Available online www.jocpr.com

Journal of Chemical and Pharmaceutical Research, 2015, 7(5):1273-1278

Research Article

ISSN : 0975-7384
CODEN(USA) : JCPRC5

Ethnomedicinal practices of a Marma tribal medicinal practitioner in Chittagong Hill Tracts, Bangladesh

Piplu Bhuiyan, Md. Mazharul Karim and Mohammed Rahmatullah*

Department of Pharmacy, University of Development Alternative, House 78, Road 11A, Dhanmondi, Dhaka, Bangladesh

---

ABSTRACT

The Marma tribal people reside in scattered communities in the Chittagong Hill Tracts region in the southeastern part of Bangladesh. The region is considered a hot-spot regarding floral species, and the Marma tribal medicinal practitioners, as a result, are quite knowledgeable about the medicinal properties of diverse plant species. A survey was carried out in the Ramu area among the Marma community with the objective of documenting the medicinal plants used and ailments treated by a Marma tribal healer. The healer was observed to use a total of 21 plants distributed into 16 families. The various plants were used to treat a variety of ailments, which included leucorrhea, enlargement of liver, skin disorders, respiratory problems, urinary disorders, kidney stone, rheumatism, edema, dog, snake and poisonous insect bites, menstrual problems, gastrointestinal tract disorders, leprosy, hypertension, cancer, tumor, pain, physical weakness, jaundice, edema, diabetes, goiter, helminthiasis, paralysis, and sexual disorders. What was interesting about the Marma healer was his use of a single plant species for treating multiple types of diseases, suggesting not only that the healer possessed an extensive knowledge on the medicinal properties of plants, but also that these plants may prove useful in treating difficult to cure or incurable diseases like diabetes, cancer, tumor, hypertension, and paralysis.

Key words: Marma, ethnomedicine, tribal practices, Chittagong Hill Tracts, Bangladesh

---

INTRODUCTION

The Marmas are a well-known tribal community residing in scattered areas of the Chittagong Hill Tracts region in the southeastern portion of Bangladesh. The region comprises of densely forested low hills and is considered a hot-spot within Bangladesh regarding abundance of floral species. A number of tribal communities reside in this region from large tribes like the Chakmas to medium-sized tribes like the Marmas and small-sized tribes like the Lushais. What all these tribes have in common is their distinct traditional medicinal systems with its main emphasis on using plants as medicines.

Most traditional medicinal systems in practically all regions of the world rely on plants to cure ailments and plants have always been a rich, in fact the main provider of foods and medicines. Many modern allopathic drugs have come from observations of folk and tribal medicinal uses of plants. As a result, documentation of medicinal plants can not only provide a scientist with the primary knowledge of further research to do regarding drug discovery from a plant, but also in the short and long run can be a rich alternative source of drugs to cure many difficult to cure or incurable diseases with affordable and readily available sources.

Towards an adequate documentation of medicinal plant species of Bangladesh, we had been conducting extensive ethnomedicinal surveys among folk and tribal medicinal practitioners over the last six years [1-16]. The objective of the present study was to document the traditional healing practices of a Marma tribal medicinal practitioner (TMP), who was observed to use plants in his practice to treat a number of complicated diseases.

EXPERIMENTAL SECTION

The Marma tribal community was located in Ramu Upazila (sub-district) of Chittagong Hill Tracts region of Bangladesh. The community had one TMP, namely Ukkoching Marma, by gender male, and by age 68 years, and practicing for 29 years by his estimate. Prior Informed Consent was first obtained from the TMP. The TMP was explained as to the nature of our visit and consent obtained to disseminate any information obtained both nationally and internationally. Interviews were conducted during 2014 in the Bengali language, which was spoken by both the TMP as well as the interviewers. However, plant names were provided by him in the Marma language. Actual interviews were conducted with the help of a semi-structured questionnaire and the guided field-walk method of Martin [17] and Maundu [18]. In this method, the TMP took the interviewers on guided field-walks through hilly forested areas from where he collected his medicinal plants, pointed out the plants, and described their uses. Plant specimens were photographed, collected, pressed and dried and brought to Dhaka, where they were identified at the Bangladesh National Herbarium.

