should have a bath with boiled water of whole plant.	Khumi, Marma and Tripura
39	Fever (Child)	<i>Clausena suffruticosa</i> (Roxb.) Wight & Arn.	Sagrauchong	Ouichiking	Sangtakkhing	Root	Juice, extracted by rubbing in stone, is sponged by cotton and applied over the forehead.	Khumi and Marma
		<i>Flemingia stricta</i> Roxb.	Krangdunaduepay	Tamatamaking	Keramkana	Whole plant	Bath with whole plant boiled water.	Marma
		<i>Flemingia stricta</i> Roxb.	Krangdunaduepay	Tamatamaking	Keramkana	Leaf	Leaf-boiled water is used for shower.	Khumi
40	Fever blister	<i>Premna esculenta</i> Roxb.	Kramurauh	Ankungna	Arai	Leaf	Leaf paste prepared by rubbing in stone is given over the sore.	Khumi and Marma
41	Food	<i>Blumea balsamifera</i> DC.	Sarakodung	Predangpul	Khunnama	Leaf	Leaf ash, prepared by	Khumi,

Sl. No.	Disease name	Species name	Local name			Parts used	Preparation process	User group
			Marma	Khumi	Tripura			
	poisoning						burning is mixed with lemon and table salt, and is taken orally thrice a day for a week.	Marma and Tripura
		<i>Diplazium esculentum</i> (Retz.) Sw.	Graigadow	Angskay	Moikhondoi	Leaf	Leaf decoction is taken thrice a day for 2-3 days.	Khumi, Marma and Tripura
42	Foot tumor	<i>Angiopteris evecta</i> (Forst) Hoffm.	Chagkathe	Angkskepui	Asojaly	Rhizome	Rhizome paste is used over the tumor 3 times a day for 3-5 days.	Khumi and Marma
43	Foot wound	<i>Angiopteris evecta</i> (Forst) Hoffm.	Chagkathe	Angkskepui	Asojaly	Rhizome	Rhizome juice, extracted by stone grinding, is used over the wounded area.	Khumi and Marma
44	Fungal infection	<i>Hedyotis scandens</i> Roxb.	Anuwaihoweatha	Anwaichi		Whole plant	Warm mash of whole plant is used over the affected area twice a day for a week.	Khumi, Marma and Tripura
		<i>Marsdenia tenacissima</i> (Roxb.) Moon	Townoy	Ayukathui	Duabotoi	Leaf	Sap exude from leaf base is applied over affected area.	Khumi
45	Gastric	<i>Breynia retusa</i> (Dennst.) Alston	Rownee	Aghkamchi	Satamsakatoma	Whole plant	Juice prepared by rubbing in stone is taken directly.	Tripura
		<i>Blumea balsamifera</i> DC.	Sarakodung	Predangpul	Khunnama	Leaf	Leaf ash, prepared by burning is mixed with lemon and table salt, and is taken orally thrice a day for a week.	Khumi, Marma and Tripura
		<i>Croton bonplandianus</i> Baill.	Painujaw	Leunke	Khubambam	Root	Root juice, extracted by rubbing in stone, is taken once a day for a week.	Khumi and Marma
		<i>Ocimum tenuiflorum</i> L.	Chaprang	Leongkede	Zeipra	Young leaf	Juice of young leaves and shoots is taken directly twice a day for 3-5 days.	Khumi, Marma and Tripura
		<i>Scoparia dulcis</i> L.	Dungangja	Daesikhlu	Samthangso	Whole plant	Juice of whole plant is taken thrice a day for a week.	Khumi, Marma and Tripura
		<i>Solanum violaceum</i> Ortega	Kajoishi	Empaithai	Khankha	Root	Root extract obtained by rubbing in stone is mixed with rice water and taken orally twice a day for 4-5 days.	Khumi, Marma and Tripura

