

## ORIGINAL ARTICLES

### A Survey of Medicinal Plants used by Folk Medicinal Practitioners in Balidha village of Jessore District, Bangladesh

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#### ABSTRACT

Folk medicinal practitioners form the primary line of health-care among a substantial section of the rural and urban population of Bangladesh. These practitioners (Kavirajes) use a variety of medicinal plants to treat various ailments and possess considerable expertise on use of medicinal plants. Since the medicinal plants used by the Kavirajes can differ widely even between adjoining areas, it was the objective of the present study to conduct an ethnomedicinal survey among the Kavirajes of Balidha village situated in Jessore district in the southern part of Bangladesh. Informed consent was obtained of the Kavirajes and interviews were conducted with the help of a semi-structured questionnaire and the guided field-walk method. A total of 73 plant species distributed into 43 families were obtained from the Kavirajes. The Fabaceae family contributed the maximum number of plants (6) followed by the Rutaceae and the Solanaceae family with 4 plants each. The Apocynaceae, Asteraceae, Euphorbiaceae, Moraceae, Myrtaceae, and Zingiberaceae families contributed 3 plants per family. Leaves constituted the major plant part used (44.3%), followed distantly by roots (17.5%) and fruits (9.3%). Gastrointestinal disorders and sexual disorders formed the major disorders treated by the Kavirajes. 19 plants were used for treatment of gastrointestinal disorders and 17 plants for treatment of sexual disorders. 9 plants were used to treat pain and 7 plants for treatment of respiratory tract infections. 3 plants were used to treat diabetes. A perusal of the scientific literature showed that uses of several plants by the Kavirajes are validated by scientific studies on the pharmacological activities of the relevant plant species. Overall, the plants present considerable potential for further scientific studies leading to discovery of novel drugs.

**Key words:** Folk medicine, medicinal plants, Balidha village, Jessore, Bangladesh

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#### Introduction

Bangladesh has over 86,000 villages spread throughout the various regions of the country. The population is predominantly rural with agriculture and agricultural laborer forming the major occupations of the rural people. Although modern allopathic medicine is available in the country, it has yet to reach the rural people, who for the most part lack access to good allopathic doctors and modern medical facilities. Since the rural people have to travel considerable distances they often turn to folk medicinal practitioners who offer a cheaper mode of treatment for the various ailments suffered by the people. This practice has gone on for centuries. The folk medicinal practitioners, locally known as Kavirajes or Vaidyas practice a simplistic form of treatment with

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medicinal plants. Their knowledge of medicinal plants is usually kept confined to the practitioner and is passed on to an immediate member of the family or to a trusted disciple. The formulations are also simple being usually decoctions, paste or simply juice extracted from crushed or macerated whole plant or plant parts. In our ongoing ethnomedicinal surveys, we have observed considerable variations in the medicinal plant species used by the Kavirajes of even adjoining areas (Hossan *et al.*, 2010; Rahmatullah *et al.*, 2010; Nawaz *et al.*, 2009; Hanif *et al.*, 2009; Hossan *et al.*, 2009; Rahmatullah *et al.*, 2009a; Rahmatullah *et al.*, 2009b; Rahmatullah *et al.*, 2009c).

It has become quite clear from our findings that to get a comprehensive picture of the medicinal plants used by the Kavirajes, surveys need to be made particularly of the village Kavirajes, who form the first tier of folk medicinal practices. Such surveys are important because it has been reported that a considerable number of modern drugs owe their discovery to the indigenous medical practices (Cotton, 1996). The early history of modern medicine also contains descriptions of plant-derived phytochemicals, many of which are still in use. Some examples are the discovery of cardiotonics in foxglove, salicylic acid in willow bark, and morphine in poppies (Rishton, 2008). A recent review has shown that approximately 25% of modern medications have been plant derived, while 75% of new drugs against infectious diseases that have arrived between 1981 and 2002 originated from natural sources (Bedoya *et al.*, 2009). It was the objective of the present study to conduct an ethnomedicinal survey among the Kavirajes of Balidha village in Jessore district, which falls in the southern part of Bangladesh.

## Materials and Methods

There were two practicing Kavirajes in the village of Balidha in Jessore district. The Kavirajes were interviewed together at their request. Informed consent was obtained from the Kavirajes prior to the interviews. The Kavirajes were explained as to the purpose of the visit and consent obtained to disseminate the results obtained in national and international publications. 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 on guided field-walks through spots from where they collected their medicinal plants, pointed out the plants, gave their local names, and described their uses. In Balidha, this work was facilitated for both Kavirajes maintained nurseries within their homesteads from they used medicinal plants for treatment. This was because as they explained medicinal plants were becoming hard to find in the wild. Interviews were conducted in the Bangla language, which was spoken by both interviewers and Kavirajes. Plant specimens were collected and dried in the field and later brought back to Dhaka for complete identification at the Bangladesh National Herbarium.

