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ORIGINAL ARTICLE

A Survey on the Use of Medicinal Plants by Folk Medicinal Practitioners in Five Villages of Boalia Sub-district, Rajshahi District, Bangladesh

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ABSTRACT

An ethnomedicinal survey was carried out in the villages of Muktarpur, Shyampur, Belgharia, Naodar, and Yusufpur situated in Boalia sub-district, Rajshahi district, Bangladesh. The objective of this survey was to find out about medicinal plants used by the folk medicinal practitioners (Kavirajes) of the five villages to treat various ailments. Informed consent was obtained from the Kavirajes prior to the survey. Interviews were conducted with the help of a semi-structured questionnaire and the guided field-walk method, where the Kavirajes took the interviewers to places from where they collected their medicinal plants, pointed out the plants, and described their uses. It was observed that the Kavirajes used a total of 48 plants distributed into 30 families. The Fabaceae family contributed 5 plants, followed by the Euphorbiaceae and Meliaceae families with 4 plants each, and the Combretaceae and Lamiaceae families with 3 plants each. Of the 48 medicinal plants used, 13 plants were cultivated for homestead use or commercial purposes. Leaves constituted the major plant part used (27.6%), followed by fruits (15.3%), and seeds (14.3%). Other plant parts administered for treatment included whole plant, roots, stems, barks, flowers, and tubers. Gastrointestinal disorders made up the major ailment treated by the Kavirajes, followed by skin disorders and respiratory tract disorders. The Kavirajes also treated ailments like reproductive disorders, hepatic disorders, cardiovascular disorders and hypertension, sexually transmitted diseases, cancer, helminthiasis, edema, diabetes, rheumatoid arthritis, epilepsy, cholera, tuberculosis, malaria, urinary tract disorders, nerve disorders, typhoid, eye disorders, leprosy, pain, hernia, goiter, anemia, cuts and wounds, and piles. Several of the above disorders are difficult to cure or incurable with modern allopathic medicines. These ailments include cancer, diabetes, rheumatoid arthritis, and epilepsy. That the Kavirajes have been treating these ailments for years points to considerable patient satisfaction in obtaining a cure. Thus the plants used by the Kavirajes present considerable potential for further scientific analysis and the discovery of better medicines.

Key words: Folk medicine, medicinal plants, Boalia, Rajshahi, Bangladesh

Introduction

Folk medicine, otherwise known as traditional, complementary or alternative medicine, co-exists with modern allopathic medicine in every country of the world. In fact, a number of important drugs in use in allopathic medicine owe their existence to observation of medicinal practices of indigenous peoples (Cotton,

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C.M., 1996). To name only a few of the important drugs in use today, aspirin, atropine, ephedrine, digoxin, morphine, quinine, reserpine and tubocurarine serve as examples (Gilani, A.H. and A.U. Rahman, 2005). In recent years, traditional medicine has received renewed interest from scientists because of the advent of multi-drug resistant microorganisms, serious side-effects obtained with a number of synthetic drugs, and because of the incurable nature of a number of diseases, where modern medicine has failed to make any positive impact.

Bangladesh has a long history of various forms of traditional medicine. The Ayurvedic and Unani systems of medicine has been practiced for hundreds of years and have well developed systems and procedures for preparations, formulations, and dosages. Another variety of traditional medicine - that of folk medicine is practiced throughout Bangladesh among various tribes and local population. The folk medicinal practitioners (known as Kavirajes or Vaidyas) use medicinal plants almost exclusively for treatment of various ailments. Their preparations are simple and most often, a single plant part or plant is used for treatment of a single ailment. Formulations usually consist of decoctions, paste, or juice of the plant, which is orally administered or topically applied depending on the ailment. Since one of the objectives of modern science is to search for drugs among the medicinal plants of different countries, this folk medicinal data can prove to be a valuable source for obtaining first-hand information on medicinal plants used by Kavirajes for centuries. This avoids the complication of identifying the principal active constituent among the dozens or more plants that are used for treatment of any single ailment in the Ayurvedic or Unani medicinal systems.

