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Medicinal Plants Used by Folk Medicinal Practitioners in Three Randomly Surveyed Villages of Rajbari District, Bangladesh

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ABSTRACT

Medicinal plants form an important and often the only component in the formulations used by the folk medicinal practitioners of Bangladesh for treatment of various ailments. Folk medicinal practitioners, otherwise known as Kavirajes, perform an integral role in the delivery of primary health-care to substantial segments of both rural and urban population of the country. Their traditional medicinal practice, which is generally referred to as folk medicinal practice, is different from other forms of traditional medicine in Bangladesh like Ayurveda and Unani forms of traditional medicine. Kavirajes use simple formulations of medicinal plants, and their practice is often confined to the immediate family and passed on through successive generations. Thus over the centuries, Kavirajes have gained not only extensive knowledge on medicinal plants but also each Kaviraj has his or her own unique list of plants, which he or she uses in formulations. Bangladesh has over 86,000 villages with each village containing one or two practicing Kavirajes. To get a comprehensive view of the medicinal plants of Bangladesh, it is therefore important to conduct extensive interviews of individual Kavirajes of both urban and rural areas. Towards obtaining such comprehensive information, the present ethnomedicinal survey was conducted among the Kavirajes of three randomly surveyed villages of Rajbari district in Bangladesh to document their use of medicinal plants and the ailments treated by those plants. Information was obtained from the Kavirajes with the help of a semi-structured questionnaire and the guided field-walk method. The results showed that the Kavirajes of the three villages surveyed used a total of 46 plants distributed into 31 families in their formulations. The Fabaceae family provided 6 plants, while the Acanthaceae, Lamiaceae and Zingiberaceae families provided three plants each. Leaves constituted the major plant part used, constituting over 50% of the total uses. Other major plant parts used were roots and stems. The various ailments treated included gastrointestinal disorders, cuts and wounds, fever, respiratory tract disorders, snake bites, pain, menstrual problems, physical weakness, diabetes, mental disorders, cardiovascular disorders, skin disorders, chicken pox, burns, spermatorrhea, bone fractures, and cattle ailments. Medicinal plants from time immemorial have proved an excellent source of medicines and this trend has continued even in recent times. As such, the medicinal plants documented in the present survey have enormous potential for further scientific research, which can lead to discovery of better medicines. At the same time, a resurgence of interest in medicinal plants can lead to their wide-spread conservation, which is important because a number of medicinal plants have become endangered through spread of human habitat and loss of primary and secondary forests.

Key words: Medicinal plants, folk medicine, Rajbari, Bangladesh.

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Introduction

Folk medicinal practice is one form of traditional medicinal practices, which is still ongoing in Bangladesh. The practitioners are generally known as Kavirajes. The distinction between folk medicinal and other traditional forms of medicinal practice like Ayurveda or Unani is that the folk medicinal practitioners rely almost exclusively on medicinal plants in their formulations for treatment of various ailments. The practices of the Kavirajes extend throughout both urban and rural areas of the country, although rural practice is more extensive than urban practice. Virtually every village of the 86,000 villages of the country has one or more Kavirajes, depending on the village population. Because of the proximity of practitioners and potential patients by virtue of residence in the same village, a degree of trust develops between the practitioner and the patient. Thus a rural person, and especially women, feels freer to discuss his or her problem with the local Kaviraj rather than an allopathic doctor, who are scarcely present in villages and whose practice is more limited to towns and cities. The other factors behind the continuation of folk medicinal practice in modern times are the lack of modern clinics and hospitals in rural areas, lack of adequate communication facilities between cities and villages, the price of allopathic medicine, and the genuine or perceived efficacy of folk medicine.

Besides Kavirajes, who cater to the mainstream or Bengali-speaking population, there exist in Bangladesh tribal medicinal practitioners. Bangladesh has over twenty tribes, who still rely on their own medicinal practitioners for treatment in general. Tribal medicinal practices, like the Kavirajes, also rely almost exclusively on medicinal plants for treatment of ailments. The formulations are rarely complex, and usually consist of simple extraction of juice from whole plant or plant parts through squeezing or macerating the plant part; the juice is then topically applied or orally administered, depending on the nature of the disease.

