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Ethnographic information and medicinal formulations of a Mro community of Gazalia Union in the Bandarbands district of Bangladesh

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ABSTRACT

The Mros are one of the eleven tribes residing in the Chittagong Hill Tracts region in the southeast portion of Bangladesh. They are believed to belong to the Tibeto-Burman group of the Mongoloid race. Their present population is estimated to be around 60,000. The Mro tribe has their own distinct culture, which they still maintain to a large extent. They shun modern allopathic doctors and keep to their own tribal medicinal practitioners to cater to their health-care needs. Since the tribal medicinal practices of the Mro healers are still undocumented, the objective of the present study was to collect ethnographic information on a Mro community and interview a Mro tribal medicinal practitioner who practices among the Mro community residing in Gazalia Union of the Bandarbands district, Bangladesh. Twenty four formulations were obtained from the Mro healer, which formulations were used for treatment of diseases like gastric trouble, headache, asthma, conjunctivitis, ear abscess, mucus, lesions on tongue, vomiting, toothache, pain in throat, chest pain, stomach pain, diarrhea, rheumatism, urinary problems, blood dysentery, abscess on the body, infection on the breast, excessive bleeding following abortion, anemia, bone fracture, constipation in children, and tumor (swellings). One formulation was also used as a contraceptive. The formulations contained a total number of 45 plant species, of which 33 could be identified. Twelve plant species could not be identified suggesting that the forests of the Chittagong Hill Tracts region are still relatively unexplored regarding the presence of various floral species. The identified plant species were distributed into 30 families. Besides plants, the healer also used parts of two reptile species in his formulations, namely the gall bladder of *Python molurus* (Indian python) and *Varanus indicus* (monitor lizard). An esoteric item used in one of the formulation consisted of skull of a person who has died of an accident. A number of spices were also used in various formulations, which were a novel aspect of the Mro healer and suggested that he possessed considerable experiences on the medicinal value of spices. By nature, most formulations were complex and contained multiple ingredients, which again attests to the Mro healer's expertise and knowledge of different plant species. Traditional medicinal knowledge has contributed to discovery of many modern drugs. From that aspect, the plants and reptile species used by the Mro healer presents considerable potential for further scientific studies leading to discovery of more effective cures for various diseases.

Key words: Medicinal plants, tribal medicine, Mro, Bangladesh

Introduction

The Mro tribe is one of the eleven tribes residing in the Chittagong Hill Tracts region in the southeastern portion of Bangladesh. They primarily dwell in the Bandarbands district, which is one of the four districts of the region. The Mros are believed to belong to the Tibeto-Burman group of the Mongoloid race. Their present population is estimated to be around 60,000. The Mros are divided into three clans, namely the Amok, Domrong, and the Sungma. The Amok clan has nineteen sects, some of which are Premsang, Prenchu, Naicha, Deng and Tang. The Domrong clan has two major sects, namely the Doupreng and the Tamsa sects. The Doupreng sect has several sub-sects like Khilongcha, Rengting, Marancha, Rahama, and Rongdin. Some of the Tamsa sub-sects are Watcha, Pongmi, and the Amangcha. The Sungma clan has several sects like the Kabsang, Nongnao, Kwai, Kanbok, and Sungprim. However, all sects speak the Mro language, which is considered to belong to the Tibeto-Burman group of languages (Chakma, 2010).

Modern allopathic doctors and clinics or hospitals are absent in the remote and densely forested regions, which comprise the habitat of the Mros. On top of it, the Mros, as a rule, shun allopathic doctors, who

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overwhelmingly come from the mainstream Bengali-speaking population. The Mros from time immemorial have relied on and still rely on their own traditional medicinal practitioners (healers) for treatment of their various diseases. Since they have lived in their forest habitats for centuries, the healers have extensive experiences on the medicinal properties of the plant and animal species found in the forest regions. This knowledge still remains to be adequately documented. Documentation of medicinal knowledge of indigenous people is important, because many modern drugs have resulted from close observations of the medical practices of indigenous peoples (Balick and Cox, 1996; Gilani and Rahman, 2005).

