Traditional Folk Medicine Used by the Tribal Practitioners of Chittagong Hill Tracts of Bangladesh to Alleviate Rheumatism

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The present investigation was undertaken on the use of indigenous medicinal plants by the tribal practitioners (*Kabiraj*) inhabiting the hilly districts called Chittagong Hill Tracts (CHTs) of Bangladesh to treat rheumatism. A large number of people in this area depend on the medicinal plant resources because of their poverty and/or their tradition. Study reveals that the tribal medicine man used eighty-six species of medicinal plants distributed into forty-five families for the treatment of rheumatic disorders. All the species were collected from different places of Hill Tracts districts and identified by the authors with the help of Bangladesh National Herbarium.

Keywords: Traditional folk medicine, Tribal practitioners (*Kabiraj*), Chittagong hill tracts, Bangladesh, Rheumatism.

Introduction

Rheumatism is a disease which begins with an inflammation of the joints in the body such as wrist, knee, hand, toe, shoulder, hip etc. Actually any joint of the body can be affected by rheumatism. It may be caused due to an infection that is initially vector borne either by germs, bacteria or by allergic agents. There is no proper treatment available other than modern medicine in CHTs.

The CHTs of Bangladesh is situated between 21°35' and 23°45' north latitude and between 91°45' and 92°50' east longitude including three districts viz. Rangamati, Bandarban and Khagrachari. Thirteen tribes (Khaisa, 1999) namely, Chakma, Marma, Tripura, Bawm, Tanchangya, Chack, Pankhos, Lusai, Kheyang, Riyang, Murang, Ushui and Khumi reside in Hill Tracts districts. The tribes of this area use a large number of medicinal plants for treating different type of diseases. Rheumatism is one of them. Some articles have been published from Bangladesh in this field. But these are insufficient to describe proper traditional medicinal plants knowledge of CHTs. For this reason, some new traditional medicinal plants knowledge which are used by the tribal healers (*Kabiraj* or *Baiddaya*) of CHTs in rheumatic disorder have been presented in this article.

Methodology

The investigation was conducted at different remote places in CHTs districts such as Guimara, Chimbuk, Amtali, Manikchari, Kaukhali, Rajsthali, Dighinala, Tentultala, Tulaban, Dainchari, Balaghata, Panchari etc. Ethno-medical information was gathered by conducting random interviews with 40 tribal healers between the ages of 45 and 75. The information was reconfirmed by conducting cross-interviews with another local practitioner as well as the same practitioner at another time. The plant specimens were deposited at BCSIR Herbarium.

Result and Discussion

A total of eighty six (86) medicinal plant species belonging to forty five families have been recorded in CHTs with their mode of preparation [Table 3], Tribal and other (Bengali and English) names, plant parts used, mode of uses and doses for the treatment of rheumatism [Table 2]. Botanical names of the plants are arranged according to alphabetical order with their family and category [Table 2]. The study reveals that the largest number of medicinal

plants are included in Euphorbiaceae family (9 plants species), followed by Lamiaceae, Verbenaceae (5 plants species each), Fabaceae, Malvaceae, Asclepiadaceae (4 plants species each), Acanthaceae (3 plants species), Zingiberaceae, Apocynaceae, Caesalpiniaceae, Graminae, Capparidaceae, Papilionaceae, Solanaceae, Menispermaceae, Moraceae, Rubiaceae, Rutaceae, Bignoniaceae, Plumbaginaceae, Anacardiaceae (2 plants species each), Amaranthaceae, Sapindaceae, Celastraceae, Apiaceae, Amaryllidaceae, Convolvulaceae, Dilleniaceae, Dioscoreaceae, Flacourtiaceae, Boraginaceae, Crassulaceae, Araceae, Lauraceae, Lygodiaceae, Clusiaceae, Moringaceae, Oleaceae, Pandanaceae, Liliaceae, Asteraceae, Sterculiaceae, Myrtaceae, Combretaceae and Meliaceae (1 plant species each) [Table 2].