RESULTS AND DISCUSSION

The healer was observed to use a total of 21 plants distributed into 16 families. The Apocynaceae family provided the maximum number of plants followed by the Amaranthaceae, Asteraceae and Verbenaceae families. The various plants were used to treat a variety of ailments, which included leucorrhea, enlargement of liver, skin disorders, respiratory problems, urinary disorders, kidney stone, rheumatism, edema, dog, snake and poisonous insect bites, menstrual problems, gastrointestinal tract disorders, leprosy, hypertension, cancer, tumor, pain, physical weakness, jaundice, edema, diabetes, goiter, helminthiasis, paralysis, and sexual disorders. The results are shown in Table 1.

There were several interesting features in the ethnomedicinal practice of the TMP. First, with the exception of one instance (where he used plant parts from two plants, see Serial Number 15, Table 1), all his plants were used as monoherbal preparations. Second, various plant parts from the same plant were used to treat diverse variety of ailments, thus suggesting that the TMP possessed good knowledge of not only the medicinal properties of plants, but also individual parts as well. Third, the diseases that the TMP treated not only included common diseases like gastrointestinal disorders, but also difficult to treat diseases even with modern medical methods, diseases like cancer, tumors, hypertension, diabetes, and paralysis.

It was of interest to review the potential for scientific research as well as scientific validation, if any, of the plants that the TMP used to treat at least some difficult to treat diseases. Two plants that the TMP used against cancer/tumors were *Alstonia scholaris* and *Jatropha gossypifolia*. Interestingly, echitamine chloride, found in the plant has been shown to exhibit significant tumor regression in methylcholanthrene-induced fibrosarcoma [19]. The compound has been also shown to exhibit cytotoxicity on other cancer cell lines like HeLa, HepG2, HL60, KB and MCF-7 cell lines [20]. Other phytochemicals present in the plant like alstonine, pleiocarpamine, *O*-methylmacralstonine, macralstonine, and lupeol are also reported to possess antineoplastic effects [21]. The chemopreventive effect of various doses of hydroalcoholic extract of the plant has been shown in benzo(a)pyrene (BaP) induced forestomach carcinoma in female mice [22]. An alkaloid fraction from the plant reportedly exhibited cytotoxicity against *in vitro* in cultured human neoplastic cell lines (HeLa, HepG2, HL60, KB and MCF-7) and in Ehrlich ascites carcinoma bearing mice [23]. The chemopreventive potential of *Alstonia scholaris* bark extract in 7,12-dimethylbenz(a)anthracene-induced skin carcinogenesis in mice has been shown [24]. A combination of alkaloids and triterpenes obtained from leaves of the plant has been shown to enhance immunomodulatory activity in C57BL/6 mice and induce apoptosis in the A549 cancer cell line [25].