## Results and Discussion

A total of 73 plant species were obtained from the Kavirajes, which was identified by the Herbarium as belonging to 43 families. The results are summarized in Table 1. The Fabaceae family contributed the highest number of plants followed by the Rutaceae family and the Solanaceae family with 4 plants per family. The Apocynaceae, Asteraceae, Euphorbiaceae, Moraceae, Myrtaceae, and Zingiberaceae families contributed 3 plants per family. It was observed that not all the plants were wild. Some of the plants were regularly cultivated in the village homesteads for personal consumption and for commercial purposes. These plants included *Mangifera indica*, *Spondias pinnata*, *Annona squamosa*, *Momordica charantia*, *Momordica cochinchinensis*, *Tamarindus indica*, *Artocarpus heterophyllus*, *Moringa oleifera*, *Psidium guajava*, *Syzygium cumini*, *Syzygium samarangense*, *Zizyphus jujuba*, *Citrus aurantifolia*, *Citrus grandis*, *Manilkara zapota*, *Curcuma longa*, and *Zingiber officinale*. Most of the plants were cultivated for their fruits, which were eaten directly. However, the fruits of *Momordica charantia* and *Momordica cochinchinensis* were cooked and eaten as vegetable and the rhizomes of *Curcuma longa* and *Zingiber officinale* were used as spices.

Leaves constituted the major plant part used (44.3%), followed by roots (17.5%) and fruits (9.3%). The results are shown in Table 2. Depending on the ailment, leaves were used alone or in combination with other plant parts. The leaves of *Hemigraphis hirta* were used alone for treatment of headache and for passing of semen in urine. On the other hand, the leaves of *Justicia adhatoda* were combined with barks for treatment of fever, cold, and coughs. A single plant part may be used to treat more than one ailment as was the case mentioned above with *Hemigraphis hirta*. The Kavirajes were reluctant to give exact formulations on grounds that this would damage their professional income if known outside. However, they did mention that most formulations were either decoctions, pastes or extracted juices from crushed or macerated whole plant or plant part(s), which depending on the ailment was administered either orally or topically. Ailments where administrations were usually topical included skin infections, eye infections, ear infections, and cuts and wounds accompanied by bleeding.