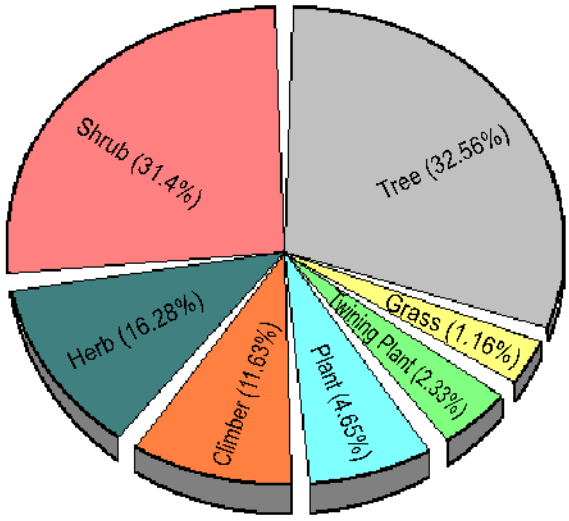


Fig. A
Percentage of medicinal plants based on habitat

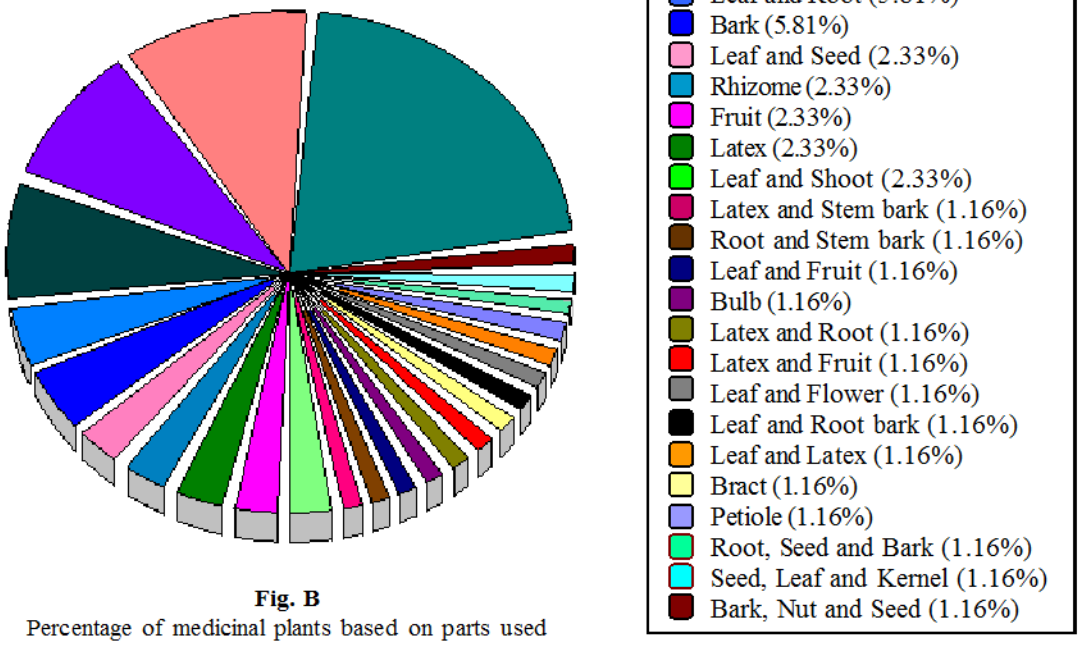


Fig. B
Percentage of medicinal plants based on parts used

A large number of medicinal plants are Tree (28 plants, 32.56%), followed by Shrub (27 plants, 31.4%), Herb (14 plants, 16.28%), Climber (10 plants, 11.63%), Plant (04 plants, 4.65%), Twining Plant (02 plants, 2.33%) and Grass (01 plant, 1.16%) [Fig. A]. It was observed that among the total plant species, Leaves (24.42% of the plants) are used followed by Root (13.95% of the plants), Whole plant (11.63% of the plants), Seed (10.47% of the plants), Leaf-Root and Bark (used 5.81% of the plants in each), Leaf-Seed, Rhizome, Fruit, Latex, Leaf-Shoot (used 2.33% of the plants in each), Root-Stem bark, Latex-Stem bark, Fruit-Leaf, Bulb, Latex-Root, Latex-Fruit, Leaf-Flower, Root-Seed-Bark, Bract, Leaf-Latex, Seed-Leaf-Kernel, Bark-Nut-Seed, Petiole, Leaf-Root Bark (used 1.16% of the plants in each) [Table 1 and Fig. B].

TABLE 1
Amount (%) and Number of the Medicinal Plants According to their Parts Used

S.No.	Plant parts used	No. of plants used	Amount of the plants (%)
01.	Leaf	21	24.42%
02.	Root	12	13.95%
03.	Latex and Stem bark	1	1.16%
04.	Seed	9	10.47%
05.	Leaf and Root	5	5.81%
06.	Fruit and Leaf	1	1.16%
07.	Bark	5	5.81%
08.	Bark, Nut and Seed	1	1.16%
09.	Fruit	2	2.33%
10.	Latex	2	2.33%
11.	Leaf and Shoot	2	2.33%
12.	Root and Stem bark	1	1.16%
13.	Leaf and Latex	1	1.16%
14.	Leaf and Seed	2	2.33%
15.	Bulb	1	1.16%
16.	Latex and Root	1	1.16%
17.	Latex and Fruit	1	1.16%
18.	Leaf and Flower	1	1.16%
19.	Root, Seed and Bark	1	1.16%
20.	Bract	1	1.16%
21.	Rhizome	2	2.33%
22.	Seed, Leaf and Kernel	1	1.16%
23.	Whole plant	10	11.63%
24.	Petiole	1	1.16%
25.	Leaf, Root and Bark	1	1.16%