Bangladesh is a country of more than 86,000 villages, each village usually being serviced by one or more Kavirajes, who form the primary health-care providers to the rural population. Each Kaviraj has his unique repertoire of medicinal plants, which he or she has gained through cumulative knowledge acquired by successive generations in the family. To obtain a primary idea about the folk medicinal practices of Bangladesh, one has therefore to collect data from individual Kavirajes for medicinal plant uses can vary widely between even Kavirajes of adjoining villages. We have been collecting ethnomedicinal data from village and tribal Kavirajes for the last two years with the aim of establishing a comprehensive data base of folk medicinal uses of medicinal plants (Rahmatullah, M., 2009; Rahmatullah, M., 2009; Rahmatullah, M., 2009; Nawaz, A.H.M.M., 2009; Rahmatullah, M., 2010; Hossan, M.S., 2010). The objective of this present study was to conduct an ethnomedicinal survey among the Kavirajes of Muktarpur, Shyampur, Belgharia, Naodar, and Yusufpur villages of Boalia sub-district in Rajshahi district, Bangladesh.

Materials and Methods

Rajshahi district lies in the north-west of Bangladesh. The climate of this district is characterized by monsoons, moderate temperature, high humidity and moderate rainfall. Boalia sub-district is one of the thirteen sub-districts of Rajshahi district. The villages of Muktarpur, Shyampur, Belgharia, Naodar, and Yusufpur fall within Boalia sub-district. The main occupation of the village population is agriculture and agricultural laborer. To access any modern health facilities or visit a specialized doctor, the people of the villages has to go to Rajshahi city. Most people prefer to treat their ailments through visiting the local Kavirajes as a first-stop measure. Kaviraj Nitai Chandra (who was the main source of our information) and his associates are well known in the above-mentioned villages and even practices in Rajshahi city, where he also administers to a substantial number of patients.

Informed consent was obtained from the Kavirajes prior to commencement of survey. Interviews were carried out with the help of a semi-structured questionnaire and the guided filed-walk method as described by Martin (1995) and Maundu (1995). In this method, the Kavirajes took the interviewers on field-walks through areas from where they collected their medicinal plants, pointed out the plants, and described their uses. All information obtained including the local names of plants was cross-checked with the Kavirajes in later sessions. Plant specimens were collected and dried in the field and brought back to Bangladesh National Herbarium at Dhaka for complete identification.

Results

The Kavirajes of the five villages of Boalia sub-district used 48 medicinal plants distributed into 30 families for treatment of various ailments. The Fabaceae family comprised the largest family contributing 5 plants, followed by the Euphorbiaceae and Meliaceae families with 4 plants each. The Combretaceae and Lamiaceae families contributed 3 plants per family. The results are summarized in Table 1.

The various plant parts used included whole plant, leaves, roots, stems, barks, fruits, seeds, flowers, and tubers. Leaves constituted the major plant part used (27.6% of total uses), followed by fruits (15.3%), seeds (14.3%), whole plant (13.3%), roots (9.2%), flowers (6.1%), stems (2.0%), and tubers (2.0%). In most cases, juice obtained from crushed plants or plant parts were administered either orally or topically depending on the

Table 1: Medicinal plants used by the Kavirajes of Muktarpur, Shyampur, Belgharia, Naodar, and Yusufpur villages in Boalia sub-district, Rajshahi district, Bangladesh