The folk and tribal medicinal practices of Bangladesh are still largely un-documented. To fulfill this gap, we had been conducting extensive ethnomedicinal surveys among the mainstream folk medicinal practitioners (Kavirajes), as well as the medicinal practitioners of a number of tribes over the last few years (Nawaz *et al.*, 2009; Rahmatullah *et al.*, 2009a-c; Hasan *et al.*, 2010; Hossan *et al.*, 2010; Mollik *et al.*, 2010a,b; Rahmatullah *et al.*, 2010a-g; Haque *et al.*, 2011; Jahan *et al.*, 2011; Rahmatullah *et al.*, 2011a,b; Sarker *et al.*, 2011; Rahmatullah *et al.*, 2012a-d). Bangladesh is believed to contain more than 5,000 floral species; the medicinal properties of an overwhelming number of these species are yet to be studied by modern methods. We think that thorough and proper investigation on these medicinal plant species can lead to discovery of many efficacious drugs, which is important considering the number of allopathic drugs that have serious side-effects or have developed vector resistance. Information on many of these plant species can be obtained through interviews of folk and tribal medicinal practitioners, who have used a large number of these plants in their various formulations for treatment of diseases over centuries. Since the medicinal practices of the Mros are largely un-documented, it was the objective of the present study to collect ethnographic information on a Mro community and interview a Mro medicinal practitioner practicing at the Mro community residing in Gazalia Union of the Bandarbands district in the Chittagong Hill Tracts region.

Materials and Methods

The Mros are a largely scattered community residing in dense forest areas of the Bandarbands district. The area is remote. Since it was not practical to conduct surveys among Mro practitioners of every Mro community, this survey was conducted among the Mro community residing in one place (Alok Para village) at Gazalia Union of the Bandarbands district. The community had one practicing healer, namely Reyang Mro. Informed consent was first obtained from the healer. The healer was fully informed about the purpose of our visit, and consent obtained that any information obtained can be disseminated both nationally and internationally. Interviews were conducted with the help of a semi-structured questionnaire and the guided field-walk method of Martin (1995) and Maundu (1995). In this method, the healer took the interviewers on guided field-walks through forest areas from where he collected his medicinal plants, pointed out the plants, and described their uses. Interviews were conducted in Bengali, which was spoken by both the interviewers as well as the Mro healer. However, plant names were taken in the Mro language. Plant specimens were collected from the spot, photographed, dried and brought back to the Bangladesh National Herbarium for complete identification. The Mro healer also used two reptile species in his formulations. The names and descriptions of the two reptile species were obtained in Bengali and the species identification done with appropriate zoological experts at the Dhaka Zoo. It was advantageous that both reptile species were common and also present in other parts of the country, so a proper identification was made quite easily. Besides information on medicinal formulations some ethnographic information was also obtained from the Headman of the Mro community at Alok Para. Several ingredients in Formulation 1 was not obtained from the wild but bought from an herbal shop close to the community. The identity of these ingredients was obtained from the shop owner who spoke Bengali and belonged to the Bengali-speaking mainstream population. Since these ingredients were common spices used throughout Bangladesh, their identities were quickly established with certainty. It is to be noted that Bengali-speaking settlers are present in numbers in the regions habituated by the Mros and they mainly cater to the Mro's need for spices, rice, fruits and vegetables, when the Mros do not have sufficient amounts grown by them or collect from the wild.

Results and Discussion

A. Ethnographic information:

The Mros, when choosing their habitat, select medium sized hills surrounded by taller or smaller hills. The hill chosen for habitat must have a mountain stream or water source nearby. When constructing homes, an elevated platform is first prepared from wooden logs or bamboo. This platform is about 4-8 feet from the ground. The floor is constructed of bamboo (if the household is poor) or woo (if the household is affluent). Individual rooms have walls made from bamboo. The houses have tin roofs or roofs are made from straw. A room has a single window. If the floor is made of wooden logs, there is about an inch space between logs. Underneath this floor, the Mros store wood to be used as fuel.

A single home may have multiple rooms, which are inter-connected through doors. To climb up to the home, the Mros use a single log of wood, which is hollowed to make steps. The first portion of the house after climbing is the verandah, or an open area, or could be a guest room. The verandah has bamboo floor and is enclosed by bamboo mats, which rise to half the height of the roof. The guest room is the largest room in the house compared to the other rooms, which are small in size. There are separate rooms for sewing and kitchen. In front of the house, there is a space on the ground, which is used for de-husking paddy. The Mro households do not have furniture like tables, beds within their rooms. Only in the kitchen, there is a bamboo rack for keeping pots and pans. They also possess many large and small-sized baskets made from rattan.

A very small room forms the kitchen area within the house. The kitchen room has earthen walls and floors. The oven consists of three iron rods on which is placed a round iron cover. Pots and pans are heated over the round iron cover during cooking. The Mros shop once a week and buy dried fish in large quantities. Every Mro village has a shop and dried items are usually sold in this shop in small quantities.