TABLE 2

Indigenous Medicinal Plants Used by the Tribal Healers of CHTs to Treat Rheumatism
[Tribal names: Chakma (C); Marma (M); Santal (S). Other names: Bengali (B); English (E)]

Botanical name and Family	Tribal and Other names	Category	Parts used	Mode of uses and dosage
Abrus precatorius L. (Fabaceae)	*Kunch* (B) Indian Liquorice (E) *Ketchbiji* (C) *Yathuripru/ Sarakao* (M)	Climber	Leaf and seed	Paste of the leaves made with bland oil is externally used for swellings and rheumatism. Seeds paste is also used externally two or three times in a day to treat rheumatism
Abutilon indicum (L.) Sw. (Malvaceae)	*Jhumka* (B) Country Mallow (E) *Surboamiliphul* (C)	Shrub	Whole plant	Pill is made from plant and is taken for the treatment of rheumatic pain and paralysis
Acanthus ilicifolius L. (Acanthaceae)	*Hargoza* (B) Holy-leaved Acanthus (E) *Fereng-jubaoung* (M)	Shrub	Root	Paste of the roots is externally applied two times daily on affected parts of the body
Achyranthes aspera L. (Amaranthaceae)	*Apang* (B) Prickly Chaff-flower (E) *Ubalahra* (C) *Chulambree* (M)	Herb	Whole plant	Juice of the whole plant is given in rheumatism; half teaspoon of juice in 3 tablespoon of water is taken 3 times daily
Adhatoda vasica Nees. (Acanthaceae)	*Basak* (B) Malabar nut (E) *Bajokpata* (C) *Kranchhi-chi* (M)	Shrub	Leaf	A poultice of leaves is applied over rheumatic joints and inflammatory swellings 2 times in a day
Alpinia calcarata Rosc. (Zingiberaceae)	*Kulanjan* (B) Galangal/Siamese ginger (E), *Khetrang/Tara* (C), *Tarabaoung* (M)	Herb	Rhizome	Decoction of rhizome is very useful in rheumatic pains; 2 cups of decoction is taken 2 times daily
Alstonia scholaris (L.) R. Br. (Apocynaceae)	*Chattim* (B) Devil Tree (E) *Sesna* (C) *Chai Lang* (M)	Tree	Stem bark and latex	A poultice of latex is applied on rheumatic swellings. Paste of stem bark is also used externally with decoction of black peppers to cure rheumatic pains
Anisomeles indica (L.) Kuntze (Lamiaceae)	*Gobra* (B) Catmint (E) *Jharbohoringsing* (C) *Nungbui* (M)	Shrub	Leaf	Oil extracted from the leaves and applied in rheumatism; three times daily
Baliospermum montanum (Willd.) Muell-Arg (Euphorbiaceae)	*Dandi* (B) *Kon kru/Naicro* (M)	Shrub	Seed	Seed oil is used in rheumatism; applied 3-4 times in a day