Sl. No.	Disease name	Species name	Local name			Parts used	Preparation process	User group
			Marma	Khumi	Tripura			
		<i>Tinospora cordifolia</i> (Willd.) Hook. f. & Thoms.	Sikri	Ajunkanumbe	Sikri	Root	Pill prepared by smashing root is dried and taken orally thrice a day up to cure.	Khumi and Marma
		<i>Zingiber capitatum</i> Roxb.	Phalago	Pennih	Blomoshla	Rhizome	Hot red iron is dipped in rhizome juice and taken orally twice a day for a week.	Khumi, Marma and Tripura
		<i>Combretum ternatum</i> (Wall. ex Clarke) O. Lecompte	Kyawnglongbai	Tancachupa	Mali	Leaf	Leaf infusion, extracted by boiling, is taken orally twice a day for a week.	Khumi, Marma and Tripura
46	Gonorrhea	<i>Peristylus constrictus</i> (Lindl.) Lindl.	Chemmodoh	Nantho	Kuthmai	Whole plant	One cup of whole-plant boiled water is taken once a day after dinner for 7-10 days.	Khumi, Marma and Tripura
47	Gum problem	<i>Breynia retusa</i> (Dennst.) Alston	Rownee	Aghkamchi	Satamsakatoma	Whole plant	Gurgle by the whole- plant boiled water.	Khumi and Marma
48	Headache Headache	<i>Musa paradisiacal</i> L.	Maldinapiow	Kotikiw	Thaileenow	Leaf	<i>Nigella sativa</i> paste is applied on the forehead and then blow is given by mouth by the warm leaf blade in case of headache during delivery.	Khumi
		<i>Ageratum conyzoides</i> L.	Achowneshhi	Khulaacha	Channama	Whole plant	Plant paste mixed with zinger is applied over the forehead.	Khumi
		<i>Alpinia conchigera</i> Griff.	Padagra	Daichikachoy	Padagra	Rhizome	Juice, extracted by smashing, is used in eye during headache.	Marma
		<i>Bryophyllum pinnatum</i> (Lamk.) Oken	Rowkyapanpow	Naproking	Naproking	Leaf	Leaf paste applied over forehead.	Marma
		<i>Campsis radicans</i> (L.) Seem.	Egro	Achama	Achachuloi	Leaf	Leaf paste is applied externally over forehead.	Marma
		<i>Cyathula prostrata</i> (L.) Blume	Nairang	Achaprue	Chakka	Root	Root paste is used over forehead.	Marma
		<i>Helminthostachys zeylanica</i> (L.) Hook.	Choimakhankre	Achakhungpui	Singraikong	Rhizome and fronds	Paste mixed with honey is taken orally 2 times a day for 2-3 days.	Khumi and Marma
		<i>Lantana camara</i> L. var.	Achownai	Moichiacha	Khelakhemows	Leaf	Leaf paste is used in the	Marma

Sl. No.	Disease name	Species name	Local name			Parts used	Preparation process	User group
			Marma	Khumi	Tripura			
		<i>aculeata</i> (L.) Moldenke & Moldenke			ugnama		forehead.	
		<i>Leucas aspera</i> (Willd.) Link	Pai Thung Sa			Whole plant	Decoction of whole plant is taken orally thrice a day for three days.	Khumi and Marma
		<i>Leucas zeylanica</i> (L.) R. Br.	Paishumchawg	Achasutang	Khun	Leaf and flower	Leaf and flower boil extract is used over the forehead. Drinking green leaf juice is good for sleep.	Khumi, Marma and Tripura
		<i>Lygodium altum</i> (Clarke) v.A.v.R.	Miaumakla	Kolomboi	Mukhratala	Young frond	Fronde extract or the raw juice prepared by smashing is taken orally during headache.	Khumi and Tripura
		<i>Maesa indica</i> (Roxb.) A. DC.	Kramafuem Apang	Dikyanang	Balai	Whole plant	After child birth, vapor-bath of the whole plant is taken for 2-3 days.	Khumi and Marma
49	Increase in pancreas	<i>Typhonium trilobatum</i> (L.) schott	Mohura	Mohura	Mukhoithoicho	Root	Root smash is taken with banana pulp four times a day for a week.	Khumi, Marma and Tripura
50	Indigestion	<i>Blumea balsamifera</i> DC.	Sarakodung	Predangpul	Khunnama	Leaf	Leaf ash, prepared by burning is mixed with lemon and table salt, and is taken orally thrice a day for a week.	Khumi, Marma and Tripura
		<i>Centella asiatica</i> (L.) Urban	Mrangkhuikhoa	Achingkra	Sangsota	Leaf	Dried leaf powder is mixed with honey (1:1) and taken orally after taking food thrice a day for a month.	Marma and Tripura
51	Insect bite	<i>Amorphophallus bulbifer</i> (Roxb.) Blume	Gongkhanpang	Ineki	Batyma	Bulbil	Bulbil slice is used over the affected area.	Khumi and Marma
		<i>Amorphophallus bulbifer</i> (Roxb.) Blume	Gongkhanpang	Ineki	Batyma	Bulbil	Bulbil paste is applied in the affected area.	Tripura
		<i>Zephyranthes grandiflora</i> Lindl.	Nambai			Rhizome	Rhizome paste is used over the affected area.	Marma
52	Insomnia	<i>Leucas zeylanica</i> (L.) R. Br.	Paishumchawg	Achasutang	Khun	Leaf and flower	Leaf and flower boil extract is used over the forehead. Drinking green leaf juice is good for sleep.	Khumi, Marma and Tripura