Bangladesh has around 5,000 floral species. However, this number is not based on systematic accounting of the floral species present in Bangladesh, and many experts believe that the actual number of floral species may be considerably more. The number of plants used in various traditional forms of medicine is generally believed to be from 500 to 600 plants. Once again, this number is not based on field-studies but merely reflects a general view point. Part of the problem is that the practitioners (including Kavirajes), who use medicinal plants in their treatments, are generally reclusive in giving out their formulations. The formulations of any specific Kaviraj is kept in secret within the family and passed on only to successive generations or long-time disciples or apprentices. As such, information on the actual number of medicinal plants used as well as formulations has been scantily documented in the scientific literature. The same holds true also for tribal medicinal practitioners, who tend to be more isolated and reclusive.

Towards a proper documentation of the medicinal plants of Bangladesh, we have been conducting systematic ethnomedicinal surveys among both mainstream Kavirajes as well as the tribal medicinal practitioners for the last few years. Our surveys have already indicated that there are considerable divergences in the plant species used, and the formulations prescribed for treatment of a given ailment, between Kavirajes of even adjoining villages and in between tribes (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-f; Jahan *et al*., 2011). The major view point that has emerged from our ongoing ethnomedicinal surveys so far has been that practically every Kaviraj has to be interviewed and the information documented to obtain a comprehensive account of medicinal plant usage in the folk and tribal medicinal systems of Bangladesh. Towards that objective, the aim of the present study was to conduct a survey among the Kavirajes of three randomly chosen villages of Rajbari district of the country to document the medicinal plant(s) used by the Kavirajes in the three villages.

Materials and Methods

The present survey was conducted among the Kavirajes of three villages, namely Shonapur, Chorkulte, and Majhbari village of Rajbari district, Bangladesh. Kaviraj Kalapada Sutradhar practiced in Shonapur village, Kaviraj Murad Biswas practiced in Chorkulte village, and Kaviraj Kazi Showkat practiced in Majhbari village. The village population averaged around 2,000 in each of the three villages surveyed. The practice of any individual Kaviraj extended over twenty years. Besides practicing folk medicine, the Kavirajes also had small parcels of agricultural lands of their own, and as such cultivated those fields also.

Informed consent was obtained from each Kaviraj prior to the interviews. Kavirajes were informed as to the nature and purpose of our visit, and consent particularly obtained for the information to be disseminated in national or international publications. All interviews were conducted in Bengali, the language being spoken by both Kavirajes and interviewers alike. Interviews were conducted with the help of a semi-structured questionnaire and the guided field-walk method as described by Martin (1995) and Maundu (1995). In this method, the Kavirajes took the interviewers to spots (usually in the mornings) from where they usually collected their medicinal plants, showed the plants, and described their properties and ailments those plants

were used for. Plant specimens were collected, pressed and dried on the spot and later brought back to Dhaka for complete identification. Plant identification was done by Mr. Manjur-Ul-Kadir Mia, ex-Curator and Principal Scientific Officer of Bangladesh National Herbarium. All information was double-checked with the Kavirajes in later evening sessions. Some information was also obtained informally from village residents who frequented the Kaviraj of their respective villages as to patient satisfaction. A high degree of patient satisfaction was observed in this respect.

Results and Discussion

It was observed that the Kavirajes of the three villages surveyed used a total of 46 plants distributed into 31 families for treatment of different ailments. The results are shown in Table 1. The Fabaceae family provided the largest number of plants with six plants. This family was followed by the Acanthaceae, Lamiaceae, and Zingiberaceae families with 3 plants per family. A plant, namely *Canarium euphyllum*, belonging to the Burseraceae family was observed to be used by the Kavirajes of this area. This is the first instance that we have observed the use of this particular plant by any Kaviraj of Bangladesh among the hundreds of surveyed conducted by us in other regions of the country.

Plant parts used by the Kavirajes included whole plants (5.3% of the total uses), leaves (50.9%), roots (17.5%), stems (10.5%), barks (3.5%), fruits (5.3%), rhizome (1.8%), base of trunk (1.8%), buds (1.8%), and top of plants (1.8%). Surprisingly, flowers and seeds of any plant were not used by the three Kavirajes at all. This was a observation, which was quite distinct from Kavirajes of other areas of Bangladesh, whose repertoire of plant parts also include flowers and seeds of various plants for treatment of ailments.