**Table 1:** Medicinal plants used by Kavirajes of Balidha village in Jessore district, Bangladesh.

Botanical name	Family	Local name	Parts used	Ailments treated
<i>Hemigraphis hirta</i> (Vahl) T. Anderson	Acanthaceae	Buripal	Leaf	Headache, passing of semen in urine.
<i>Justicia adhatoda</i> L.	Acanthaceae	Bausher ata	Leaf, bark	Fever, cold, coughs.
<i>Sansevieria trifasciata</i> Prain	Agavaceae	Shaper gach	Whole plant, leaf	Snake repellent.
<i>Mangifera indica</i> L.	Anacardiaceae	Aam gach	Bark, flower, fruit	Dysentery, to prevent graying of hair.
<i>Spondias pinnata</i> (J.G. König ex L. f.) Kurz.	Anacardiaceae	Amra	Bark	Dysentery with white mucus.
<i>Annona squamosa</i> L.	Annonaceae	Ata gach	Seed	Aphrodisiac.
<i>Centella asiatica</i> (L.) Urb.	Apiaceae	Thankuni	Whole plant, leaf	Dysentery, cataract, stomach problems.
<i>Allamanda cathartica</i> L.	Apocynaceae	Koilki phool gach	Root	To provide cooling effect in body.
<i>Hemidesmus indicus</i> R.Br.	Apocynaceae	Anontomul	Leaf	Any type of disease.
<i>Tabernaemontana divaricata</i> (L.) R. Br. ex Roemer & J.A. Schultes	Apocynaceae	Kath mollika	Leaf	Sedative.
<i>Typhonium trilobatum</i> (L.) Schott	Araceae	Ghatkol	Leaf stem	Blood dysentery.
<i>Aristolochia indica</i> L.	Aristolochiaceae	Iche gach	Root	Snake bite.
<i>Calotropis gigantea</i> (L.) Ait.f. pain due to trauma.	Asclepiadaceae	Akondo gach	Leaf, sap	Gingivitis, to stop bleeding from cuts and wounds,
<i>Blumea lacera</i> DC	Asteraceae	Bon-mulo	Root	Helminthiasis, passing of semen in urine.
<i>Mikania cordata</i> (Burm.f.) B. L. Robinson	Asteraceae	Jarmany lota	Leaf, stem	To provide a cooling effect.
<i>Spilanthes acmella</i> (L.) Murray	Asteraceae	Nak phool	Flower	Tooth ache.
<i>Bombax ceiba</i> L.	Bombacaceae	Shimul gach	Root	Aphrodisiac, passing of semen with urine.
<i>Opuntia dillenii</i> (Ker-Gawl.) Haw.	Cactaceae	Foni-monsha	Leaf	Headache, menstrual pain, pain in leg, passing of semen in urine.
<i>Chenopodium ambrosioides</i> L.	Chenopodiaceae	Agnishwar	Leaf	Acidity, burns.
<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn.	Combretaceae	Arjun	Bark	Heart disorders, indigestion.
<i>Commelina benghalensis</i> L.	Commelinaceae	Kengra gach	Leaf	Pain.
<i>Ipomoea mauritiana</i> Jacq.	Convolvulaceae	Bhuey kumra	Rhizome	Any type of disease.
<i>Kalanchoe pinnata</i> (Lam.) Pers.	Crassulaceae	Pathorkuchi pata	Leaf	Stomach ache.
<i>Momordica charantia</i> L.	Cucurbitaceae	Korla pata	Leaf	Infections.
<i>Momordica cochinchinensis</i> (Lour.) Spreng.	Cucurbitaceae	Boro kakroal, Karol gach	Seed, root	Rheumatism (seed), pain, abscess (root).
<i>Cyperus kyllingia</i> Endl. displacement of ovary in women.	Cyperaceae	Badlar shuta	Root	Aphrodisiac, urinary problems,
<i>Diospyros blancoi</i> A. DC.	Ebenaceae	Gab gach	Seed	Aphrodisiac.
<i>Acalypha indica</i> L. passing of semen with urine.	Euphorbiaceae	Muktajhuri	Leaf, root	Aphrodisiac, to ease delivery,
<i>Jatropha gossypifolia</i> L.	Euphorbiaceae	Laal kocha	Sap	Abscess in hip.
<i>Ricinus communis</i> L.	Euphorbiaceae	Bherna gach	Seed	Arthritis, rheumatism.
<i>Abrus precatorius</i> L.	Fabaceae	Shet kunch	Leaf, root	Aphrodisiac, arthritis, rheumatism.
<i>Cassia alata</i> L.	Fabaceae	Daoder gach	Leaf	Ringworm.
<i>Clitoria ternata</i> L.	Fabaceae	Nilkontho phool	Leaf, root	Sexual problems.
<i>Desmodium gangeticum</i> (L.) DC.	Fabaceae	Shalpan	Leaf, root	Chest pain, sexual problems.