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Botanical name and Family	Tribal and Other names	Category	Parts used	Mode of uses and dosage
Bauhinia purpurea L. (Caesalpiniaceae)	*Raktakanchan* (B) Butterfly Tree (E) *Baper* (S)	Tree	Stem bark and Root	Powdered stem bark and paste of root is more efficacious for rheumatic pains
Bambusa bambos (L.) Voss. (Graminae)	*Bans* (B) Bamboo (E) *Khai-wang-wah/ Medi-wah* (M)	Plant	Leaf and Root	Combination of leaves and roots paste is externally used in rheumatism; 2-3 times daily
Bridelia retusa (L.) Spreng. (Euphorbiaceae)	*Kantakoi* (B) *Fai-mong* (M)	Tree	Bark	Bark is used two times daily as a liquid ointment with gingelly oil to treat rheumatism
Cajanus cajan (L.) Huth(Fabaceae)	*Arhar* (B) Pigeon Pea (E) *Heankhrung* (C) *Piang Kong* (M)	Shrub	Leaf and Young fruits	A decoction made from leaves and young fruits and mixed with pepper paste is taken to cure arthritis; two cups of decoction given two times daily
Calotropis procera R. Br. (Asclepiadaceae)	*Akand* (B) Swallow wart (E) *Angar Pada* (C) *Mehiruao* (M)	Shrub	Leaf and Root	A poultice of slightly roasted leaves is applied 2-3 times daily on rheumatic joints and swellings. Extracts of leaves and roots is very efficacious remedy for rheumatism
Cardiospermum helicacabum Linn. (Sapindaceae)	*Lataphatkari* (B) Baloon vine (E) *Kalaboitta* (C) *Grangbaoung* (M)	Climber	Leaf and Root	Decoction of roots is taken one cup dose twice a day for treating lumbago. Paste of the leaves mixed with castor oil is applied on swelling and rheumatic joints
Cassia fistula L. (Caesalpiniaceae)	*Sonalu* (B) Indian Laburnum (E) *Honalu* (C)	Tree	Fruit	Pulp of the fruits is applied externally as an effective remedy for rheumatism; one or two times daily
Celastrus paniculatus Willd. (Celastraceae)	*Lataphataki* (B) Black oil tree (E) *Munjui* (S)	Climber	Seed	Oil extracted from the seeds is applied to relieve rheumatic pains
Centella asiatica (L.) Urban (Apiaceae)	*Thankuni* (B) Indian pennywort (E) *Menmeni* (C) *Mrang Khua* (M)	Herb	Whole plant	An infusion of the plant is taken in half cup dose two times daily to alleviate chronic rheumatism
Cleome viscose L. (Capparidaceae)	*Hurhur* (B) Wild Mustard (E) *Mursurjya* (C) *Hongchha* (M)	Herb	Seed	A poultice of the seeds is used as an efficacious remedy for chronic joint pains

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Botanical name and Family	Tribal and Other names	Category	Parts used	Mode of uses and dosage
Clerodendrum siphonanthus R. Br. (Verbenaceae)	*Bamunhatti* (B) Peacock's Tail (E) *Dhunnophul* (C) *Khonghkhao* (M)	Shrub	Leaf and Root	Leaves and roots juice mixture is taken in one teaspoon dose daily for curing swellings in any part of the body
Crataeva nurvala Buch-Ham (Capparidaceae)	*Barun/Bonna* (B) Three-leafed Caper (E) *La Pova* (M)	Tree	Leaf	Leaf juice is taken with milk and ghee for treating chronic rheumatism. A paste of leaves is also used in rheumatic swellings after mixing with mustard seeds and flour
Crinum asiaticum L. (Amaryllidaceae)	*Sukdarshan* (B) Poison Bulb (E) *Koba Rashun* (C)	Herb	Bulb	Roasted bulb is applied as a rubefacient in rheumatism and lumbago
Croton oblongifolius Roxb. (Euphorbiaceae)	*Chuka/Baragachi* (B) Oblong-leaved Croton (E) *Tors-kuti* (S)	Tree	Root	A paste of root mixed with the infusion of stem bark of *Calotropis procera* and applied on rheumatic swellings
Cryptolepis buchanani Roem & Schutt. (Asclepiadaceae)	*Chhagalbati* (B) *Laba* (S)	Shrub	Latex and Root	Paste of root bark and diluted latex are applied externally to alleviate rheumatism
Cuscuta reflexa Roxb. (Convolvulaceae)	*Swarnalata* (B) Dodder (E) *Jigro* (M)	Twinning plant	Whole plant	A decoction of the plant is taken for treating rheumatic pains; three tablespoons thrice in a day
Cymbopogon citratus (DC.) Stapf. (Graminae)	*Gandhabena* (B) Lemongrass (E) *Dhan-sabrang/ Kukisawarang* (C)	Grass	Leaf	Oil or decoction of the leaves is used effectively over rheumatic joints and lumbago
Dalbergia volubilis Roxb. (Papilionaceae)	*Ankilata* (B) *Dandauphal* (C) *Tha-su Noya* (M)	Shrub	Leaf	A cup of decoction of the leaves is taken twice or thrice daily to treat arthritis
Datura metel L. (Solanaceae)	*Dhutura* (B) Thorn Apple (E) *Dutra* (C) *Dutrachi* (M)	Shrub	Leaf	A poultice of leaves is useful remedy for curing rheumatic swelling of the joints and lumbago
Derris indica (Lamk.) Bennet (Fabaceae)	*Dahur/Karanja* (B) Indian Beech (E) *Karanja* (S)	Tree	Leaf and Seed	A decoction of leaves is used as a medicated bath in rheumatic pains. Paste or oil of seeds is also used two times over painful rheumatic joints
Dillenia indica L. (Dilleniaceae)	*Chalta* (B) Elephant apple (E) *Dabrusi* (C) *Kra Aning* (M)	Tree	Unripe fruit	Sherbet prepared from unripe fruit and is given to treat rheumatic pains