Table 1. Medicinal plants used by the Marma tribal medicinal practitioner

Serial Number	Scientific Name	Family Name	Local Name	Parts used	Disease, Symptoms, Formulations, and Administration
1	*Justicia gendarussa* Burm.f.	Acanthaceae	Kai bang, Mahlanaok	Leaf, bark of root	Leucorrhea. Leaf juice is orally taken with honey. Enlargement of liver. One handful of leaves are crushed and leaf fibers along with leaf juice is put on a banana leaf, which is warmed and applied over the liver area and tied to the area at night before sleep. The leaf bandage is taken off in the morning. This is done for 7 days. Asthma. Leaves are crushed with garlic cloves and taken orally with honey. Poisonous abscess. Leaves are burnt to ashes and the ash applied to abscess for 7 days.
2	*Achyranthes aspera* L.	Amaranthaceae	Chaikagri bang	Leaf, root, whole plant	To expedite delivery or to induce abortion. Roots are tied to the woman's thigh and taken off immediately following delivery. Burning sensations during urination, passing of blood or pus with urine. Leaves and whole plant are burnt to ashes. Pills prepared from the ash are orally taken with honey. Rheumatism, edema. Paste of whole plant is topically applied. Kidney stone. Root and whole plant juice is orally taken. Insect bite. Paste of fresh leaves is applied as a poultice.
3	*Amaranthus spinosus* L.	Amaranthaceae	Mong-goai	Leaf, root	Burning sensations during urination. Roots are taken orally. Stoppage of menstruation. Roots are taken orally. Constipation, snake bite, to increase lactation. Paste of leaves and roots is taken orally.
4	*Alstonia scholaris* (L.) R.Br.	Apocynaceae	Choilong ing bang	Leaf, bark, flower, root, gum exudate	Leprosy, skin diseases. Leaf paste is applied topically. Hypertension, helminthiasis. Juice obtained from crushed bark is orally taken. Cancer, tumor. Juice obtained from crushed bark and gum exudates is orally taken. Coughs, respiratory difficulties. Juice obtained from a combination of crushed leaves, bark and roots is orally taken.
5	*Holarrhena pubescens* (Buch.-Ham.)	Apocynaceae	Latukhak bang	Bark, leaf, root	Diarrhea, passing of blood with stool. Juice obtained from crushed bark is taken orally. Asthma. Root juice is taken orally. Lower abdominal pain. Juice obtained from crushed bark and young leaves is taken orally.
6	*Ichnocarpus frutescens* L.	Apocynaceae	Tonhu bang	Leaf, stem, root, sap	To increase milk in nursing mother. Root juice is orally taken. Acne. Crushed leaves are applied. Rheumatic pain. Paste of root and sap is topically applied. Eczema. Crushed leaves and stems are topically applied.
7	*Eupatorium triplinerve* M. Vahl.	Asteraceae	Paincho bang	Leaf	Physical weakness. Leaf juice is orally taken. Cold in children. Leaf juice is orally taken with honey. Severe infections, to stop bleeding from cuts and wounds. Crushed leaves are topically applied.
8	*Mikania micrantha* Kunth	Asteraceae	Tossili mrak	Leaf, stem	Gastric ulcer. Leaf juice is orally taken on an empty stomach. Jaundice. Leaf and stem juice is added to water followed by taking a bath in the water. Snake bite, poisonous insect bite. Leaves are burnt and the ashes applied topically.
9	*Diplazium esculentum* (Retz.) Sw.	Athyriaceae	Gaingdok	Leaf, root	Antidote to adverse reaction from wrong medication. Root juice is orally taken. Spermatorrhea. Crushed roots are taken orally with honey. Rheumatism, chicken pox. Paste of leaves is topically applied.
10	*Calycopteris floribunda* Lam.	Combretaceae	Lomu luis bang	Leaf, top of stem, root	Severe infections, leprosy. Paste of leaves and top of stems is topically applied. Malarial fever. Juice obtained from tops of stems is orally taken. Snake bite. Root juice is topically applied.
11	*Costus speciosus* (Koen.) Sm.	Costaceae	Kraitong mui	Leaf, seed, root	Tendon pain. Leaves and roots are warmed and applied topically to the painful tendons. Loss of appetite, flatulence. Young leaves are cooked and eaten.
12	*Jatropha gossypifolia* L.	Euphorbiaceae	Lespu bang	Leaf, seed, seed oil	Irregular menstruation. Mashed seeds are orally taken. Severe infections. Seed oil is topically applied. Cancer. Juice obtained from crushed leaf and seed is orally taken.
13	*Curculigo orchioides* Gaertn.	Hypoxidaceae	Olae bang	Leaf, root	Sex stimulant. Dried and powdered root is orally taken with sugar and ghee (clarified butter). Urinary stone. Root juice is orally taken. Skin diseases. Paste of leaf and root is applied topically. Snake bite. 5-6g young leaves are crushed to obtain juice, which is orally taken.
14	*Piper nigrum* L.	Piperaceae	Gol morich	Fruit	See *Cymbopogon citratus*.
15	*Cymbopogon citratus* DC.	Poaceae	Cheba lang	Leaf, root	Tonsillitis. Several leaves are boiled in water with a small amount of fruits of *Piper nigrum* and the water taken orally like tea.