The various ailments treated by the Kavirajes ranged from the common to fairly complicated ailments like cardiovascular disorders, mental disorders, and diabetes. Thirteen plants were used for treatment of gastrointestinal disorders, suggesting that this is the most common ailment suffered by the village population. The result is not surprising, given the general lack of proper sanitary conditions and lack of quality drinking water. Six plants were used for treatment of pain, while five plants each were used for treatment of cuts and wounds, and respiratory tract sicknesses. The Kavirajes were also accustomed to treat cattle diseases along with human ailments, and four plants were used for treatment of cattle diseases. These four plants were *Cuscuta reflexa*, *Cissus repanda*, *Diplazium esculentum*, and *Alpinia nigra*.

The Kavirajes had no fixed system, e.g. a single plant or plant part or one formulation for treatment of only a single disease. Occasionally, a single plant or plant part was used for treatment of a single disease, e.g. the leaves of *Justicia adhatoda* were used for treatment of frequent fever. The leaves of *Justicia gendarussa* were used for treatment of snake-bitten patients. But one single plant part was also observed to be used for treatment of quite diverse ailments. For instance, the leaves of *Barleria prionitis* were used for treatment of both diarrhea as well as cuts (to stop bleeding). The leaves of *Tylophora indica* were used for treatment of two very different disorders like snake bite and stomach disorder. Two plant parts from the same plant may be used for treatment of two different diseases. The roots of *Clerodendrum viscosum* were used for alleviation of waist pain, while the top of young stems were used for treatment of intermittent fever or flatulency.

In most cases, the formulations used were simple, being merely plant juices to be administered with honey or milk (when administered orally). However, for treatment of headache due to insomnia or trouble falling asleep, a complex formulation was used by the Kaviraj concerned. The formulation consisted of mixing the juice obtained from macerated vines or roots of *Ipomoea mauririana* with coconut water (water contained within the fruits of *Cocos nucifera*), sesame oil, and a little amount of powder of *Canarium euphyllum*. The mixture was mixed thoroughly to form an oil-like consistency, and then applied to the head at night. Powdered *Canarium euphyllum* has other uses in Bangladesh; most often, it is used in incense sticks or burnt to create smoke to repel mosquitoes or other flying insects. This is the first instance, where we observed a medicinal use for this plant. A more complex formulation was used by a Kaviraj for treatment of body ache, headache, insomnia, or to prevent hair loss. In this instance, the trunk of a mature *Musa sapientum* plant was cut at the base and a small hole made in the base. After some time the hole would fill up by itself with water or plant sap. The water was then taken and mixed with whole plant of *Ipomoea mauritiana*, sesame oil, and powder

Table 1: Medicinal plants used by the Kavirajes of three randomly surveyed villages of Rajbari district, Bangladesh.

Serial Number	Scientific Name	Family Name	Local Name	Utilize Part	Ailment
1	*Barleria prionitis* L.	Acanthaceae	Shonjiboni	Leaf	Stomach disorders (e.g. diarrhea), cuts. Juice from macerated leaves is taken twice for stomach disorders. Crushed leaves are applied to cuts.
2	*Justicia adhatoda* L.	Acanthaceae	Baksha	Leaf	Frequent fever. ½ chatak juice obtained from macerated leaves is taken with ½ chatak honey. Note that leaf juice is extremely bitter.
3	*Justicia gendarussa* L.	Acanthaceae	Rikfol	Leaf	Snake bite. Juice from macerated leaves is applied to snake-bitten area.
4	*Achyranthes aspera* L.	Amaranthaceae	Chichchiri	Root	Severe pain in stomach due to menstrual cramps. Juice from crushed roots is taken with one powdered black pepper seed twice daily.