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Botanical name and Family	Tribal and Other names	Category	Parts used	Mode of uses and dosage
Dioscorea pentaphylla L. (Dioscoreaceae)	*Jhumalu* (B) Yam (E) *Bhutta Lodi* (C) *Bow Su Da Uo* (M)	Climber	Whole plant	Paste of the plant mixed with oil is used by the Chakma for treating rheumatic pains; two times daily
Diploclisia glaucescens (Bl.) Diels. (Menispermaceae)	*Sonattola* (C)	Climber	Leaf	A decoction of leaves is taken in two cups doses two times in a day for rheumatism
Euphorbia antiquorum L. (Euphorbiaceae)	*Tikta Sij* (B) Triangular Spurge (E) *Ji Jong Ba* (M) *Sid* (S)	Shrub	Latex	Latex is mixed with seed oil of *Azadirachta indica* and applied externally twice a day to treat rheumatism and painful joints
Ficus bengalensis L. (Moraceae)	*Bot* (B) Banyan Tree (E) *Bargach* (S)	Tree	Latex	Latex is used as a remedy over lumbago and rheumatic pains
Ficus racemose L. (Moraceae)	*Jogyadumur* (B) Fig (E) *Dhumur gulo* (C) *Sudayachi* (M)	Tree	Latex and Fruit	Fruits are taken by the Chakma tribe to treat rheumatic pains in Khagrachari. Latex is also more popular in this area to treat rheumatic pain in the joints
Gardenia coronaria Ham. (Rubiaceae)	*Sit Gach* (B) *Rekphul Gach* (C)	Tree	Leaf	Paste of the leaves is applied in rheumatism; three times daily
Glycosmis pentaphylla (Retz.) A. Dc. (Rutaceae)	*Datmajan* (B) Tooth brush plant (E) *Bhujuraphul* (C) *Si Ma Sere* (M)	Shrub	Leaf	An infusion of leaves is taken in half cup dose twice in a day to treat rheumatism
Gynocardia ororata R. Br. (Flacourtiaceae)	*Chaulmoogra* (B) Gynocardia (E)	Tree	Seed	Oil of the seeds is used in rheumatic pains; two or three times in a day
Heliotropium indicum L. (Boraginaceae)	*Hatisur* (B) Heliotrope (E) *Edosorota* (C) *Puichhiboung* (M)	Plant	Leaf	Leaf extract is applied in rheumatism; 2 times daily
Hemidesmus indicus (L.) R. Br. (Asclepiadaceae)	*Anantamul* (B) Indian Sarsaparilla (E) *Chikondudhia* (C)	Twining plant	Root	Paste of roots is used in swelling and rheumatic joints. The decoction of roots is also taken in one cup dose two times daily to treat chronic rheumatism

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Botanical name and Family	Tribal and Other names	Category	Parts used	Mode of uses and dosage
Hibiscus rosa-sinensis Linn. (Malvaceae)	*Joba* (B) China Rose (E) *Hindu Ma-pangi* (M) *Chang Kasey/ Nainggree* (M)	Shrub	Leaf and Flower	Combined leaves and flowers juice is externally used twice a day as an efficacious remedy for rheumatic pains
Hyptis suaveolens (L.) Poit. (Lamiaceae)	*Tokma* (B) Bush Mint (E) *Chongadana* (C)	Herb	Leaf	Juice of the leaves is taken in rheumatism; half teaspoon of juice in 3 tablespoon of water thrice a day
Jatropha gossypifolia L. (Euphorbiaceae)	*Jamalgota/Erenda* (B) Bellyache-bush (E) *Jagunagola* (C) *Meapai* (M)	Shrub	Seed	Seed oil is applied externally for treating rheumatism; 2-3 times daily
Justicia gendarussa Burm. (Acanthaceae)	*Bishalla* (B) *Kambasok* (C)	Shrub	Leaf and Young shoot	A poultice of leaves is used in rheumatism in Khagrachari. The decoction of leaves and young shoots is taken in one cup dose twice a day to treat chronic rheumatism
Kaempferia galangal L. (Zingiberaceae)	*Chandumula* (B) Black Thorn (E) *Adahomla* (C) *Rainjong/Pa-sui* (M)	Herb	Leaf	The leaves are applied externally in the form of lotion for treatment of swellings and rheumatism; 2 or 3 times daily
Kalanchoe pinnata (Lam.) Pers (Crassulaceae)	*Patharkuchi* (B) American Life Plant (E) *Gois* (C) *Rokkiapambao* (M)	Herb	Leaf	Leaf paste is applied on rheumatic and muscle pain; two times in a day
Lantana camara Linn. (Verbenaceae)	*Chotra* (B) Lantana (E) *Katazamlodi* (C) *Arobaoung* (M)	Shrub	Leaf and Shoot	Decoction of leaves and shoots is given as an effective remedy in rheumatism; one cup twice a day
Lasia spinosa (L.) Thw. (Araceae)	*Kantakachu* (B) *Hattolingaga/ Gandagi* (C) *Taratu/Sorogong* (M)	Plant	Rhizome	Paste made from rhizome is used over rheumatic swellings; one or two times daily
Leucas aspera (Willd.) Link. (Lamiaceae)	*Shetadrone/Chota Halkusha* (B) Leucas (E) *Goissajangal* (C) *Painseybaoung* (M)	Herb	Leaf	Leaf juice is externally applied two times daily in rheumatic and joint pains
Linum usitatissimum L. (Lamiaceae)	*Tisi* (B) Linseed (E)	Herb	Seed	A poultice of seeds is very useful remedy for rheumatic swellings