Sl. No.	Disease name	Species name	Local name			Parts used	Preparation process	User group
			Marma	Khumi	Tripura			
		<i>Senna tora</i> (L.) Roxb.	Dangyae	Amilu	Sawakhi	Young leaf	Leaf should be kept under pillow; leaf decoction is taken orally twice a day for 2 weeks.	Khumi and Marma
53	Itching	<i>Atylosia scarabaeoides</i> (L.) Baker	Noemuie	Ajungmuie		Leaf	Leaf boiled water is used for bathing for a week.	Khumi and Marma
		<i>Clerodendrum viscosum</i> Vent.	Khumejaie	Haronga	Khakoh	Whole plant and root	Bath with plant and root boiled water.	Khumi and Marma
		<i>Persicaria hydropiper</i> (L.) Spach	Mracheai	Achakachu	Sathaimcho	Leaf	Leaf is smashed to produce juice which is taken twice a day for a week.	Marma
		<i>Scoparia dulcis</i> L.	Dungangja	Daesikhlu	Samthangso	Whole plant	Paste, prepared by smashing, is used over the itching area.	Khumi and Marma
54	Jaundice	<i>Begonia silhetensis</i> (A. DC.) C. B. Clarke	Kiowkhai	Araraipou	Mukhoithaichoi	Leaf	Extracted leaf juice is taken orally twice a day for a week or leaf is cooked with hill crab and then taken.	Khumi, Marma and Tripura
		<i>Cissus repens</i> Lamk.	Waronkoi	Arori	Mukhopape	Young shoot	Young tender shoot is used to make soup with hill crab.	Khumi, Marma and Tripura
		<i>Desmodium triquetrum</i> (L.) DC. subsp. <i>auriculatum</i> (DC.) Prain	Pawlogy	Chiakiniacha	Blongmykongda	Root	Juice prepared by squeezing roots is mixed with cold water, which is taken twice a day for a week.	Khumi and Marma
55	Joint pain	<i>Equisetum ramosissimum</i> Desf.	Pinlacha	Acala	Shachuri	Stem	Heated stem is bound over the joint.	Khumi, Marma and Tripura
		<i>Persicaria hydropiper</i> (L.) Spach	Mracheai	Achakachu	Sathaimcho	Leaf	Leaf is smashed to produce juice which is taken twice a day for a week.	Marma
56	Large spleen	<i>Drynaria quercifolia</i> (L.) J. Sm.	Fulunobah	Chee Fulu	Nao Oi	Rhizome	Pills made from rhizome powder and sugar is taken twice a day for seven days.	Khumi and Marma
57	Less sleep	<i>Centella asiatica</i> (L.) Urban	Mrangkhuikhoa	Achingkra	Sangsota	Leaf	Leaf juice, mixed with water	Marma and

Sl. No.	Disease name	Species name	Local name			Parts used	Preparation process	User group
			Marma	Khumi	Tripura			
							and sugar, is taken once a day.	Tripura
		<i>Scoparia dulcis</i> L.	Dungangja	Daesikhlu	Samthangso	Whole plant	Juice of whole plant is taken thrice a day for a week.	Khumi, Marma and Tripura
58	Lice in hair	<i>Clerodendrum viscosum</i> Vent.	Khumejaie	Haronga	Khakoh	Leaf	Hair washes with leaf boiled water.	Khumi
59	Liver diseases	<i>Flemingia stricta</i> Roxb.	Krangdunaduepay	Tamatamaking	Keramkana	Root	Paste prepared by smashing roots is used over chest for half an hour. This is practiced for 2-3 times a day for a month.	Tripura
60	Menstrual problem (Excessive menstruation)	<i>Gouania tiliaefolia</i> Lamk.	Lananowngnamya	Ayupuwin	Daurai	Whole plant	Plant juice is taken with water (before meal) twice a day for 5-7 days.	Khumi, Marma and Tripura
61	Menstrual problem (Irregular menstruation)	<i>Bauhinia acuminata</i> L.	Thankhrapru	Achumiakangli	khuntaosa	Root and flower	Juice, prepared by smashing root and flower, is taken before menstruation, once a day for a week.	Khumi, Marma and Tripura
		<i>Celosia cristata</i> L.	Krawmong Pai	Saiwang	Khongcha	Root	Paste or juice, extracted by rubbing the root in stones, is taken orally thrice a day for a week.	Tripura
		<i>Flemingia macrophylla</i> (Willd.) O. Kuntze ex Merr.	Sangnemro	Ceakenae	Blong Mikunda	Root	Root extract obtained by grinding in stone is taken orally thrice a day for 5-7 days.	Khumi, Marma and Tripura
		<i>Ixora cuneifolia</i> Roxb.	Kyamoachuie	Chi Shing Da Keu		Root	Extracted root juice is taken directly twice a day for a week.	Marma
		<i>Pentapetes phoenicea</i> L.	Moide khowra	Cheota	Nania	Root	Root juice, extracted through rubbing in stone, is taken twice a day for a week.	Marma
62	Paralysis	<i>Ageratum conyzoides</i> L.	Achowneshhi	Khulaacha	Channama	Whole	Poultice with warm plant over	Khumi