Table 1: Continue

5	*Aerva sanguinolenta* (L.) Blume	Amaranthaceae	Bish korali	Leaf	Snake bite, stomach disorder. 1 chatak of juice from macerated leaves is orally administered once to snake-bitten person. ½ chatak juice obtained from macerated leaves is orally administered to persons with stomach disorders twice.
6	*Calotropis gigantea* (L.) Ait.f.	Asclepiadaceae	Shet akondo	Leaf	Swelling and pain of ankles, rheumatic pain. Leaves are rubbed with mustard oil, warmed and applied to painful areas.
7	*Tylophora indica* (Burm.f) Merr.	Asclepiadaceae	Ishil mul	Leaf	Snake bite, stomach disorder. 1 chatak of juice from macerated leaves is orally administered once to snake-bitten person. ½ chatak juice obtained from macerated leaves is orally administered to persons with stomach disorders twice daily.
8	*Enydra fluctuans* Lour.	Asteraceae	Helencha	Leaf	Physical weakness, diabetes. ½ chatak juice obtained from macerated leaves is mixed with goat milk and taken twice daily.
9	*Mikania cordata* (Burm.f.) B. L. Robinson	Asteraceae	Shada Jarman lota	Leaf	Cuts. Juice from macerated leaves is applied to cuts.Ulcer, flatulency. ½ chatak juice obtained from macerated leaves is taken thrice daily. After the ailment has been cured, ½ chatak juice from macerated leaves is taken once daily for a further 10-20 days.
10	*Bombax ceiba* L.	Bombacaceae	Shimul	Root Of Young Plants	High sugar levels. ½ chatak juice from macerated roots is mixed with a little amount of sugarcane molasses and taken.
11	*Heliotropium indicum* L.	Boraginaceae	Hatishura	Leaf	Mental disorders. Leaves are squeezed in water and applied to head.
12	*Canarium euphyllum* Kurz	Burseraceae	Sheti dhup	Bark	Headache due to insomnia or trouble falling asleep. Juice obtained from macerated vines or roots of *Ipomoea mauritiana* is mixed with coconut water, sesame oil, and a little amount of sheti dhoop (powder of *Canarium euphyllum*), mixed thoroughly to form an oil, which is applied to head at night. Body ache, headache, insomnia, to prevent hair loss. The plant (*Musa sapientum*) is cut at the base and a hole made in the base, which then by itself fills up with water (possibly plant sap and water). The water is taken and mixed with whole plant of *Ipomoea mauritiana* and sesame oil. One teaspoonful of dhoop (powder of *Canarium euphyllum* bark) is added and the decoction thoroughly mixed. The mixture is taken 2-3 times.
13	*Terminalia arjuna* (Roxb.ex DC.)Wight & Arn.	Combretaceae	Arjun	Bark	Stomach disorders, cardiovascular disorders, diabetes. Bark is dried on a new piece of tin in the sun. It is then powdered and taken with goat milk or cow milk.
14	*Ipomoea mauritiana* Jacq.	Convolvulaceae	Bhui kumra	Leaf, root	Headache due to insomnia or trouble falling asleep. Juice obtained from macerated vines or roots of *Ipomoea mauritiana* is mixed with coconut water, sesame oil, and a little amount of sheti dhoop (powder of *Canarium euphyllum* bark), mixed thoroughly to form an oil, which is applied to head at night. Body ache, headache, insomnia, to prevent hair loss. The plant (*Musa sapientum*) is cut at the base and a hole made in the base, which then by itself fills up with water (possibly plant sap and water). The water is taken and mixed with whole plant of *Ipomoea mauritiana* and sesame oil. One teaspoonful of dhoop (powder of *Canarium euphyllum* bark) is added and the decoction thoroughly mixed. The mixture is taken 2-3 times.
15	*Kalanchoe pinnata* (Lam.) Pers.	Crassulacea	Pathorkuchi	Leaf	Stomach disorders in children, bloating, to increase appetite. Two teaspoonfuls of juice obtained from macerated leaves is to be taken three times.
16	*Coccinia grandis* (L.) J. Voigt	Cucurbitaceae	Taelae kochu	Leaf	Large boil, to keep head cool, to calm down stomach upsets and burning sensations in the stomach. Crushed leaves are applied to boils. Crushed leaves are applied to head or stomach area as appropriate. Dysentery, to keep head cool. Three drops of juice obtained from squeezed leaves is applied to the eyes for treatment of dysentery. Juice obtained from squeezed leaves is applied to head to keep head cool.