					Swelling of throat, rheumatic pain. Crushed leaves are orally taken with butter. Indigestion in children. Root juice is orally taken.
16	*Morinda persicaefolia* Ham.	Rubiaceae	Tara tara bang	Leaf, root	Jaundice. One cup of juice obtained following rubbing roots on a stone is taken orally thrice daily. Food poisoning. Leaf juice is orally taken. Contraceptive. Boiled leaves are orally taken on a regular basis. Any type of fever. Juice obtained from rubbing root on a stone is orally taken thrice daily for 5-7 days.
17	*Scoparia dulcis* L.	Scrophulariaceae	Du jhanga	Leaf, whole plant	Diarrhea, dysentery. One cup of juice obtained from crushed young leaves is orally taken. Excessive menstruation. Pills prepared from whole plant are orally taken. Vomiting. Root juice is orally taken. Diabetes. Two whole young plants are macerated and pills prepared from the macerated plants are taken orally twice daily on an empty stomach.
18	*Smilax zeylanica* L.	Smilacaceae	Khrakha bang	Root	Diarrhea. Root juice is orally taken. Loss of appetite, dysentery. Juice obtained following making a paste of root is orally taken. Leucorrhea. Root juice is orally taken.
19	*Clerodendrum indicum* (L.) Kuntze	Verbenaceae	Veraepaidu bang	Leaf, bark of root	Asthma, chest pain. Root bark paste is applied to chest topically. Goiter. Root juice is orally taken for 21 days and paste of leaves is topically applied. Helminthiasis. Root bark is orally taken.
20	*Clerodendrum viscosum* Vent.	Verbenaceae	Khungkha bang	Young leaf, top of stem, flower, root	Stomach pain. Juice obtained from crushed young leaf and root is orally taken. Paralysis. Roots are rubbed against a stone and the juice that comes out is orally taken. At the same time, warm leaves are applied to paralyzed areas. Respiratory difficulties. Juice obtained from crushed young leaf and flower is orally taken. Difficulties in urination in children. One to two spoonfuls of juice obtained following rubbing roots against a stone are orally taken.
21	*Alpinia nigra* (Gaertner) B.L. Burtt.	Zingiberaceae	Nisar rowa	Root	Edema, sex stimulant. Juice obtained from crushed root is orally taken. Testicular problems. Paste of root and honey is topically applied to testis.

A potent anticancer and novel lathyrane diterpenoid compound, abiodone, has been isolated from *Jatropha gossypifolia*, another plant used by the Marma TMP against cancer [26]. Ethanol extract of the plant showed cytotoxic effects against human epithelial MCF-7 breast cancer cells in a dose-dependent manner [27]. It is thus quite remarkable that lacking any clinical diagnostic procedures for diagnosing any forms of cancer, the Marma TMP, nevertheless, has selected two medicinal plants to treat cancer, plants which have been scientifically reported to have anticancer effects of plant extracts or plant constituents.