The Mros may eat singly in the morning and afternoon, but dinner is a total family affair accompanied with lots of conversation. If there is a guest in the house, the guest is fed first followed by the family members. The Mros eat vegetables containing lots of hot peppers. If any unknown guest belonging to the Bengali-speaking mainstream population arrives, the Mros give him a space to stay and provide the guest with cooking utensils. The Mros do not cook for such guests. If there is a Mro guest who is aged, food is placed before him or her with bent knees and after the guest has finished feeding, several incense sticks are lighted at the sitting place of the guest, incantations are said and then the elderly guest utters good wishes for the family.

The Mros eat rice, which has been prepared from paddy, de-husked in a dheki (a hollow opening in the soil in which paddy is put followed by pounding with a wooden pestle when the husks separate from the rice). After cooking the rice, it is put in a rattan basket covered with banana leaves. They eat rice very early in the morning and as soon as the sun sets.

Adults and young women have the duty of collecting water from a nearby mountain stream. The women put a piece of long rattan basket on top of their head called a 'thrung'. A water pot is put inside the thrung and water is collected in the water pot. After bringing water to home, it is distributed into a large container for cooking and washing hands and face and several small containers for drinking purposes. Each container is covered with banana leaves. When a child is asked to bring water, so as the water does not wet the child while bringing the water pot, a piece of polythene is tied to the thrung and which stays on the back of the child.

Men and boys bathe in the afternoon, while women bathe in the evening in the mountain stream following completion of the day's work. The Mros do not have any toilet systems within their homes; defecation and urination is done within the forest.

The Mros cultivate paddy, vegetables and tobacco in the relatively plain land at the bottom of hills. Around their homesteads they may plant one or two fruit trees of 'boroi' (*Ziziphus mauritiana*) and aam (*Mangifera indica*). Large number of banana trees can be found growing by themselves on the hill slopes. Occasionally, they tend to these banana groves, but more often they just collect the fruits from the wild. The Mros also sometimes cultivate turmeric on the hill slopes. Some of the agricultural equipments used by the Mros during cultivation include 'parpa' (spade), 'charai' (machete), 'mlek' (like a spade, used to cut branches or logs to pieces), 'tangchen' (small curved machete), 'laitim' (plow), 'thrung' (long rattan basket), and 'chapam' (large container for storing rice).

The children are trained to perform household chores side-by-side with playing. One of the duties of children is to collect dry branches and twigs from the forest areas to be used as fuel. The children may also collect water from the mountain streams. Playing of children may consist of spreading earth on each other's bodies. Very small children are strapped with a piece of cloth and hung from the shoulder. The child may be carried this way while the mother is doing household chores like cooking or travelling. During sleep time, small children are put in long rattan baskets made by the Mros. These baskets are suspended and can swing. Children usually do not intermingle with unknown persons.

The Mros usually keep domestic animals like dogs, cats, pigs, buffaloes and poultry in their homesteads. More emphasis is placed on having pigs, buffaloes and poultry. Nearly every family has a pig or two and more affluent families have buffaloes. Nearly every house has a cat. The cats stay practically all the time inside the house. The cats are fed by the side of family members when the family members eat food. The cats are trained to chase chickens out of the house when any chicken enters the house. Dogs, puppies and pigs are kept underneath the platform on which the house has been constructed. On cold mornings, pigs are allowed to enjoy the warmth of a fire if any human lights up a fire to warm up. They usually roam together. The buffaloes are kept on the downside of the hill slopes. They are allowed to roam and eat freely during the daytime, but are tethered to bamboo stakes during the night. The poultry are of a special breed, which is semi-wild and are larger than domesticated chickens found in rural homesteads of the Bengali-speaking mainstream population throughout the country. One chicken may weigh up to 4-5 kilogram.

The Mro community in which the present survey was conducted had a primary school with a teacher who has merely obtained his Secondary School Certificate. The school was run jointly by a number of non-

Governmental organizations (NGOs) like BRAC, UNDP and N. Z. Ekota Mohila Samity. The salary of the school teacher was Bangladesh Taka (BDT) 1500 per month (about US\$ 75). Every children attending school had to pay a tuition fee of BDT 100 per month. During school holidays, some children would walk with their father and attend another distant school after traversing for 3-4 hours and crossing two rivers. During these times, the child would walk in front and the father would walk in the back carrying the child's school bag on top of a stick.