<i>Erythrina variegata</i> L.	Fabaceae	Faila mandar	Leaf	Stomach ache in children.
<i>Tamarindus indica</i> L.	Fabaceae	Tetul gach	Leaf, flower	Eye diseases, cataract, rheumatism, dysentery.
<i>Flacourtia indica</i> (Burm.f.) Merr.	Flacourtiaceae	Bujir gach, Kata gach	Leaf	Stomach ache.
<i>Ocimum sanctum</i> L.	Lamiaceae	Tulshi	Leaf	Cough, aphthous ulcer, dysentery, excessive sweating.
<i>Barringtonia racemosa</i> (L.) Roxb.	Lecythidaceae	Moha shomudro gach	Leaf	Snake bite, snake repellent.
<i>Asparagus racemosus</i> Willd.	Liliaceae	Shotomul	Leaf, root	Diabetes, heart diseases.
<i>Crinum asiaticum</i> L.	Liliaceae	Go-roshun	Leaf	Dysentery in cattle.
<i>Punica granatum</i> L.	Lythraceae	Dalim gach	Leaf	Blood dysentery.
<i>Hibiscus rosa sinensis</i> L.	Malvaceae	Rokto joba	Leaf, fruit	Menstrual irregularities.
<i>Sida cordifolia</i> L.	Malvaceae	Mithe berela	Leaf, root	Dysentery (presence of mucus in stool)
<i>Azadirachta indica</i> A. Juss.	Meliaceae	Neem gach	Leaf, bark	Considered useful in any type of disease.
<i>Artocarpus heterophyllus</i> Lam.	Moraceae	Kathal	Fruit, sap	Vitamin supplementation.
<i>Ficus benghalensis</i> L.	Moraceae	Bot gach	Bark, sap	To reduce obesity, nose bleed, sexual weakness.
<i>Ficus racemosa</i> L.	Moraceae	Job dumur	Fruit	Stomach ache.
<i>Moringa oleifera</i> Lam.	Moringaceae	Sajna gach	Skin of fruit	Rheumatism, ear disease, headache.
<i>Psidium guajava</i> L.	Myrtaceae	Piyara gach	Leaf	Gastric problems, cuts and wounds.
<i>Syzygium cumini</i> (L.) Skeels	Myrtaceae	Jaam gach	Leaf	Diabetes.
<i>Syzygium samarangense</i> (Blume) Merr. & L. M. Perry	Myrtaceae	Jamrul	Leaf	Cold, itch, waist pain.
<i>Piper chaba</i> W. Hunter	Piperaceae	Chui gach	Bark	Coughs.
<i>Ziziphus jujuba</i> Mill.	Rhamnaceae	Kul boroi	Leaf	Hoarseness of voice.
<i>Rosa damascena</i> Mill.	Rosaceae	Golap	Flower	Appetite stimulant.
<i>Anthocephalus chinensis</i> (Lam.) A. Rich. ex Walp.	Rubiaceae	Kodom phool gach	Leaf	Elephantiasis (hydrocele), any problem of scrotum.
<i>Paederia foetida</i> L.	Rubiaceae	Gondho patali	Leaf	Indigestion, stomach ache.
<i>Aegle marmelos</i> (L.) Corr.	Rutaceae	Bael	Leaf, root, fruit	Excessive blood during menstruation, diseases of the scrotum.
<i>Citrus aurantifolia</i> (Christm.) Swingle	Rutaceae	Lebu gach	Fruit	Sexual stimulant.
<i>Citrus grandis</i> (L.) Osbeck	Rutaceae	Jambura gach	Root	Aphrodisiac.
<i>Murraya koenigii</i> (L.) Spreng	Rutaceae	Neem bhoot	Leaf	To cure fear of ghosts.
<i>Manilkara zapota</i> (L.) P. Royen	Sapotaceae	Chobeda gach	Fruit	Vitamin supplementation.
<i>Datura metel</i> L.	Solanaceae	Dhutra	Sap	Head lice infestation.
<i>Physalis micrantha</i> Link	Solanaceae	Tulo tepa	Leaf	Tonsillitis.
<i>Solanum torvum</i> Swartz	Solanaceae	Konthikari	Fruit	Chicken pox.
<i>Withania somnifera</i> (L.) Dunal	Solanaceae	Ashwagondha	Leaf, root	Allergy, aphrodisiac.
<i>Abroma augusta</i> L.f.	Sterculiaceae	Ulot kombol	Leaf	Astringent.
<i>Clerodendrum viscosum</i> Vent.	Verbenaceae	Vati gach	Leaf	Helminthiasis.
<i>Nyctanthes arbor tristis</i> L.	Verbenaceae	Sheuli phool gach	Leaf, flower	Cough.
<i>Cissua quadrangularis</i> L.	Vitaceae	Har-bhangar gach	Whole plant	Bone fracture.
<i>Curcuma longa</i> L.	Zingiberaceae	Holud gach	Root	Excessive bile secretion.
<i>Curcuma zedoaria</i> (Christm.) Roscoe	Zingiberaceae	Choti gach	Root	Diabetes, constipation, indigestion.
<i>Zingiber officinale</i> Roscoe	Zingiberaceae	Ada	Rhizome	Breathing problem, coughs.