17	*Momordica charantia* L.	Cucurbitaceae	Bon-uccha	Leaf	Chicken pox (to alleviate pain and infections, also taken as a preventive). Pills made from crushed leaves are taken as preventive for chicken pox. One pill is taken thrice daily for alleviation of pain and any infection arising out from breakage of pustules.
18	*Cuscuta reflexa* Roxb.	Cuscutaceae	Shorno lota	Whole plant	Foot and mouth disease in cattle, swelling of jaws in cattle, fever in cattle. Juice obtained from macerated whole plant is orally administered three times.
19	*Euphorbia hirta* L.	Euphorbiaceae	Dudhle ghas	Sap from stem	Cuts, infections. Sap from cut stem is applied.
20	*Abrus precatorius* L.	Fabaceae	Kuch gach	Stem sap	Cuts and wounds. Sap is applied to cuts and wounds as an antiseptic.
21	*Cassia fistula* L.	Fabaceae	Shongrile, Bon shonli	Leaf	Stomach disorders. ½ chatak juice obtained from macerated leaves is taken twice.
22	*Cassia sophera* L.	Fabaceae	Jhunti gach, Kaal kaeshondae	Root, leaf	Gynecological problems. Root is tied to the waist with a piece of string. Burns, formation of abscesses due to burns, burning sensations in the body. Crushed leaves are applied to burns and abscesses formed due to burns. Juice from squeezed leaves is applied for relief of burning sensations in body.
23	Erythrina orientalis (L.) Merr.	Fabaceae	Madar gach	Root	Spermatorrhea. Roots are cut from the plant and soaked in water. The water is taken thrice daily for 1 week. Note that the taste of this water is sweet.
24	*Ocimum tenuiflorum* L.	Fabaceae	Radha tulshi	Leaf	Coughs. ½ chatak juice obtained from macerated leaves is taken with honey twice daily.
25	*Tamarindus indica* L.	Fabaceae	Tetul gach	Leaf from mature plants, whole young plant	Sinusitis, chronic cold. ½ kg leaves are boiled in 7 kg water till the volume has been reduced to ½ kg and the decoction stored in a bottle. ½ chatak of the decoction is to be taken thrice daily. To expedite delivery. Whole plant is held in front of the forehead or in front of the nose and cut into pieces immediately during delivery. Note that if the cutting process is delayed, the uterus may come out with the newborn.
26	*Clerodendrum viscosum* Vent.	Lamiaceae	Bhatir gach	Top of young stem, root	Waist pain. Roots are tied with a string to the waist. Intermittent fever, flatulency. ½ chatak (chatak is a local measure approximating 62.5g) juice obtained from macerated top of young stems is taken thrice. The juice is taken once for flatulency.
27	*Leucas aspera* (Willd.) Link	Lamiaceae	Dondo kolosh	Leaf stalk, leaf	Snake bite. Snake bitten persons are orally administered juice obtained from macerated from leaf stalks. Coughs. Juice from macerated leaves is taken with honey.
28	*Pogostemon parviflorus* Benth.	Lamiaceae	Danob chechano	Leaf	Crying of small children. 10 drops of juice obtained from macerated leaves are given to children; alternately, juice is mixed with mustard oil and rubbed onto children's body.
29	*Asparagus racemosus* Willd.	Liliaceae	Shotomul	Root	Burning sensations in stomach, burning sensation in soles of feet, stomach pain, hot feeling in body, to induce sleep. Juice obtained from macerated roots is taken thrice. Alternately, crushed roots are taken.
30	*Hibiscus rosa sinensis* L.	Malvaceae	Joba phooler gach	Leaf	Spermatorrhea. Leaves are squeezed till slippery and then taken with sugarcane molasses for 1 week.
31	*Tiliacora acuminata* Miers	Menispermaceae	Sham lota	Leaf	Cuts. Juice from macerated leaves is applied to cuts.
32	*Ficus heterophylla* L.f.	Moraceae	Bhui baula	Leaf	Severe pain. Leaves are crushed with camphor and applied to affected areas.
33	*Moringa oleifera* Lam.	Moringaceae	Shojne gach	Leaf	Diabetes, frequent urination. Leaves are crushed and taken. Alternately, leaves are fried in a little oil along with salt and hot peppers and eaten.