During marriage, the age of the bride is usually 3-5 years more than the groom. The minimum age of marriage for girls is 18-20 years and for boys 16-17 years. During marriage, the groom's parents have to give the bride's parents around 110-400 silver Takas (1 silver taka = 1200 BDT) as dowry. Besides that, the groom's family also has to bear the expenses for all the bride's ornaments worn by the bride during the wedding ceremony. Half of this is paid before marriage and the other half following birth of the first child. If within 12-18 months of marriage, the bride decides not to live with her husband, the bride's father has to pay back the groom's father all the expenses. If a husband dies after marriage, the wife goes back and starts living with her parents; however, any children borne from the marriage has to stay with the dead husband's family. If marriage is between bride and groom coming both from affluent families, they hold a marriage fair called 'popoi'. During marriage the groom's family and friends take 20-50 chickens to the bride's home and stays there for two days. During these two days, the bride's family can eat chicken but not pork and the groom's family can eat pork but not chicken. Following these two days the groom's family and friends bring back the bride to the groom's home along with presents given by the bride's family. These gifts may include thrung, charai, and 'pujong' (mattress made from cotton and containing cotton inside). Pigs may also be given as gift by the bride's family to the groom's family. Following birth of the first child, the groom has to present the bride's mother with a small or large milking cow to compensate the mother for feeding her daughter with breast milk following her birth. If the groom cannot afford a cow, he either has to present his wife's mother with a suitable present of her choice or beg forgiveness for the omission of any gifts.

During leisure time, Mro women would play the 'plong' (flute), tidy up the children or make pujongs on weaving machines with their own hands. On cold evenings, women may light a fire and spend long times in conversations between themselves. During summer evenings, the men may talk between themselves and at the same time make thrungs and the women will gather in conversation while making pujongs. The Mros sleep on pujongs using a square or a rectangular pillow. Pujongs may also be used as blankets during winter cold. In this case, pujongs are made of thick threads.

B. Medicinal formulations:

The Mro healer mentioned that he used a total of 24 formulations for treatment of various ailments. The formulations are shown in Table 1. The various ailments treated included gastric trouble, headache, asthma, conjunctivitis, ear abscess, mucus, lesions on tongue, vomiting, toothache, pain in throat, chest pain, stomach pain, diarrhea, rheumatism, urinary problems (having difficulties in urinating), blood dysentery, abscess on the body, infection on the breast, excessive bleeding following abortion, anemia, bone fracture, constipation in children, and tumor (swellings). One formulation was also used as a contraceptive. The various ailments treated were common ailments and of the nature which would affect people particularly living in dense forest areas in a hot and humid climate under not so hygienic conditions of living.

A total of 45 plants or plant parts were used in the formulations (these 45 plant species are in addition to spices like fennel, fenugreek, black mustard, onions and garlic used in some of the formulations). Out of the 45 plant species, 33 could be identified and 12 species could not be identified at the Bangladesh National Herbarium. This suggests that the Chittagong Hill Tracts region still has areas of which the plant species has not been explored and possibly many more new species can be found following a thorough exploration. The Mro names of the 12 unidentified species were hingko, shoikha, pangle kuju, shonkhai lota, maju fol, tuihir singh, somrikha, roia, robdip, ram nyet, tuihir, and kalakora. The 33 identified plant species were distributed into 30 families. The results are shown in Table 2.

Overall, compared to the mainstream folk medicinal practitioners (Kavirajes) or some other tribal medicinal practitioners, the Mro healer's formulations were usually complex. For instance, the formulation for gastric trouble (Serial Number 1) included plants or plant parts from 17 different species. Of these 17 plant parts, ten were spices. Panch foron (a combination of the spices fenugreek, nigella, cumin, black mustard, and fennel) is a widely used spice combination in Bangladesh and India and particularly used for cooking vegetables. The combination is widely believed to aid digestion. The rhizomes of *Zingiber officinale*, bark of *Cinnamomum verum*, seeds of *Piper nigrum*, and seed kernels of *Myristica fragrans* are also commonly used spices in Bangladesh. All of these four spices are considered to have medicinal properties on top of their digestive properties and imparting a particular flavor or taste to a dish, particularly meat dishes. In fact the Mro healer used spices in his other formulations also. Seed of *Nigella sativa*, known as kalo jira in both Bengali and Mro language, is also a common spice in Bangladesh. The Mro healer used this spice for treatment of headache and

dizziness (Serial Number 2), mucus (Serial Number 6), chest pain (Serial Number 11), and anemia (Serial Number 21). However, the spice was not used alone but in combination with other plant parts. The seed of *Piper nigrum* (known as gol morich in both Bengali and Mro language) is also a well-known spice in Bangladesh. This spice was used by the Mro healer for treatment of gastric trouble (Serial Number 1), mucus (Serial Number 6), chest pain (Serial Number 11), and anemia (Serial Number 21). In this case also, this spice was also used along with other spices or plant parts for treatment.