Sl. No.	Plant Name	Family	Local name	Utilized part	Ailments and formulations
1	*Tetragonia tetragonoides* (Pall.) Kuntze	Aizoaceae	Shonta	Whole plant	Tonic, colic, eye diseases.
2	*Aloe vera* (L.) Burm.f.	Aloaceae	Ghrit-kumari	Whole plant	Laxative, appetizer, alopecia, asthma, tuberculosis.
3	*Amaranthus spinosus* L.	Amaranthaceae	Kanta-khudurey	Whole plant	Gonorrhea, laxative, expectorant.
4	*Mangifera indica* L.	Anacardiaceae	Aam	Leaf, fruit, seed	Eye diseases, antidote to poison, edema, cholera, dysentery, diabetes.
5	*Annona squamosa* L.	Annonaceae	Ata	Leaf, fruit, seed	Abortifacient, helminthiasis, colic, itch.
6	*Lasia spinosa* (L.) Thwaites	Araceae	Kata-kochu	Tuber	Edema, piles, constipation.
7	*Borassus flabellifer* L.	Arecaceae	Tal	Root, fruit	Cancer, edema, epilepsy, boil.
8	*Cocos nucifera* L.	Arecaceae	Dab	Root, fruit, fruit juice	Syphilis, jaundice, diabetes, cholera.
9	*Blumea lacera* DC	Asteraceae	Kukur-sungha	Leaf, flower	Edema, colic, helminthiasis.
10	*Vernonia patula* (Dryand.) Merr.	Asteraceae	Jowhanti	Whole plant	Impotency, helminthiasis, fever, coughs.
11	*Cannabis sativa* L.	Cannabaceae	Bhang	Leaf, root	Cancer, hypertension, antidote to poison, itch, rheumatoid arthritis.
12	*Carica papaya* L.	Caricaceae	Pepe	Whole plant	Tuberculosis, constipation, helminthiasis, cooling, leucoderma, ecbolic (a drug that increases uterine contractions and facilitates delivery), fever.
13	*Terminalia arjuna* (Roxb . ex DC.) Wight & Arn.	Combretaceae	Arjun	Leaf, bark, fruit	Hypertension, anemia, leprosy.
14	*Terminalia belerica* (Gaertn.) Roxb.	Combretaceae	Bohera	Leaf, bark, fruit	Constipation, sexual diseases.
15	*Terminalia chebula* Retz.	Combretaceae	Horitoki	Leaf, bark, seed	Asthma, heart diseases, eye diseases, itch, night blindness.
16	*Kalanchoe pinnata* (Lam.) Pers.	Crassulaceae	Patharchuni	Leaf, stem, bark	Headache, asthma, stone dissolving in any part of the body.
17	*Coccinia grandis* (L.) J. Voigt	Cucurbitaceae	Telakucha	Leaf, root	Diabetes, edema, eye diseases.
18	*Momordica charantia* L.	Cucurbitaceae	Korla	Root, seed, fruit	Cancer, night blindness, rheumatoid arthritis, helminthiasis.
19	*Dioscorea bulbifera* L.	Dioscoreaceae	Lota-bori	Root, fruit	Goiter, hernia, tumor, carminative.
20	*Acalypha indica* L.	Euphorbiaceae	Phool-jhuri	Leaf, flower	Helminthiasis, colic, vomit-inducing.
21	*Codiaeum variegatum* (L.) A.Juss.	Euphorbiaceae	Tri-phorthok	Whole plant	Syphilis, coughs, wounds, eye diseases.
22	*Euphorbia milii* 'Lutea' Hort	Euphorbiaceae	Dodhi-kata	Whole plant	Eczema, sexual diseases, diarrhea.
23	*Phyllanthus emblica* L.	Euphorbiaceae	Amloki	Leaf, fruit	Appetizer, gonorrhea, toothache, itch.
24	*Dalbergia sissoo* Roxb. ex DC.	Fabaceae	Shishu	Leaf, bark, seed	Eczema, sexual diseases, leucoderma.
25	*Mimosa pudica* L.	Fabaceae	Lajjaboti	Leaf, root, flower	Diarrhea, hypertension, antidote to poison.
26	*Saraca indica* L.	Fabaceae	Ashok	Leaf, bark	Sexual diseases, analgesic, appetizer.
27	*Cassia tora* L.	Fabaceae	Araj	Leaf, seed	Helminthiasis, liver diseases, typhoid.
28	*Tamarindus indica* L.	Fabaceae	Tetul	Leaf, fruit, seed	Diabetes, appetizer, jaundice, eczema, conjunctivitis.
29	*Hyptis suaveolens* (L.) Poit.	Lamiaceae	Tokma	Leaf, seed	Liver diseases, cancer, constipation.
30	*Ocimum gratissimum* L.	Lamiaceae	Seth-tulshi	Whole plant	Heart diseases, eye diseases, cooling.
31	*Ocimum tenuiflorum* L.	Lamiaceae	Krishna-tulshi	Whole plant	Bronchitis, liver diseases, cancer.
32	*Punica granatum* L.	Lythraceae	Dalim	Leaf, fruit, seed	Diabetes, heart diseases, dysentery, stimulant, tumor.
33	*Aphanamixis polystachya* (Wall.) R. Parker	Meliaceae	Pitraj	Leaf, bark, seed	Rheumatoid arthritis, analgesic, itch, antidote to poison.
34	*Azadirachta indica* A. Juss.	Meliaceae	Neem	Leaf, bark	Cancer, skin diseases, helminthiasis, wounds, diabetes, rheumatoid arthritis.
35	*Cereus grandiflorus* (L.) P.Mill.	Meliaceae	Kuth-raaz	Whole plant	Tonic, nervous disorders, heart diseases.
36	*Swietenia mahagoni* (L.) Jacq.	Meliaceae	Mahogany	Leaf, bark, seed	Impotency, malaria, appetizer.
37	*Ludwigia hyssopifolia* (G. Don) Exell apud A.R. Fernandes	Onagraceae	Modho-naow	Whole plant	Sedative, skin diseases, dysentery.
38	*Oxalis lobata* Sims	Oxalidaceae	Amrul	Whole plant	Dysentery, diarrhea, coughs, stimulant.
39	*Phyllanthus reticulatus* Poir.	Phyllanthaceae	Chitki	Leaf, bark	Edema, constipation, cooling.