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Botanical name and Family	Tribal and Other names	Category	Parts used	Mode of uses and dosage
Litsea glutinosa (Lour.) Roxb. (Lauraceae)	*Kukurchita* (B) Tallow Laurel (E) *Paja* (S)	Tree	Seed	Oil of the seeds is applied for treating rheumatism; 3-4 times in a day
Lygodium pinnatifidum Sw. (Lygodiaceae)	*Dheki-shak* (B) Fern (E) *Huttigurpo* (C) *Miau-maka-la* (M)	Climber	Root	Roots are used externally in rheumatism after boiling with mustard oil
Mallotus philippinensis Muell-Arg (Euphorbiaceae)	*Sindur* (B) Monkey-face tree (E) *Kuruar gach* (C)	Shrub	Root	Ground root is applied with rubbing on the painful parts in rheumatism; 2 to 3 times daily
Mesua ferrea L. (Clusiaceae)	*Nageswar* (B) Iron-wood Tree (E) *Naksawi* (C)	Tree	Seed	Seeds oil is applied as an embrocation for rheumatic pains
Moringa oleifera Lamk. (Moringaceae)	*Sajna* (B) Drumstick tree/Horse Radish tree (E) *Dain Tho Rai* (M)	Tree	Root, Seed and Bark	Paste of roots mixed with salt and is applied on swellings as well as rheumatic joints. Oil made from seed is also externally applied on rheumatic joints. Paste of bark mixed with garlic, onion and black pepper is also given in rheumatism
Nyctanthes arbor-tristis L. (Oleaceae)	*Sheuli* (B) Night Jasmine (E) *Shinguri Phul* (C) *Saparom* (M)	Tree	Leaf	A decoction of the leaves is taken in two cups dose twice daily to treat rheumatism
Ocimum gratissimum Linn. (Lamiaceae)	*Ram Tulsi* (B) Shrubby Basil (E) *Midaphul* (C) *Sang Haphoi* (M)	Shrub	Whole plant	A decoction of the plant is used externally as an aromatic bath to treat rheumatism
Oroxylum indicum (L.) Vent (Bignoniaceae)	*Sona/Kanak* (B) Indian trumpet-flower (E) *Krang-sia-bao* (C) *Kraat Saba* (M)	Tree	Bark and Root-bark	A decoction of the bark is taken in 2 cups dose 2 times daily as an efficacious remedy for the treatment of rheumatic swellings. An infusion made from root-bark is also taken in rheumatism
Paederia foetida Linn. (Rubiaceae)	*Gandhabhaduli* (B) King's tonic/ Chinese moon-creeper (E) *Padbaillodi* (C) *Nuyechhi-baou* (M)	Climber	Leaf and Root	An infusion of leaves and roots is given to treat rheumatism and lumbago; one cup two times in a day