Table 1: Formulations used by the Mro traditional medicinal practitioner for treatment of various ailments.

Serial Number	Ailment with symptoms	Formulation	Local name of plants/ingredients used
1	Gastric trouble	Bark of <i>Cinnamomum verum</i> J. Presl. (Lauraceae), seeds of <i>Piper nigrum</i> L. (Piperaceae), fruits of <i>Syzygium aromaticum</i> (L.) Merr. & L. M. Perry (Myrtaceae), seed kernels of <i>Myristica fragrans</i> Houtt. (Myristicaceae), maju fol (unidentified plant), panch foron (combination of seeds of fenugreek, nigella, cumin, black mustard and fennel), rhizomes of <i>Zingiber officinale</i> Roscoe (Zingiberaceae) [note that all these items are procured from herbal shops and not collected from the wild], roots of <i>Cyclea barbata</i> Miers (Menispermaceae), bark of hingko (unidentified), bark of shoikha (unidentified), fruit of pangle kuju (unidentified), proctai (unidentified) and root of <i>Lepisanthes tetraphylla</i> (Vahl) Radlk. (Sapindaceae) [the latter items are collected from the wild] are thoroughly dried, powdered and mixed in the ratio of 1:3 between items obtained from shops and items collected from the wild. The mixture is taken on an empty stomach and following taking the formulation, warm water is to be taken. Primarily, the formulation is taken for 1 week. However, for chronic gastric trouble, the formulation is taken for 12-15 days. During this time, eating of any food aggravating gastric trouble is forbidden.	<i>Cinnamomum verum</i> : Daruchini <i>Piper nigrum</i> : Gol morich <i>Syzygium aromaticum</i> : Long <i>Myristica fragrans</i> : Jaifol <i>Zingiber officinale</i> : Ada <i>Cyclea barbata</i> : Krong dak mokhet <i>Lepisanthes tetraphylla</i> : Sam proa
2	Headache, dizziness	Seeds of <i>Nigella sativa</i> L. (Ranunculaceae) are thoroughly powdered and mixed with juice obtained from macerated roots of shonkhai lota (unidentified). The mixture is applied thrice daily to the head following wetting the head with water. At the same time, the mixture is smelled. The procedure is followed till cure.	<i>Nigella sativa</i> : Kalo jira
3	Asthma	Leaves of <i>Kalanchoe pinnata</i> (Lam.) Pers. (Crassulaceae) are first slightly burnt over a flame. Then juice obtained following squeezing the leaves is taken with honey. The procedure is followed for a week. This formulation is for patients who are having asthma for the first time. At the same time, leaves of <i>Gynura procumbens</i> (Lour.) Merr. (Asteraceae) and locally grown onions are macerated together and the mixture applied to the throat externally. At the same time, leaves of <i>Gynura procumbens</i> are put for some time in warm water followed by drinking the water. At the same time, juice obtained from macerated leaves of <i>Anisomeles indica</i> (L.) O. Kuntze (Lamiaceae) is orally taken with honey thrice daily.	<i>Kalanchoe pinnata</i> : Pathorkuchi <i>Gynura procumbens</i> : Song klang pata <i>Anisomeles indica</i> : Paki song pata
4	Conjunctivitis	Seeds of <i>Casuarina equisetifolia</i> L. (Casuarinaceae) are rubbed on a piece of stone and the powder collected. The skull of a person who has died of an accident is also rubbed on a stone and the powder collected. The powders are combined and mixed with milk from a nursing mother who is nursing a girl child (if conjunctivitis develops in a male) and from a nursing mother who is nursing a boy child (if conjunctivitis develops in a female) and applied to the eyes twice daily in the morning and night for 1 week.	<i>Casuarina equisetifolia</i> : Jhau
5	Ear abscess	The pulp from inside the seeds of <i>Momordica charantia</i> L. (Cucurbitaceae) is first collected. Then it is powdered and mixed with finely powdered tal mishri [sugar obtained from sap of <i>Borassus flabellifer</i> L. (Arecaceae)] and applied to inside the ears twice daily for a week.	<i>Momordica charantia</i> : Tita korla <i>Borassus flabellifer</i> : Taal
6	Mucus	Bark of <i>Santalum album</i> L. (Santalaceae) or <i>Aquilaria agallocha</i> Roxb. (Thymeliaceae) are dried and finely powdered and then mixed with powdered seeds of <i>Nigella sativa</i> L. (Ranunculaceae). The mixture is smelled on a continuous basis till mucus is cleared.	<i>Santalum album</i> : Chondon <i>Aquilaria agallocha</i> : Agor <i>Nigella sativa</i> : Kalo jira
7	Lesions on tongue	The gall bladder of Indian python (<i>Python molurus</i>) or monitor lizard (<i>Varanus indicus</i>) is dried thoroughly under the sun. The roots of <i>Cyclea barbata</i> Miers	<i>Cyclea barbata</i> : Krong dak mokhet <i>Python molurus</i> : Ojogor