Ethoveterinary applications are denoted in bold lettering.

**Table 2:** Percent use of whole plant or plant parts by the Kavirajes of Balidha village.

Plant part	Percent use (%)
Whole plant	3.1
Leaf	44.3
Root	17.5
Stem	2.1
Bark	7.2
Flower	5.2
Fruit	9.3
Seed	4
Rhizome	2.1
Sap	9.3

**Table 3:** Relevant scientific findings on several medicinal plants used by Kavirajes of Balidha village.

Plant	Ailments treated by the Kavirajes	Relevant scientific findings
<i>Justicia adhatoda</i> L.	Fever, cold, coughs.	Anti-inflammatory activities of alkaloids isolated from the plant (Chakraborty <i>et al.</i> , 2001); anti-tussive effect of plant extract against mechanical or chemical stimulation-induced coughing in animals (Dhuley, 1999); isolation of a bronchodilator alkaloid, vasicinone from the plant (Amin and Mehta, 1959).
<i>Centella asiatica</i> (L.) Urb.	Dysentery, stomach problems.	Healing effects of plant extract and a phytochemical (asiaticoside) isolated from the plant against acetic acid-induced gastric ulcers in rats (Cheng <i>et al.</i> , 2004); protective action of the plant against ethanol-induced gastric mucosal lesions in rats (Cheng and Koo, 2000).
<i>Calotropis gigantea</i> (L.) Ait.f.	Pain due to trauma.	Antinociceptive activity of plant latex in mice (Soares <i>et al.</i> , 2005).
<i>Terminalia arjuna</i>	Heart disorders.	Protective effects of plant bark against Doxorubicin-induced cardiotoxicity (Singh <i>et al.</i> , 2008); significant inotropic and hypotensive effect of bark, also increases coronary artery flow and protects myocardium against ischemic damage, reviewed by Dwivedi (2007); protection of rabbit heart by bark against ischemic-reperfusion injury (Gauthaman <i>et al.</i> , 2005); cardioprotective effect of alcoholic extract of bark in an <i>in vivo</i> model of myocardial ischemic-reperfusion injury (Karthikeyan <i>et al.</i> , 2003); efficacy of the plant in chronic stable angina (Dwivedi and Gupta, 2002; Bharani <i>et al.</i> , 2002); beneficial effects of bark of the plant in isolated ischemic-reperfused rat heart (Gauthaman <i>et al.</i> , 2001); beneficial effects in coronary artery disease (significant reductions in anginal frequency) (Dwivedi and Jauhari, 1997).
<i>Moringa oleifera</i> Lam.	Rheumatism, headache.	Phytochemicals reported from plant having anti-inflammatory and antinociceptive activities, which may prove useful against rheumatic pain and other pain (Sashidhara <i>et al.</i> , 2009).
<i>Syzygium cumini</i> (L.) Skeels	Diabetes.	Inhibition by aqueous leaf extract of adenosine deaminase activity and reduction of glucose levels in hyperglycemic patients (Bopp <i>et al.</i> , 2009); increase of body weight and decrease of blood sugar levels by ethanolic extract of seeds in alloxan diabetic albino rats (Singh and Gupta, 2007); hypoglycemic effect obtained with defatted seeds and water soluble fiber from the seeds in alloxan diabetic rats (pandey and Khan, 2002).
<i>Cissus quadrangularis</i> L.	Bone fracture.	A number of studies on the healing effect of the plant on bone fracture (Chopra <i>et al.</i> , 1976; Udupa and Prasad, 1964a,b; Singh and Udupa, 1962; Udupa, <i>et al.</i> , 1961).

Gastrointestinal infections received the maximum number of citations (19 plants) followed by sexual disorders (17 plants). That gastrointestinal infections are common in rural Bangladesh is a well-known fact due to absence of proper sanitary conditions and because of the villager's habit of drinking water without boiling or filtration. It is noteworthy that even with the advent of tube wells, the villagers mostly use surface water obtained from ponds or rivers for drinking and cooking purposes. What was interesting was the number of plants for sexual disorders, a considerable number of them being used as aphrodisiacs. The Kavirajes treated rheumatism with 5 plants and diabetes with 3 plants. Notably both these diseases cannot be cured with modern medicine and are widely prevalent throughout the world. Three plants, namely *Sansevieria trifasciata*, *Aristolochia indica*, and *Barringtonia racemosa* were used for treatment of snake bites or as snake repellents. The villagers would either plant them around their homesteads or scatter leaves and branches of these plants around their homes, and particularly their bedrooms. What was also interesting was that 3 plants namely, *Hemidesmus indicus*, *Ipomoea mauritiana*, and *Azadirachta indica* were used by the Kavirajes for all types of diseases. The plants could be used in conjunction with any other plant where they would produce a synergistic effect. One plant (*Crinum asiaticum*) had ethnoveterinary use being used to treat dysentery in cattle. Another interesting use of a plant (*Ficus benghalensis*) was to reduce obesity. In this case, a decoction of the bark and sap was administered on a regular basis. The plant could prove to be of excellent value for obesity is one of the leading causes of hypertension, heart diseases, and diabetes (Muller-Wieland *et al.*, 2010), besides reducing physical mobility.

### Discussion:

Knowledge of folk medicinal uses of medicinal plants can prove valuable for further scientific studies in the quest for newer and more efficacious drugs. Seven medicinal plants obtained in the present study showed validation of their uses through reported relevant pharmacological activities, as shown in Table 3. This finding only highlights the importance for conducting further scientific studies on the remaining plants. It is expected that newer studies can not only lead to discovery of novel compounds from these plants, which can prove useful in medicine but also raise public awareness on the conservation and sustainable uses of these plants.

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