Table 1: Continue

40	*Piper cubeba* L.f.	Piperaceae	Kabab-chini	Leaf, fruit, seed	Rheumatoid arthritis, impotency, sexual diseases.
41	*Hygroryza aristata* (Retz.) Nees ex Wight & Arn.	Poaceae	Bera-saaz	Whole plant	Expectorant, antiseptic, hepatitis.
42	*Zea mays* L.	Poaceae	Bottha	Root, fruit	Hypertension, diabetes, rheumatoid arthritis, pneumonia.
43	*Rosa damascena* Mill.	Rosaceae	Golap	Leaf, root, flower	Tonsillitis, heart diseases, cooling.
44	*Anthocephalus chinensis* (Lam.) A. Rich. ex Walp.	Rubiaceae	Kodom	Leaf, flower	Fever, coughs, eye diseases, labor pain.
45	*Glycosmis pentaphylla* (Retz.) Corr.	Rutaceae	Dard-brash	Stem, fruit	Toothache, rheumatoid arthritis.
46	*Mimusops elengi* L.	Sapotaceae	Bokul	Leaf, flower, seed	Leucorrhea, tuberculosis, diarrhea.
47	*Solanum surattense* Burm.f.	Solanaceae	Kontikari	Leaf, fruit, seed	Laxative, rheumatoid arthritis, night blindness, malaria.
48	*Curcuma longa* L.	Zingiberaceae	Holud	Tuber	Jaundice, diarrhea, dysentery, small pox, eczema, gonorrhea, sedative.

ailment. It was observed that the whole plant may be used by the Kavirajes for treatment of ailments totally unrelated to one another. *Tetragonia tetragonoides* (Pall.) Kuntze (whole plant) was used as a tonic as well as for treatment of colic or eye diseases. *Aloe vera* (L.) Burm.f. (whole plant) was used as a laxative, an appetizer and for treatment of alopecia, asthma, and tuberculosis. The Kavirajes were reticent to give out exact formulations; instead, they mentioned only the parts of the plants used and the ailments treated.

The number of ailments claimed to be treated by the Kavirajes were extremely diverse. Besides common ailments like gastrointestinal disorders, respiratory tract disorders, and skin disorders (which were common among the village population), the Kavirajes also treated diseases like cancer, rheumatoid arthritis, cardiovascular disorders, nerve disorders, epilepsy, and edema. 25 plants were used for treatment of gastrointestinal disorders, 13 plants for treatment of skin disorders, and 12 plants for treatment of respiratory tract disorders. 8 plants each were used to treat rheumatoid arthritis and cancer, while 10 plants were used to treat sexually transmitted diseases. Other ailments treated included alopecia, tuberculosis, cholera, malaria, typhoid, piles, helminthiasis, reproductive disorders (impotency), urinary tract disorders (e.g. leucorrhea), fever, anemia, cuts and wounds, leprosy, pain, hernia, goiter, hepatic disorders, eye disorders, and stone formation in any part of the body. The Kavirajes did not use combination of plants for treatment of any ailment. A single plant or plant part was used for treatment of ailments, which could be from one to several. However, occasionally different plant parts from the same plant were observed to be used for treatment of different ailments.

Not all of the medicinal plants used by the Kavirajes were collected from the wild. Quite a few were cultivated around the homesteads or for commercial purposes. Plants that were cultivated for their edible fruits included *Mangifera indica* L., *Annona squamosa* L., *Borassus flabellifer* L., *Cocos nucifera* L., *Carica papaya* L., *Terminalia belerica* (Gaertn.) Roxb., *Terminalia chebula* Retz., *Phyllanthus emblica* L., *Tamarindus indica* L., and *Punica granatum* L. The fruits of *Momordica charantia* L. are cooked and eaten as vegetable, while *Rosa damascena* Mill. was cultivated for its flowers, which were sold commercially. The tubers of *Curcuma longa* L. were used as a spice and added to almost every vegetable, fish or meat dish cooked.