		(Menispermaceae) are scrubbed on a stone to extract juice. The juice is mixed with dried gall bladder and applied to tongue lesions.	<i>Varanus indicus</i> : Gui shap
8	Vomiting	Roots of <i>Solanum violaceum</i> Orteg. (Solanaceae) are soaked in water in which rice has been washed. The roots are then scrubbed on a piece of stone to gather juice. The juice is orally taken.	<i>Solanum violaceum</i> : Rui kha hing lota
9	Toothache, swelling of gums	The thin bark following taking off the outer bark of <i>Dipterocarpus turbinatus</i> Gaertn.f. D. Laevis (Dipterocarpaceae) is boiled in water till the water has a red color. The water, while it is still warm is used for repeated gargling. At the same time, snuff (finely ground flavored tobacco) is applied to painful areas or swellings.	<i>Dipterocarpus turbinatus</i> : Gorjon
10	Pain in throat, tonsillitis	The roots of <i>Cyclea barbata</i> Miers (Menispermaceae) are burnt in fire to ashes. The ash is mixed with ingredients obtained from top of match sticks and the gall bladder of <i>Varanus indicus</i> (monitor lizard). A pinch of the mixture is taken twice daily in the morning and evening till cure. Note that match stick ingredients cannot be too much.	<i>Cyclea barbata</i> : Krong dak mokhet <i>Varanus indicus</i> : Gui shap
11	Chest pain	Seeds of <i>Nigella sativa</i> L. (Ranunculaceae) and <i>Piper nigrum</i> L. (Piperaceae) are mixed with a little amount of water, macerated thoroughly and taken orally.	<i>Nigella sativa</i> : kalo jira <i>Piper nigrum</i> : Gol morich
12	Stomach pain	Macerated rhizomes of <i>Curcuma roxburghii</i> Rahman et Yusuf are taken only once.	<i>Curcuma roxburghii</i> : Pahari kalo holud
13	Diarrhea	The barks of <i>Mangifera indica</i> L. (Anacardiaceae) and <i>Ziziphus mauritiana</i> Lam. (Rhamnaceae), which are yet to bear fruits are collected and combined with roots of <i>Lepisanthes tetraphylla</i> (Vahl) Radlk. (Sapindaceae) and gall bladder of <i>Varanus indicus</i> (monitor lizard) and thoroughly mixed by rubbing with a stone. A portion of the mixture is taken thrice daily till cure.	<i>Mangifera indica</i> : Aam <i>Ziziphus mauritiana</i> : Boro <i>Lepisanthes tetraphylla</i> : Sam proa <i>Varanus indicus</i> : Gui shap
14	Rheumatism	Stems of <i>Allamanda cathartica</i> L. (Apocynaceae) from the top of roots to the uppermost part are taken, cut into small pieces, put within a cloth and immersed in warm water. The stems within the piece of cloth are then applied to painful areas in the morning and evening for a week.	<i>Allamanda cathartica</i> : Fok kaia
15	Having difficulties in urinating	The east-facing roots of a large <i>Bombax ceiba</i> L. (Bombacaceae) tree are scrubbed with a piece of stone along with tal mishri [sugar prepared from sap of <i>Borassus flabellifer</i> L. (Arecaceae)] to form a powdered mixture, which is taken twice daily for seven days. Alternately, the roots of <i>Lygodium flexuosum</i> (L.) Sw. (Lygodiaceae) are mixed with tal mishri and taken twice daily for seven days.	<i>Bombax ceiba</i> : Tula gach <i>Borassus flabellifer</i> : Taal <i>Lygodium flexuosum</i> : Klom buma
16	Blood dysentery	The fruits of maju fol tree (unidentified) are thoroughly powdered and mixed with roots of tuihir singh (unidentified) and somrikha (unidentified). The mixture is taken thrice daily till cure.	
17	Abscess	Juice obtained from macerated roots of roia (unidentified), robdip (unidentified) and <i>Angiopteris sylhetensis</i> de Vriese (Marattiaceae) are macerated together to obtain juice, which is then warmed and applied to abscess 2-3 times daily. Note that roots of roia plant are very bitter in taste.	<i>Angiopteris sylhetensis</i> : Klang kuko
18	Infection on breast	The roots of ram nyet plant (unidentified) are burnt over a fire to ashes and the ash is applied to infections. At the same time juice obtained from macerated root is also applied to breast if the infection is severe or there is swelling.	
19	Excessive bleeding following abortion	Bark of tuihir plant (unidentified) is scrubbed with a stone to obtain powder, which is then mixed with tal mishri [sugar prepared from sap of <i>Borassus flabellifer</i> L. (Arecaceae)]. One finger width amount of the mixture is then taken orally three times. If bleeding does not stop, more mixture is administered orally.	<i>Borassus flabellifer</i> Taal
20	Birth control (contraceptive)	Roots of <i>Plumeria obtusa</i> L. (Apocynaceae) trees that bear red flowers are scrubbed on a stone to obtain juice. The juice is next mixed with a little wine and taken. Note that the mixture should be taken from the day when menstruation stops.	<i>Plumeria obtusa</i> : Mroton ring
21	Anemia	Three parts (amount) juice obtained from macerated leaves of <i>Centella asiatica</i> (L.) Urb. (Apiaceae) is mixed with one third (amount) each of old fruit juice of <i>Tamarindus indica</i> L. (Fabaceae), honey, fruits of <i>Phyllanthus emblica</i> L. (Euphorbiaceae), molasses, bark of <i>Cinnamomum verum</i> J. Presl. (Lauraceae), seed kernels of <i>Myristica</i>	<i>Centella asiatica</i> : Thankuni <i>Tamarindus indica</i> : Tetul <i>Phyllanthus emblica</i> : Amloki <i>Cinnamomum verum</i> : Daruchini <i>Myristica fragrans</i> : Jaifol <i>Nigella sativa</i> : Kalo jira