The Marma TMP used the plant, *Scoparia dulcis*, against diabetes. Aqueous extract of the plant has been shown in streptozotocin adult diabetic male albino Wistar rats to significantly reduce blood glucose, sorbitol dehydrogenase, glycosylated hemoglobin, thiobarbituric acid reactive substances (TBARS), and hydroperoxides, and significantly increase plasma insulin, glutathione peroxidase (GPx), glutathione-S-transferase (GST) and reduced glutathione (GSH) activities in liver [28, 29]. Aqueous extract of the plant demonstrated antihyperlipidemic effects in streptozotocin diabetic rats [30]. A compound isolated from the plant, scoparic acid D has been shown to be responsible for the antidiabetic effects observed in streptozotocin adult diabetic male albino Wistar rats [31]. A saponin rich aqueous extract of the plant also demonstrated antihyperglycemic activity in alloxan diabetic rats [32]. Thus despite what may be considered as primitive medicinal practices, the Marma TMP's knowledge of plants appears to be quite validated by modern scientific research.

This scientific validation of the plants used by the Marma TMP can be observed for other plants also. To take a single instance, roots of *Ichnocarpus frutescens* were used by the TMP to alleviate rheumatic pain. The analgesic and anti-inflammatory activities of the roots of this plant have been reported [33], thus justifying its use for treatment of rheumatic pain.

CONCLUSION

A number of the plants used by the Marma tribal healer, especially plants used to treat difficult diseases like cancer or diabetes, can be scientifically validated in their traditional uses based on reported pharmacological properties of the plants or components isolated from the plants. As such, all the other plants used by the healer also deserve scientific attention as to their relevant pharmacological properties and possible drug discovery.

Acknowledgements
The authors are grateful to the Marma TMP for providing ethnomedicinal information.

REFERENCES

[1] RT Esha; MR Chowdhury; S Adhikary; KMA Haque; M Acharjee; M Nurunnabi; Z Khatun; Y.-K Lee; M Rahmatullah, *Am.-Eur. J. Sustain. Agric*., **2012**, 6(2), 74-84.
[2] M Rahmatullah; AR Chowdhury; RT Esha; MR CHowdhury; S Adhikary; KMA Haque; A Paul; M Akber, *Am.-Eur. J. Sustain. Agric*., 2012, 6(2), 107-112.
[3] A Biswas; WM Haq; M Akber; D Ferdausi; S Seraj; FI Jahan; AR Chowdhury; M Rahmatullah, *Am.-Eur. J. Sustain. Agric*., **2011**, 5(1), 15-22.
[4] KR Biswas; T Ishika; M Rahman; A Swarna; T Khan; MN Monalisa; M Rahmatullah, *Am.-Eur. J. Sustain. Agric*., **2011**, 5(2), 158-167.
[5] N Islam; R Afroz; AFMN Sadat; S Seraj; FI Jahan; F Islam; AR Chowdhury; MS Aziz; KR Biswas; R Jahan; M Rahmatullah, *Am.-Eur. J. Sustain Agric*., **2011**, 5(2), 219-225.
[6] M Rahmatullah; MNK Azam; MM Rahman; S Seraj; MJ Mahal; SM Mou; D Nasrin; Z Khatun; F Islam; MH Chowdhury, *Am.-Eur. J Sustain Agric*., **2011**, 5(3), 350-357.
[7] M Rahmatullah; KR Biswas, *J. Altern. Complement Med*., **2012**, 18(1): 10-19.
[8] M Rahmatullah; A Hasan; W Parvin; M Moniruzzaman; Z Khatun; FI Jahan; R Jahan, *Afr. J. Tradit. Complement. Alternat. Med*., **2012**, 9(3), 350-359.
[9] M Rahmatullah; Z Khatun; A Hasan; W Parvin; M Moniruzzaman; A Khatun; MJ Mahal; MSA Bhuiyan; SM Mou; R Jahan, *Afr. J. Tradit. Complement. Alternat Med*., **2012**, 9(3), 366-373.
[10] M Rahmatullah; MNK Azam; Z Khatun; S Seraj; F Islam; MA Rahman; S Jahan; MS Aziz; R Jahan, *Afr. J. Tradit. Complement. Alternat Med*., **2012**, 9(3), 380-385.
[11] M Rahmatullah; Z Khatun; D Barua; MU Alam; S Jahan; R Jahan, *J. Altern. Complement. Med*., **2013**, 19(6), 483-491.