Sl. No.	Disease name	Species name	Local name			Parts used	Preparation process	User group
			Marma	Khumi	Tripura			
						plant	the area is given once a day for a month.	
63	Rheumatic pain	<i>Aidia pseudospicata</i> Ridsdale	Chiesangda Afrue	Dikyakaling		Leaf	Heated leaf is used over the pained area during pain.	Tripura
		<i>Clerodendrum indicum</i> (L.) O. Kuntze	Taratoba	Taratoba	Taratoba	Leaf and root	Leaves and root extracts are taken directly thrice a day for 5-7 days.	Khumi, Marma and Tripura
		<i>Lantana camara</i> L. var. <i>aculeata</i> (L.) Moldenke & Moldenke	Achownai	Moichiacha	Khelakhemows ugnama	Leaf	Warmed leaf paste is spread over the pained area.	Khumi
		<i>Merremia umbellate</i> (L.) Hallier f.	Thamangnoway	Apheajong	Bangphenophu	Flower	Flower is touched in pained area.	Marma
64	Ringworm	<i>Acacia farnesiana</i> (L.) Willd.	Waiya	Hoiaki	Awaia	Flower, leaf and root	Bath with leaf, flower and root boiled water for a week.	Khumi and Marma
		<i>Hedyotis scandens</i> Roxb.	Anuwaihoweatha	Anwaichi		Whole plant	Warm mash of whole plant is used over the affected area twice a day for a week.	Khumi, Marma and Tripura
		<i>Smilax laurifolia</i> L.	Khraikodow	Angwaijong	Sowgsowgra	Root	Taking bath by root boiled water for a week.	Khumi, Marma and Tripura
65	Scanty urination	<i>Drynaria quercifolia</i> (L.) J. Sm.	Fulunobah	Chee Fulu	Nao Oi	Rhizome	Peeled rhizome is chewed with sugar three times a day for 3-5 days.	Marma
66	Senseless	<i>Lygodium altum</i> (Clarke) v.A.v.R.	Miaumakla	Kolomboi	Mukhratala	Root	Used as ingredients in another composition mixed with turmeric juice @ 1:1 and spray over the face.	Marma
67	Snake bite	<i>Maesa ramentacea</i> (Roxb.) A. DC.	Chupru	Taiokatti	Kotoma	Leaf	Affected area is covered with leaves that will remove venom.	Khumi, Marma and Tripura
		<i>Ophiorrhiza mungos</i> L.	Chiesaida-anie	Chiesaida-kamchi	Chiesaida-anie	Leaf	Leaf paste is applied on the wounded area.	Marma
68	Sore	<i>Celosia cristata</i> L.	Krawmong Pai	Saiwang	Khongcha	Dried flower	Smashed flower is used over the belly and swollen area,	Marma

Sl. No.	Disease name	Species name	Local name			Parts used	Preparation process	User group
			Marma	Khumi	Tripura			
							twice a day for a week.	
		<i>Dalbergia stipulacea</i> Roxb.	Nuwfrei	Youngyonking	Dulela	Fruit and leaf	Fruit and leaf is used to make paste, and that is used over the affected area.	Khumi, Marma and Tripura
		<i>Geodorum citrinum</i> Jack.	Chemro	Doamia	Khulairu	Bulb	Extracted juice, by rubbing bulb in stone, is applied over the affected area for a week.	Khumi, Marma and Tripura
		<i>Leea aequata</i> L.	Dow	Akley Thai	Changklenma	Root and young leaf	Root and leaf paste is applied in the affected area	Khumi, Marma and Tripura
		<i>Parabaena sagittata</i> Miersex Hook.f. & Thoms.	Gaidiaanowai	Muipungpou	Angkala	Leaf	Leaf paste is applied over the affected area.	Marma
		<i>Sida acuta</i> Burm. f.	Woakhipini	Chowkhodi	Mrang	Young plant	Paste applied over the sore.	Tripura
		<i>Tournefortia roxburghii</i> C.B. Clarke	Kraushow	Asaphaiacha	Kalasona	Leaf	The dried leaf is thrashed and used directly.	Marma
		<i>Cyathula prostrata</i> (L.) Blume	Nairang	Achaprue	Chakka	Leaf/young shoot	Paste of leaf or shoot is applied over the sore.	Khumi and Tripura
69	Spermator rhea	<i>Drynaria quercifolia</i> (L.) J. Sm.	Fulunobah	Chee Fulu	Nao Oi	Rhizome	Peeled rhizome is chewed with sugar three times a day for 3-5 days.	Marma
70	Stomachache	<i>Aglaonema hookerianum</i> Schott	Cshekhow	Lykho	Hatharikhiethok	Spathe	Extracted spathe juice (two table spoon) taken orally twice a day for 2-3 days.	Khumi, Marma and Tripura
		<i>Clausena suffruticosa</i> (Roxb.) Wight & Arn.	Sagrauchong	Ouichiking	Sangtakkhing	Root	Rice water mixed with root juice is taken orally thrice a day up to cure.	Khumi and Marma
		<i>Curcuma longa</i> L.	Nanhuo	Amchi	Sotowi	Rhizome	A mixture is prepared with the rhizome paste, lime and ash, which is taken orally thrice a day during pain.	Khumi, Marma and Tripura
		<i>Leucas aspera</i> (Willd.) Link	Pai Thung Sa			Whole plant	Decoction of whole plant is taken orally thrice a day for three days.	Khumi and Marma
		<i>Ocimum tenuiflorum</i> L.	Chaprang	Leongkede	Zeipra	Young leaf	Juice of young leaves and shoots is taken directly twice	Khumi, Marma and