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Botanical name and Family	Tribal and Other names	Category	Parts used	Mode of uses and dosage
Pandanus fascicularis Lam. (Pandanaceae)	*Keya* (B) Screw Pine (E) *Koa-gach* (S)	Shrub	Bract	Extracted oil from bracts is very useful in rheumatism; two times daily
Pedilanthus tithymaloides (L.) Poit. (Euphorbiaceae)	*Rangchita* (B) Jew's Slipper (E) *Moroo Nak* (M)	Shrub	Leaf	Leaf juice is applied externally in joint pains; two or three times in a day
Plumbago indica L. (Plumbaginaceae)	*Rakta-chitra/ Agnichita* (B) Fire plant (E) *Agunithida* (C) *Kaing-kheu* (M)	Herb	Root	Root juice mixed with coconut oil and used externally on swellings, rheumatism and paralysis. A decoction of roots is also taken internally to treat rheumatism; 2 cups should be taken daily
Plumbago zeylanica L. (Plumbaginaceae)	*Chita* (B) Ceylon Leadwort (E) *Tidi* (C) *Kain Kawk* (M)	Herb	Root	The paste of the roots is mixed with bland oil and is used twice a day over rheumatic and paralytic parts
Plumeria acuminata Ait. (Apocynaceae)	*Golak Champa* (B) Pagoda tree/ Temple tree (E) *Angara* (M)	Tree	Leaf and Latex	The milky juice of the plant mixed with coconut oil and applied on rheumatic joints. A poultice of roasted leaves is also used on the swellings
Premna integrifolia L. (Verbenaceae)	*Ganiari* (B) *Kritma* (C)	Tree	Leaf	An infusion of the leaves is taken internally for treating rheumatism; one cup twice daily
Ricinus communis L. (Euphorbiaceae)	*Bheranda* (B) Castor (E) *Rangma-vedul* (C) *Krachubaoung* (M)	Shrub	Seed, Leaf and Kernel	A paste of kernel is applied in sciatica, rheumatism and lumbago after boiling in milk and water. Seed oil is an effective remedy for muscular rheumatism, paralysis and joint pains. A poultice of leaves is also useful when applied on swellings
Semecarpus anacardium L.f. (Anacardiaceae)	*Bhela* (B) Oriental Cashew Nut Tree (E) *Bhelwa* (S)	Tree	Bark, Nut and Seed	Oil of the nuts and paste of the seeds are applied as embrocation in rheumatism. Seed oil is also used after warming on rheumatic swellings
Sida rhombifolia L. (Malvaceae)	*Lal Berela* (B) Yellow Barleria (E) *Ohah Ki Pale* (C) *Ipiripiung* (S)	Herb	Whole Plant	The plant is taken as a tea for rheumatism. Paste of the roots is mixed with mustard oil in the ratio of 3:1 and is applied externally twice a day to alleviate rheumatic pains

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Botanical name and Family	Tribal and Other names	Category	Parts used	Mode of uses and dosage
Smilax macrophylla Roxb.(Liliaceae)	*Kumarilata* (B) Indian Sarsaparilla (E) *Kumuzzaludi* (C) *Krak Khrow* (M)	Climber	Root	A decoction of roots is taken in one cup dose two times in a day to treat swellings and rheumatism
Spilanthes paniculata Wall. (Asteraceae)	*Marhatitiga* (B) Spilanthes (E) *Osonshak/ Jhummoshak* (C) *Ampui* (M)	Herb	Whole plant	One cup of decoction is taken two or three times daily for rheumatism
Spondias pinnata (L.f.) kurz. (Anacardiaceae)	*Amra* (B) Hog Plum (E)	Tree	Bark (Stem and Root)	Paste of the bark mixed with mustard oil and used as an embrocation to treat rheumatism; three times daily
Sterculia villosa Roxb. (Sterculiaceae)	*Chandul* (B) *Udal* (C) *Krabaou/ Fi-yo-ba* (M)	Tree	Petiole	A drink made from petioles mixed with sugar and water is taken as an efficacious remedy for rheumatism
Stereospermum tetragonum Dc. (Bignoniaceae)	*At-kapali* (B) Trumpet tree (E) *Hamarang Gaas* (C) *Soi Koyoi Pang* (M)	Tree	Leaf	An effective remedy made from the fresh leaf juice mixed and boiled with oil is applied externally twice daily to treat rheumatism
Syzygium jambos (L.) Alston (Myrtaceae)	Golapjam (B) Rose-Apple (E)	Tree	Leaf	Leaf paste is applied twice a day to treat rheumatic and muscle pains
Tephrosia purpurea (L.) Pers.(Fabaceae)	*Ban nil/Sarpunkha* (B) Wild Indigo (E) *Jaronilgaichho* (C) *Rhoyubaoung* (M)	Plant	Root	Root is taken as a decoction in one cup dose twice daily for rheumatism
Terminalia bellirica (Gaertn.) Roxb. (Combretaceae)	*Bahera* (B) Belaric Myrobalan (E) *Bora Gach* (C) *Soi Sing Si* (M)	Tree	Seed	Oil of the seeds is used three times daily over rheumatic swellings
Tinospora cordifoia (Willd.) Hook. f. (Menispermaceae)	*Gulancha* (B) Tinospora (E) *Gurach-ludhi* (C) *Kha bru nay* (M)	Climber	Whole plant	Fresh juice of the plants is taken for treating rheumatism; half teaspoon of juice in three tablespoon of water is taken thrice a day