[12] M Rahmatullah; SR Pk; M Al-Imran; R Jahan, *J. Altern. Complement. Med*., **2013**, 19(7), 599-606.
[13] A Khatun; MAA Khan; MA Rahman; MS Akter; A Hasan; W Parvin; RJ Ripa; M Moniruzzaman; MJ Mahal; M Rahmatullah, *Am.-Eur. J Sustain. Agric*., **2013**, 7(5), 319-339.
[14] MN Nahar; J Ferdous; FZ Samanta; KA Shuly; S Nahar; R Saha; S Islam; MJ Mahal; S Seraj; M Rahmatullah, *Am.-Eur. J. Sustain. Agric*., **2013**, 7(5), 403-414.
[15] SA Hasan; MM Uddin; KN Huda; A Das; N Tabassum; MR Hossain; MJ Mahal; M Rahmatullah, *Am.-Eur. J. Sustain. Agric*., **2014**, 8(1), 10-19.
[16] I Malek; N Mia; ME Mustary; MJ Hossain; SM Sathi; MJ Parvez; M Ahmed; S Chakma; S Islam; MM Billah; M Rahmatullah, *Am.-Eur. J. Sustain. Agric*., **2014**, 8(5), 59-68.
[17] GJ Martin, Ethnobotany: a 'People and Plants' Conservation Manual, Chapman and Hall, London, **1995**, pp268.
[18] P Maundu, *Indigenous Knowledge and Development Monitor*, **1995**, 3(2), 3-5.
[19] P Kamarajan; N Sekar; V Mathuram; S Govindasamy, *Biochem. Int*., **1991**, 25(3), 491-498.
[20] GC Jagetia; MS Baliga; P Venkatesh; JN Ulloor; SK Mantena; J Genebriera; V Mathuram, *J. Pharm. Pharmacol*., **2005**, 57(9), 1213-1219.
[21] MS Baliga, *Integr. Cancer Ther*., **2010**, 9(3), 261-269.
[22] GC Jagetia; MS Baliga; P Venkatesh, *Toxicol. Lett*., **2003**, 144(2), 183-193.
[23] GC Jagetia; MS Baliga, *Phytother. Res*., **2006**, 20(2), 103-109.
[24] S Jahan; R Chaudhary; PK Goyal, *Integr. Cancer Ther*., **2009**, 8(3), 273-279.
[25] L Feng; Y Chen; L Yuan; X Liu; JF Gu; MH Zhang; Y Wang, *Molecules*, **2013**, 18(11), 13920-13939.
[26] A Falodun; U Kragl; SM Touem; A Villinger; T Fahrenwaldt; P Langer, *Nat. Prod. Commun*., **2012**, 7(2), 151-152.
[27] N Engel; A Falodun; J Kühn; U Kragl; P Langer; B Nebe, *BMC Complement. Altern. Med*., **2014**, 14, 334.
[28] M Latha; L Pari, *Braz. J. Med. Biol. Res*., **2004**, 37(4), 577-586.
[29] L Pari; M Latha, *Gen. Physiol. Biophys*., **2005**, 24(1), 13-26.
[30] L Pari; M Latha, *J. Med. Food*., **2006**, 9(1), 102-107.
[31] M Latha; L Pari; KM Ramkumar; P Rajaguru; T Suresh; T Dhanabal; S Sitasawad; R Bhonde, *Nat. Prod. Res*., **2009**, 23(16), 1528-1540.
[32] PS Perumal; PV Anaswara; A Muthuraman; S Krishan, *Ayu*, **2014**, 35(2), 211-217.
[33] A Pandurangan; RL Khosa; S Hemalatha, *Pharmacologyonline*, **2008**, 1, 392-399.