Sl. No.	Disease name	Species name	Local name			Parts used	Preparation process	User group
			Marma	Khumi	Tripura			
		<i>Ophiorrhiza mungos</i> L.	Chiesaida-anie	Chiesaida-kamchi	Chiesaida-anie	Root	a day for 3-5 days. Root paste is taken thrice a day for 3 days.	Tripura Khumi
		<i>Phyllanthus niruri</i> L.	Magoinoai	Sikangkhlhu	Satanshah	Root	Pill, prepared by smashing the root and garlic, is taken orally once a day up to cure.	Marma and Tripura
		<i>Rauvolfia serpentina</i> (L.) Benth. ex Kurz	Abomaraja	Mahaga	Khungchak	Root, leaf and flower	Root: Juice, extracted by rubbing in stone is taken twice a day for 3 days; Leaf and flower: Juice, extracted by smashing, is taken orally after boiling as above dose.	Tripura
		<i>Scoparia dulcis</i> L.	Dungangja	Daesikhlu	Samthangso	Leaf	Leaf juice is taken directly twice a day for three days.	Tripura
		<i>Tinospora cordifolia</i> (Willd.) Hook. f. & Thoms.	Sikri	Ajukanumbe	Sikri	Root	Pill prepared by smashing root is dried and taken orally thrice a day up to cure.	Khumi and Marma
		<i>Zingiber montanum</i> (Koen.) Dietr.	Pele	Paley	Paley	Rhizome	Rhizome juice mixed with hot water and salt is taken orally once a day for 2-3 days.	Marma and Tripura
71	Stone in urinary gland	<i>Jasminum sambac</i> (L.) Ait.	Kyalungpai	Tangachupa	Malikum	Root	Root juice (1/2 cup) mixed with honey taken twice a day for a month for stone formation.	Khumi
72	Stone in gall bladder, kidney, urinary gland	<i>Evolvulus nummularius</i> (L.) L.	Tamonai Kemonai	Dkyajuli Saiju		Whole plant	Plant portions boiled with water and taken as drink twice a day for 1-2 weeks.	Khumi, Marma and Tripura
73	Stop excess bleeding after child birth	<i>Adiantum caudatum</i> L.	Jogemuchoi	Achaichong		Leaf	Leaf juice (Half cup) extracted by smashing is given to mother thrice a day for 2-3 days.	Khumi, Marma and Tripura
74	Swelling	<i>Spermacoce latifolia</i> Aublet	Rowna	Heiupow	Shapipra	Young leaf	Smashed leaf is used in the	Khumi

Sl. No.	Disease name	Species name	Local name			Parts used	Preparation process	User group
			Marma	Khumi	Tripura			
							affected area.	
75	Swollen legs and ankles	<i>Mimosa pudica</i> L.	Hrapaing	Ange	Changlachi	Leaf, root and flower	Boiled water with leaf, root and flower is used for bathing for 3-5 days.	Marma
76	Swollen vein	<i>Leea aequata</i> L.	Dow	Akley Thai	Changklenma	Root and young leaf	Root and leaf paste is applied in the affected area	Khumi, Marma and Tripura
77	Syphilis	<i>Peristylus constrictus</i> (Lindl.) Lindl.	Chemmodoh	Nantho	Kuthmai	Whole plant	One cup of whole-plant boiled water is taken once a day after dinner for 7-10 days.	Khumi, Marma and Tripura
78	Taste disorder	<i>Commelina diffusa</i> Burm. f.	Wakrewakrai	Andeochi	Moikhnai	Young leaf	Boiled tender leaves are taken asan appetiser.	Khumi, Marma and Tripura
79	Throat pain due to cold	<i>Senna obtusifolia</i> (L.) Irwin & Barneby	Hankheuw	Puikache	Muiktoima	Root	Root juice, extracted by rubbing in stone, is taken thrice a day for a week.	Marma
		<i>Tabernaemontana divaricata</i> (L.) R. Br. ex Roem. & Schult.	Tachhowro	Ayungkew	Chuantoi	Root	Root is kept in mouth during pain.	Marma
		<i>Tabernaemontana divaricata</i> (L.) R. Br. ex Roem. & Schult.	Tachhowro	Ayungkew	Chuantoi	Leaf	Leaf is kept in mouth during pain.	Khumi and Tripura
		<i>Tabernaemontana recurva</i> Roxb.	Tasaru	Ambuace	Lamacha	Root	Root is kept in mouth during pain.	Khumi, Marma and Tripura
80	To avoid pregnancy	<i>Crotalaria pallida</i> Ait.	Cholloi	Acha Akling Rui	Chowly	Root	Root is tied with the naval of the female during sex.	Khumi, Marma and Tripura
81	To gain sense	<i>Clausena suffruticosa</i> (Roxb.) Wight & Arn.	Sagrauchong	Ouichiking	Sangtakkhing	Whole plant	Powder of the dried whole plant is mixed with water, and that is sprayed over the face to get sense.	Khumi and Marma
82	To increase breast milk	<i>Ichnocarpus frutescens</i> (L.) R. Br.	Suotalangning	Katnayong	Duabotai	Leaf and shoot	Chicken soup prepared with leaf and shoot as ingredients is taken twice a day for 3-5	Khumi and Tripura