		<i>fragrans</i> Houtt. (Myristicaceae), seeds of <i>Nigella sativa</i> L. (Ranunculaceae) and seeds of <i>Piper nigrum</i> L. (Piperaceae). The mixture is taken (two spoonfuls each time) in the morning on an empty stomach and water has to be taken in plenty following taking the mixture.	<i>Piper nigrum</i> : Gol morich
22	Bone fracture	Leaves and stems of <i>Cissus quadrangularis</i> L. (Vitaceae) are cut into small pieces. They are then wrapped in a thin piece of cloth and tied to the fractured area. The fractured area is kept straight with a thin stick. The cloth and the stick is tied tightly for 7 days.	<i>Cissus quadrangularis</i> : Hat bam, Har bhanga lota
23	Constipation in children	Whole kolakora (unidentified) plant, garlic, hingko plant (unidentified), maju fol (unidentified), whole plants of <i>Eupatorium ayapana</i> Vent. (Asteraceae), and skin of fruits of <i>Feronia elephantum</i> Corrêa. (Rutaceae) rae finely powdered and mixed together and then made into pills the size of marbles and then dried. If a children drinks milk, the pills are administered with milk, otherwise with warm water.	<i>Eupatorium ayapana</i> : Kui parsong <i>Feronia elephantum</i> : Kodbel
24	Tumor (swelling)	Roots of <i>Alocasia cucullata</i> (Lour.) G. Don. (Araceae) are inserted within a ripe banana piece and swallowed whole. Alternately, the formulation for abscess (see Serial No. 17 is followed).	<i>Alocasia cucullata</i> : Lipkai

Table 2: Family-wise distribution of medicinal plants used by the Mro practitioner.

Plant name	Family
<i>Mangifera indica</i>	Anacardiaceae
<i>Centella asiatica</i>	Apiaceae
<i>Allamanda cathartica</i>	Apocynaceae
<i>Plumeria obtusa</i>	Apocynaceae
<i>Alocasia cucullata</i>	Araceae
<i>Borassus flabellifer</i>	Arecaceae
<i>Eupatorium ayapana</i>	Asteraceae
<i>Gynura procumbens</i>	Asteraceae
<i>Bombax ceiba</i>	Bombacaceae
<i>Casuarina equisetifolia</i>	Casuarinaceae
<i>Kalanchoe pinnata</i>	Crassulaceae
<i>Momordica charantia</i>	Cucurbitaceae
<i>Dipterocarpus turbinatus</i>	Dipterocarpaceae
<i>Phyllanthus emblica</i>	Euphorbiaceae
<i>Tamarindus indica</i>	Fabaceae
<i>Anisomeles indica</i>	Lamiaceae
<i>Cinnamomum verum</i>	Lauraceae
<i>Lygodium flexuosum</i>	Lygodiaceae
<i>Angiopteris sylhetensis</i>	Marattiaceae
<i>Cyclea barbata</i>	Menispermaceae
<i>Myristica fragrans</i>	Myristicaceae
<i>Syzygium aromaticum</i>	Myrtaceae
<i>Piper nigrum</i>	Piperaceae
<i>Nigella sativa</i>	Ranunculaceae
<i>Ziziphus mauritiana</i>	Rhamnaceae
<i>Feronia elephantum</i>	Rutaceae
<i>Santalum album</i>	Santalaceae
<i>Lepisanthes tetraphylla</i>	Sapindaceae
<i>Solanum violaceum</i>	Solanaceae
<i>Aquilaria agallocha</i>	Thymeliaceae
<i>Cissus quadrangularis</i>	Vitaceae
<i>Curcuma roxburghii</i>	Zingiberaceae
<i>Zingiber officinale</i>	Zingiberaceae