Table 1: Continue

34	*Musa sapientum* L.	Musaceae	Bicha kola	Base	Body ache, headache, insomnia, to prevent hair loss. The plant (*Musa sapientum*) is cut at the base and a hole made in the base, which then by itself fills up with water (possibly plant sap and water). The water is taken and mixed with whole plant of *Ipomoea mauritiana* and sesame oil. One teaspoonful of dhoop (powder of *Canarium euphyllum* bark) is added and the decoction thoroughly mixed. The mixture is taken 2-3 times.
35	*Psidium guajava* L.	Myrtaceae	Peyara gach	Bud, fruit	To strengthen teeth, dysentery. Buds are chewed and eaten to strengthen teeth. Fruits are chewed and eaten to stop dysentery.
36	*Piper longum* L.	Piperaceae	Pipul	Leaf, fruit	Dull feeling in the head due to formation of mucus, mucus. For treatment of dull feeling in the head due to mucus, fruits of *Piper longum* are sliced and taken with leaves of *Piper betle.* For treatment of mucus, juice obtained from macerated leaves is taken thrice daily. Note that the juice is slightly hot in taste. Headache or to keep head cool, constipation, bloating. Juice obtained from squeezed leaves is taken 2-3 times.
37	*Glycosmis pentaphylla* (Retz.) Corr.	Rutaceae	Mechwak gach, Aishtel gach	Whole plant	To remove fear. Whole plant is uprooted in seven tries on seven consecutive days. To cleanse teeth, bleeding from gums. A stem of the plant is slightly chewed till it is soft and then used as a toothbrush. Note that other toothpastes or brush cannot be used while this plant is in use.
38	*Scoparia dulcis* L.	Scrophulariaceae	Misri danar gach	Leaf, top of plant, root	Appetite stimulant, diabetes, dysentery. ½ chatak of juice obtained from macerated leaves is taken three times. For dysentery, if the above procedure does not work, crushed top of stems are orally administered with mustard oil. Dysentery. Young leaves are chewed for their juice, which is slightly sweet.
39	*Smilax zeylanica* L.	Smilacaceae	Kata kumra	Top of young stems	Dysentery, to improve memory. Top of young stems are chewed and the juice taken. This is done thrice. Note that the juice is slightly bitter in taste.
40	*Solanum torvum* Swartz	Solanaceae	Tith baegun	Fruit	Skin infections (used as both therapeutic and preventive). For preventive purposes, fruits are fried in oil and taken with rice like a vegetable. For therapeutic purposes, unripe or ripe fruits are warmed in mustard oil and applied to affected areas.
41	*Centella asiatica* (L.) Urb.	Umbelliferae	Thankuni	Leaf	Blood dysentery (symptoms: mucus and blood with stool). ½ chatak juice obtained from macerated leaves is taken thrice daily.
42	*Diplazium esculentum* (Retz.) Sw.	Woodsiaceae	Dheki shak	Root, leaf	Skin disorders. Macerated roots are applied to affected areas. Dysentery in cattle or humans, diarrhea in cattle. 250g juice obtained from macerated root is fed to cattle three times for cattle dysentery. 50g juice obtained from macerated root is fed three times for human dysentery. Juice obtained from macerated leaves is given to cattle for cattle diarrhea. Human dysentery. ½ chatak of juice obtained from macerated leaves (if dysentery is not severe) or from macerated roots (if dysentery is severe) is taken three times.
43	*Cissus repanda* (Wight & Arn.) Vahl.	Vitaceae	Doyel-er-gach	Vine	Bone fracture in humans and cattle. Vines are crushed and applied to fractured area in the form of a poultice. The poultice is to be kept in place for 24 hours. Note that if the poultice is kept for more than 24 hours, there may be outgrowth of bones.
44	*Alpinia nigra* (Gaertn.) B. L. Burtt.	Zingiberaceae	Tarat gach	Leaf, root	Swelling of face in cattle, cattle lice. Roots are macerated till they assume the texture of clay, then warmed slightly and applied to face of cattle twice for swelling of face. Leaves are rubbed on cattle body to get rid of cattle lice.
45	*Curcuma ferruginea* Roxb.	Zingiberaceae	Bon ada,Bau ada	Rhizome	Sinusitis (symptoms: headache, mucus) in humans, cattle fever and cattle pox. For sinusitis, rhizomes are macerated till it forms like clay and then applied to the head twice daily. For cattle fever and cattle pox, 250g juice obtained from a combination of macerated rhizomes and 7 black peppers is orally administered.
46	*Curcuma longa* L.	Zingiberaceae	Holud	Portion of stem beneath the soil	Blood purifier, stomach disorders, to improve health and skin texture. ½ chatak juice obtained from macerated portion of stems beneath the soil is taken three times for purifying blood or for stomach disorders. The stem portion beneath the soil is macerated to a clayey form and applied to skin to improve texture.