Sl. No.	Disease name	Species name	Local name			Parts used	Preparation process	User group
			Marma	Khumi	Tripura			
							production	
83	Tonsillitis	<i>Ixora cuneifolia</i> Roxb.	Kyamoachuie	Chi Shing Da Keu		Root	Root paste is spread over the area for 7 days.	Khumi
84	Tooth and mouth pain	<i>Mussaenda roxburghii</i> Hook. f.	Sungphaifla	Nakaling	Samuimu	Root	Root paste is used and/or chewing the root directly for 2-3 days.	Khumi, Marma and Tripura
		<i>Breynia retusa</i> (Dennst.) Alston	Rownee	Aghkamchi	Satamsakatoma	Whole plant	Gurgle by the whole plant boiled water.	Khumi and Marma
85	Under arm sore	<i>Melastoma malabathricum</i> L.	Sayme	Chiplai	Taitong	Leaf	Leaf paste is used over the wound area for 3-4 days.	Khumi and Marma
86	Urine infection	<i>Jasminum sambac</i> (L.) Ait.	Kyalungpai	Tangachupa	Malikum	Root	Root paste is used in the urinary organ	Khumi
		<i>Maranta arundinacea</i> L.	Fawraiou	Dotrucho	Thalairu	Rhizome	Rhizome juice extract by smashing is taken by mixing with root extract of mango and banana tree.	Khumi, Marma and Tripura
87	Vomiting	<i>Ixora cuneifolia</i> Roxb.	Kyamoachuie	Chi Shing Da Keu		Root	Root juice is taken orally after vomiting.	Tripura
		<i>Amaranthus spinosus</i> L.	Hankhala	Apading	Moinchu	Root	Root juice, extracted by rubbing in stone, is mixed with rice water and taken orally after vomiting.	Khumi, Marma and Tripura
88	Weakness	<i>Desmodium triquetrum</i> (L.) DC. subsp. <i>auriculatum</i> (DC.) Prain	Pawlogy	Chiakiniacha	Blongmykongda	Root	Root is used with tea.	Tripura
89	Wound	<i>Centella asiatica</i> (L.) Urban	Mrangkhuikhoa	Achingkra	Sangsota	Leaf	Heated leaf juice is mixed with salt and applied over the wound area in every 3-5 minutes.	Marma and Tripura
		<i>Chromolaena odorata</i> (L.) King & Robinson	Pachi	Oila	Khelaki	Young leaf	Leaf paste is used over the wounded area.	Khumi, Marma and Tripura
		<i>Dalbergia stipulacea</i> Roxb.	Nuwfrei	Youngyonking	Dulela	Fruit and leaf	Fruit and leaf is used to make paste, and that is used over the affected area.	Khumi, Marma and Tripura
		<i>Gouania tiliaefolia</i> Lamk.	Lananowngnamya	Ayupuwin	Daurai	Whole	Paste prepared by smashing	Khumi,

Sl. No.	Disease name	Species name	Local name			Parts used	Preparation process	User group
			Marma	Khumi	Tripura			
						plant	the whole plant is used over the wounded area.	Marma and Tripura
		<i>Hedyotis thomsoni</i> Hook.f.	Tasowpangpai	Angbow King	Mawblaikrwma	Leaf, root and stem	Paste of leaf, root and stem is used over the wounded area.	Khumi and Marma
90	Wound on eye	<i>Hedyotis thomsoni</i> Hook.f.	Tasowpangpai	Angbow King	Mawblaikrwma	Leaf	Leaf juice is used to wash eyes.	Tripura
91	Wounds in hands and legs	<i>Staurogyne argentea</i> Wall.	Rowmbong	Pawmoui	Towmaorai	Leaf	Leaf juice is taken orally thrice a day for a week.	Khumi, Marma and Tripura