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Botanical name and Family	Tribal and Other names	Category	Parts used	Mode of uses and dosage
Toona ciliate J. Roem. (Meliaceae)	*Tun/Rangi* (B) Red Toon/Indian Mahogany (E) *Sorbet* (C)	Tree	Bark	An infusion of the bark is taken for rheumatism; one cup of infusion twice daily
Trewia nudiflora L. (Euphorbiaceae)	*Pitali/Lattu* (B) False White Teak (E) *Chagalla-dibhangor* (C) *Rin Moro* (M)	Tree	Root	A decoction of roots is taken in two cups dose twice daily to treat rheumatism. A poultice of the roots is also used externally over rheumatic pains
Tylophora indica (Burm. f.) Merr. (Asclepiadaceae)	*Anatamul* (B) Emetic Swallow (E) *Kamrau* (M)	Climber	Leaf and Root Bark	A decoction or an infusion of the leaves and root barks is given in rheumatism; one cup two times in a day
Uraria laopoides Dc. (Papilionaceae)	*Lata-chakuley* (B) Bilailehur (C) *Krangdhuau* (M)	Shrub	Whole plant	A decoction of the plants is given in rheumatism; two cups of decoction twice daily
Urena lobata L. (Malvaceae)	*Ban-okra* (B) Congo jute (E) *Bulbuli Gach* (C) *Pophibaung* (M)	Shrub	Root	Paste of root is applied externally in rheumatism and lumbago; two or three times daily
Vitex negundo L. (Verbenaceae)	*Nishinda* (B) Chaste tree (E) *Niramisludi* (C)	Shrub	Leaf	Fermented leaf extract is applied on rheumatism as a useful remedy
Vitex trifolia L.f. (Verbenaceae)	*Panisamalu* (B) Indian Wild Pepper (E) *Niramizhechi* (C)	Shrub	Leaf	Juice of the leaves is used as an efficacious remedy on rheumatic pains; three times in a day
Withania somnifera (L.) Dunal. (Solanaceae)	*Ashwagondha* (B) Winter Cherry (E)	Shrub	Root	A decoction of the roots is very useful in rheumatism; one cup daily
Zanthoxylum budranga (Roxb.) Dc. (Rutaceae)	*Kantahorina* (B) Indian Prickly Ash (E) *Baruna Shak* (C) *Yureng* (M)	Tree	Bark	An infusion of the bark is taken for treating rheumatism; two cups of infusion twice a day

TABLE 3
Mode of Preparation for Medicinal Plant Parts

S.No.	Mode	Method of Preparation
01.	Powder	The fresh plant parts consisting of the flower, leaf, root, bark, seed, wood etc. are chopped, dried and ground with a mortar and pestle; sieved with fine piece of cotton cloth and dried in sun shine for about 2½ hour; packed in an air tight container.
02.	Pill	The dried fine powder of the plant materials is mixed-well with concentrated juice of sugar cane or rice paste; roll up the mixing materials to achieve a tubular shape; cut into small pieces and dry in air for one hour and keep in a clean airtight bottle.
03.	Extract	The dried as well as grinded plant parts are steeped into boiling water and allowed to stand for 3-4 hours; strain and repeat this process 3 times. The liquid is heated mildly until the moisture has been absolutely evaporated.
04.	Juice	The whole plants or plant parts (fresh) are washed, minced and crushed; filtered through a fine white cloth to extract the juice. It is usually prepared fresh for the day's use to avoid very quick oxidization.
05.	Poultice	To prepare poultice, the fresh or dried plant materials are pounded with a pestle in a mortar; mixed with water (hot or cold), molasses or oil and are spread on a cloth before applying to the affected areas.
06.	Infusion	The dried (2 g) or fresh (4 g) plant part is mixed with 8 cups of hot water; covered and allowed to stand for about 15 minutes. It is strained before use. Infusion is taken either hot or cold. Prepared infusion should not be taken next day.
07.	Paste	The plant parts (dried or fresh) crushed and mixed with water or oil as required.
08.	Decoction	About 500 ml of water is taken in a ceramic pot; 10 g of dried and pounded or 20 g of fresh plant part is poured into water containing ceramic pot; boiled until the water volume is reduced to half, strained and cooled before use. Decoction should be taken within 2-3 days after preparation.
09.	Oil	Oil is extracted by using Clevenger apparatus following steam distillation method. After chopping, the raw plant part is put into the distillation flask over water. Then the water is heated. As a result, flow of the vapor of volatile compounds passed through a cooling condenser and then condense back to liquid. The liquids are reserved in a receiving vessel. Oil is separated from oil layer in the vessel.

Conclusion

The old tribal healers have been preserving folk medicinal knowledge in their scripts from time immemorial. But the young tribal generation is not interested to utilize the traditional folk medicine due to invention of modern synthetic drugs. It is important to take necessary step for documentation and preservation of valuable and rare medicinal plants which will be helpful to invent harmless modern herbal drugs and applying modern research activities in the future to come.

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