Discussion

Our various ethnobotanical surveys conducted thus far in Bangladesh highlights the fact that use of medicinal plants differ considerably between the Kavirajes of adjoining areas or even villages. The present survey is no different in that regard if a comparative analysis of medicinal plants used by Kavirajes is made between the five villages of Boalia sub-district (present survey) and six villages of Bagha sub-district, which was completed in a previous survey (Rahmatullah, M., 2010). Notably, both Boalia and Bagha are adjoining sub-districts by the river Padma in Rajshahi district, Bangladesh. Of the 48 plants reported in the present survey and the 54 plants reported in the previous survey (Rahmatullah, M., 2010), only six plants were seen to be commonly used and then again with the exception of two plants, the rest were used to treat dissimilar ailments in the two sub-districts. The comparative analysis is shown in Table 2. It may be seen from Table 2, that even with the two plants, *Vernonia patula* (Dryand.) Merr. was used for treatment of impotency, helminthiasis, fever, and coughs in the villages of Boalia sub-district, but used to treat only erectile dysfunction (impotency) in the six villages of Bagha sub-district. *Kalanchoe pinnata* (Lam.) Pers, was used for treatment of headache, asthma, and to dissolve stones formed in any part of the body in Boalia sub-district, and used

for treatment of kidney and gall bladder stones in Bagha sub-district. The treatment mode was also different

Table 2: A comparative analysis of ailments treated by medicinal plants (in common) between two adjoining sub-districts Boalia and Bagha of Rajshahi district, Bangladesh

Botanical name	Family	Ailments treated in Boalia sub-district (present survey comprising of the villages of Muktarpur, Shyampur, Belgharia, Naodar, and Yusufpur)	Ailments treated in Bagha sub-district (previous survey comprising of the villages of Narayanpur, Kalidaskhali, Durduria, Khayarhat, Alaipur, and Baghaas reported in [11])
Vernonia patula (Dryand.) Merr.	Asteraceae	Impotency, helminthiasis, fever, coughs.	Erectile dysfunction.
Terminalia arjuna (Roxb. ex DC.) Wight & Arn.	Combretaceae	Hypertension, anemia, leprosy.	Erectile dysfunction.
Kalanchoe pinnata (Lam.) Pers.	Crassulaceae	Headache, asthma, stone dissolving in any part of the body.	Kidney and gall bladder stones.
Coccinia grandis (L.) J. Voigt	Cucurbitaceae	Diabetes, edema, eye diseases.	Headache.
Ocimum gratissimum L.	Lamiaceae	Heart diseases, eye diseases, cooling.	Cough, cold.
Anthocephalus chinensis (Lam.) A. Rich. ex Walp.	Rubiaceae	Fever, coughs, eye diseases, labor pain.	Infertility in men or women, infections in diabetic patients, bloating in cattle.

in the two sub-districts. For treatment of erectile dysfunction (impotency) in Bagha sub-district, a combination of bark of *Litsea liyuyingi* Liou Ho mixed with roots of *Ipomoea mauritiana* Jacq., bark of *Terminalia arjuna* (Roxb. ex DC.) Wight & Arn., bark of *Bombax ceiba* L., roots of *Trigonella foenum-graecum* L., and roots of *Vernonia patula* was used, whereas in Boalia sub-district only the whole plant of *Vernonia patula* was used to treat impotency. Similarly, for treatment of kidney and gall bladder stones, in Bagha sub-district leaves of *Kalanchoe pinnata* were used in combination with *Cynodon dactylon* (L.) Pers. leaves, while at Boalia sub-district, *Kalanchoe pinnata* was used alone for treatment of stone formation in any part of the body. These differences in plant use in the two sub-districts were more prominent with the other four medicinal plants. To cite just one instance, *Terminalia arjuna* (Roxb. ex DC.) Wight & Arn. was used for treatment of hypertension, anemia, and leprosy in Boalia sub-district, but used for treatment of erectile dysfunction in Bagha sub-district.

When the differences between treatments of completely different ailments with the same plant by different Kavirajes in different areas of Bangladesh are taken into account, a comprehensive survey of the use of medicinal plants pertaining to the whole country cannot be over-emphasized. *Terminalia arjuna* is used in Boalia sub-district villages for treatment of hypertension, anemia, and leprosy, while it is used for treatment of erectile dysfunction in Bagha sub-district. Experimental studies have shown that the bark of this plant has considerable inotropic and hypotensive effects thus increasing coronary artery flow and protecting myocardium against ischemic damage (Dwivedi, S., 2007). However, other pharmacological activities of the plant related to its folkloric use are yet to be identified. The same is true for many other plants obtained in the present survey, pharmacological activity studies of which are yet to be carried out. At the same time, a survey of the scientific literature suggests that the uses of a number of plants by the Kavirajes are validated by scientific evidence. The medicinal plants used in the folk medicinal system of Bangladesh thus presents considerable potential for further scientific studies and discovery of newer drugs, more so, because our survey indicated considerable patient satisfaction with the Kavirajes' mode of treatment.

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