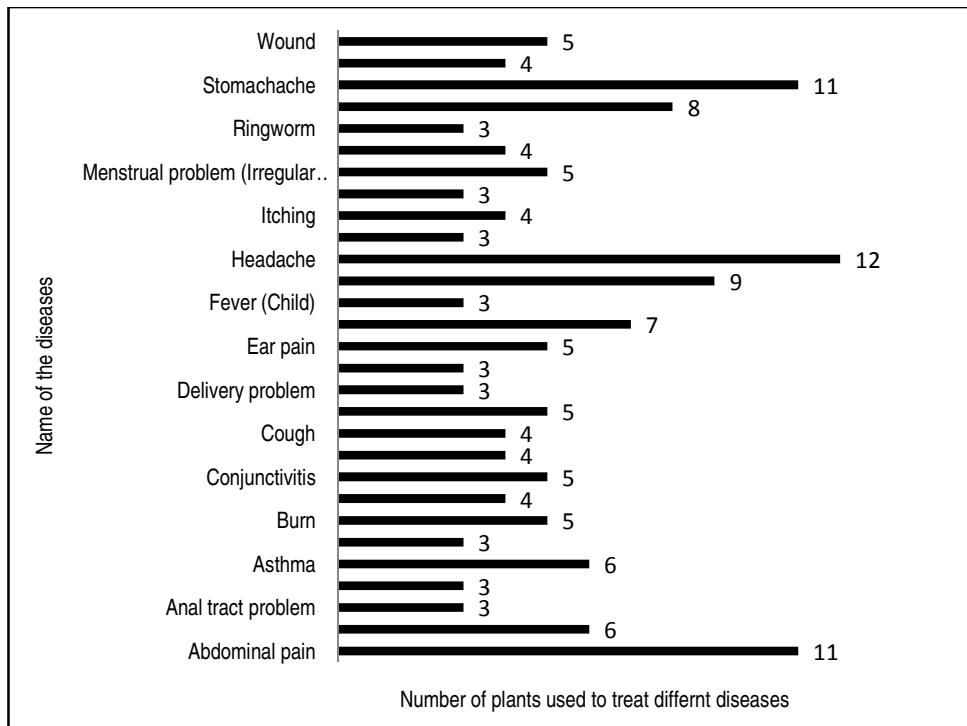


Fig. 1. Number of plants having different pharmacological actions (Diseases that used 3 and above number of plants are shown here)

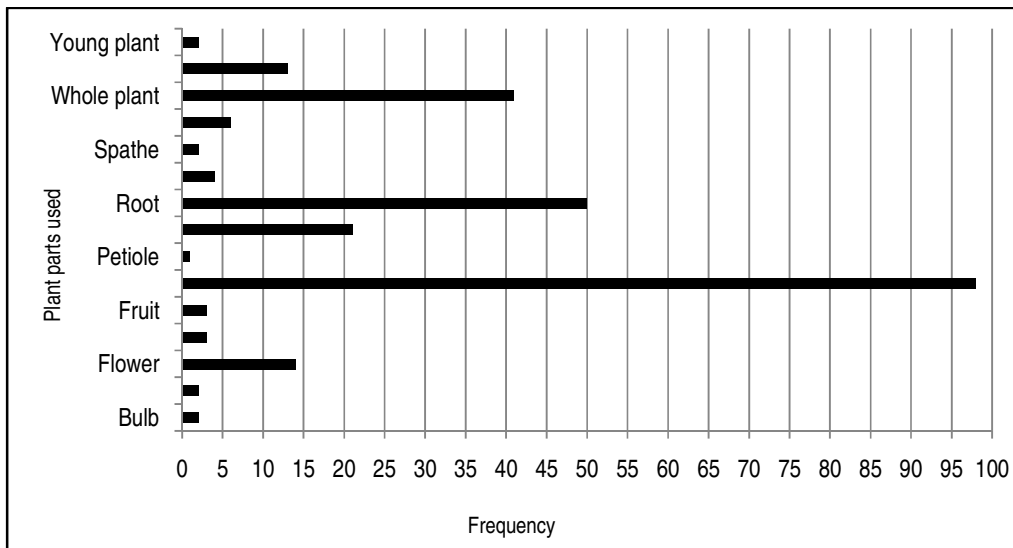


Fig. 2. Frequently used plant parts to treat different diseases

It was exposed that out of 116 species, *Marma* community used the highest number of species (98), followed by *Khumi* (84) and *Tripura* (67) to treat different diseases, though some species were used by more than one community. It was

also revealed that the above mentioned three communities commonly used 52 species (Fig. 4).