In one instance, the Mro healer used three different formulations for treatment of the same disease (Serial Number 3). Asthma was treated by oral administration of juice obtained from slightly burnt leaves of *Kalanchoe pinnata* mixed with honey. At the same time, leaves of *Gynura procumbens* and locally grown onions were macerated together and the mixture applied to the throat externally. At the same time, leaves of *Gynura procumbens* were put for some time in warm water followed by drinking the water. At the same time, juice obtained from macerated leaves of *Anisomeles indica* was orally administered with honey thrice daily.

Administrations of formulations were of three types, the two primary types being oral and topical. However, in two instances, the formulation was advised to be smelled by the patient. For treatment of headache and dizziness (Serial Number 2), the formulation was advised to be both topically applied to the head as well as smelled. For clearing of mucus, bark of *Santalum album* or *Aquilaria agallocha* was dried, powdered, mixed

with powdered seeds of *Nigella sativa* and advised to be smelled by the patient occasionally till clearance of mucus occurs.

The Mro healer used the gall bladder of two reptiles, namely Indian python (*Python molurus*) and monitor lizard (*Varanus indicus*) in combination with plant parts in several of his formulations. For treatment of tongue lesions (Serial Number 7), the gall bladder of both Indian python and monitor lizard was used in combination with roots of the plant, *Cyclea barbata*. For treatment of pain in throat or tonsillitis, the gall bladder of monitor lizard was used in combination with roots of *Cyclea barbata* (Serial Number 10). The gall bladder of monitor lizard was also used for treatment of diarrhea in combination with barks of *Mangifera indica* and *Ziziphus mauritiana* and roots of *Lepisanthes tetraphylla* (Serial Number 13). *Cyclea barbata* roots seemed to be one plant part frequently used by the Mro healer, being used for treatment of gastric trouble (Serial Number 1), for treatment of tongue lesions (Serial Number 7), and for treatment of pain in throat or tonsillitis (Serial Number 10).

Two of the treatments of the Mro healer were quite esoteric in nature. For treatment of conjunctivitis, the powdered skull of a person who has died through an accident was used in combination with seeds of *Casuarina equisetifolia* and milk from a nursing mother (Serial Number 4). Not only that, if the patient with conjunctivitis was a male, the nursing mother has to be one with a female child and vice versa. For treatment of urination difficulties, the roots of *Bombax ceiba* facing east were used in the formulation (Serial Number 15). Whether east-facing roots had any special properties in the form of phytochemicals and which were different from roots facing other sides need to be scientifically determined.

The fact that twelve plant species used by the Mro healer could not be identified strongly suggests that more ethnomedicinal and botanical surveys be conducted among the Mros and their habitat. Also the fact remains that at least the use of one of the plant used by the Mro healer, namely *Cissus quadrangularis* for treatment of bone fracture (Serial Number 22) has been scientifically validated (Udapa and Prasad, 1964 a,b; Chopra *et al.*, 1976). It is expected that further scientific studies on plant and reptile species used by the Mro healer could lead to discovery of more efficacious drugs. Even though the diseases treated by the Mro healer were generally simple in nature, these diseases affect millions of people all over the world, and mostly people who cannot afford or lack access to allopathic doctors and modern medicine. Thus validation of the medicinal formulations of the Mros can benefit not only the Mros but also other forest-living tribes of Bangladesh. Also one of the diseases treated by the Mro healer was rheumatism. If the Mro healer's formulation for rheumatism can lead to even a better symptomatic treatment for this disease (against which modern medicine has no known cure), it can relieve millions of rheumatism-affected people worldwide. As such, the Mro healer's formulations merit further scientific studies.

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