of *Canarium euphyllum* bark. The decoction was then thoroughly mixed and taken orally. It is to be noted that the second formulation differed from the first only in addition of water or plant sap from cut trunks of *Musa sapientum*, the rest of the ingredients being the same. However, while the first was administered topically, the second was administered orally. Also while headache and insomnia seemed to be common ailments treated by both formulations, oral administration of the second formulation was also used for treatment of body ache, and to prevent hair loss.

We observed one instance where the formulation was neither topical in the sense of being rubbed onto the body or oral in the sense being swallowed and taken within the stomach. For treatment of gynecological problems, one Kaviraj simply advised tying the roots of *Cassia sophera* to the waist of the woman patient with a piece of string. Notably, one Kaviraj also prescribed tying the roots of *Clerodendrum viscosum* around the waist with a string to alleviate waist pain. Whether such procedure can really cure a patient or merely serves a placebo effect remains open to further scientific inquiries. A formulation may sometimes serve both therapeutic as well as preventive purposes. The leaves of *Momordica charantia* were taken as pills both to alleviate pain and infections due to chicken pox, as well taken as preventive measure for not contracting chicken pox. Notably, in this case the pills were taken during the spring season when chicken pox incidences occurs the most. In other areas of Bangladesh, the leaves and fruits of this plant are often prescribed for diabetic patients by the Kavirajes. The fruits of *Solanum torvum* were similarly used for both therapeutic as well as preventive purposes regarding occurrences of skin infections.

Five plants, namely *Enydra fluctuans*, *Bombax ceiba*, *Terminalia arjuna*, *Moringa oleifera*, and *Scoparia dulcis* were separately used by the Kavirajes for treatment of diabetes or diabetes-related symptoms like high blood sugar. The Kavirajes did not use modern diagnostic procedures for determination of blood sugar levels. Any patient, whose urine tasted sweet was considered to have diabetes, more so, if the patient was simultaneously suffering from weakness and was in general ill health. Diabetes has no modern cure. Since the Kavirajes had been using their formulations from time immemorial, it is worth looking into the scientific possibilities of discovery of novel anti-diabetic drugs from these plants.

One novel treatment prescribed by a Kaviraj was using the plant, namely *Glycosmis pentaphylla*, to remove fear. In this case, the whole plant was to be uprooted in seven tries on seven consecutive days. The plant is a small plant, so it can be uprooted in even less than seven tries provided the soil is soft. However, this probably was an incidence of instilling psychological confidence in a patient that he or she can achieve something, and in the process, relieving the patient of fear. Inquiries of both patients and the Kaviraj indicated that there was not set parameter for defining fear, the fear could be fear of enemies, fear of spirits, or even fear, which has no defined objects. It was a case of the patient merely complaining of being afraid, and then the above formulation would be prescribed for the patient.

A number of our previous studies have shown in details that quite a number of the medicinal plants used by the Kavirajes have found support from modern scientific research when tested for relevant pharmacological activities (Rahmatullah *et al*., 2010g; Biswas *et al*., 2011). The present study is no exception. Just to cite one instance, *Scoparia dulcis* - a medicinal plant used by the Kavirajes for treatment of diabetes has been cited quite frequently in the scientific literature for its anti-diabetic effects (Latha *et al*., 2004a,b; Pari and Latha, 2004; Pari *et al*., 2004; Latha and Pari, 2005; Pari and Latha, 2005; Pari and Latha, 2006; Latha *et al*., 2006; Latha *et al*., 2009; Beh *et al*., 2010). The plants obtained in the present survey thus present exciting potential for further scientific research leading to discovery of novel drugs. At the same time, further research highlighting the importance of these medicinal plants can spur conservation efforts to save these plants, many of which are facing endangerment because of encroaching human habitat.

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