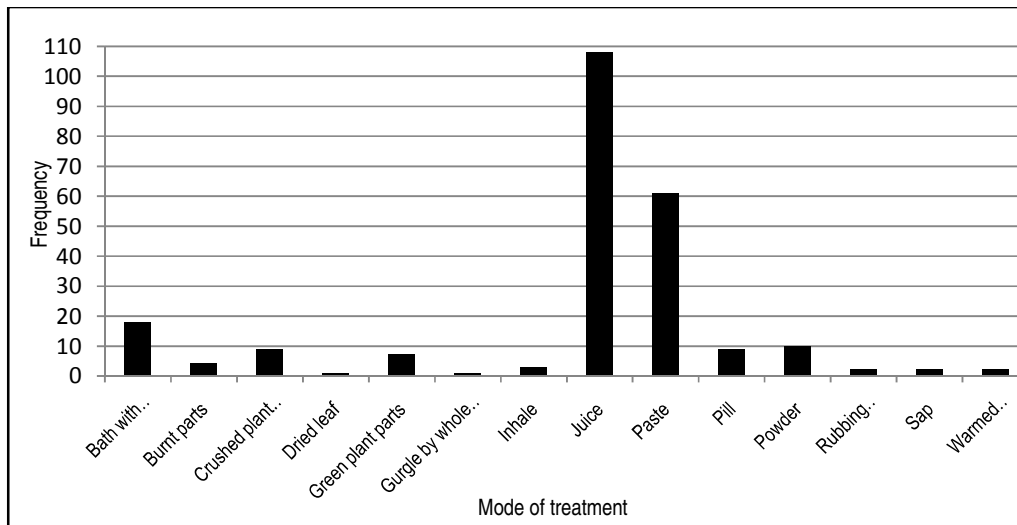


Fig. 3. Modes of providing herbal treatment

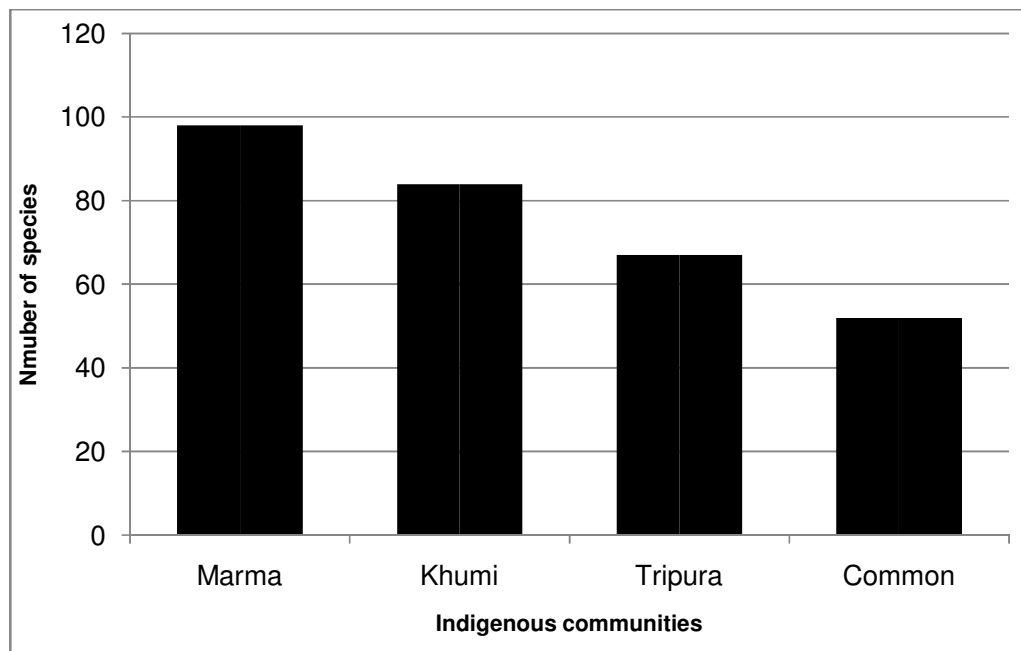


Fig. 4. Individually and collectively used species numbers

4. CONCLUSION

It is very unfortunate that limited work has been done so far by the natural scientists to document the TK of the THs about their healing practices of Bangladesh and hence we need to take some measures for protection of this knowledge. Conservation of rare and important medicinal plants through *ex-situ* and *in-situ* conservation

might be the best mode of protection. Organized motivational and awareness raising campaign for local people should be conducted. On the other hand, training should be provided to the local farmers about nursery and plantation techniques on medicinal plants to get good results. Formation of a social-knowledge-service-network between the THs and other stakeholders will help to protect the TK related to medicinal plants.

CONSENT

Not applicable.

ETHICAL APPROVAL

Not applicable.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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