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ORIGINAL ARTICLE

An Ethnomedicinal Survey of Folk Medicinal Practitioners of Shitol Para Village, Jhalokati district, Bangladesh

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ABSTRACT

Bangladesh is a developing country with the majority of population residing in rural areas lacking proper access to modern medicinal facilities. Folk medicinal practitioners (Kavirajes) form the primary health-care providers to the vast majority of rural population as well as a substantial number of the urban population, who cannot afford the price of allopathic medicines. Kavirajes rely on medicinal plants for treatment of ailments. This expertise on medicinal plant usage varies widely between Kavirajes of different areas and even can differ substantially between Kavirajes of adjoining villages. The objective of the present study was to conduct an ethnomedicinal survey of Kavirajes in Shitol Para village of Jhalokati district, Bangladesh. Informed consent was obtained from the Kavirajes prior to the actual survey. Interviews were conducted with the help of a semi-structured questionnaire and the guided field-walk method in which the Kavirajes took the interviewers to areas from where they collected their medicinal plants, pointed out the plants and described their uses. It was observed that the Kavirajes of Shitol Para village used 95 plants distributed into 48 families for treatment of various ailments. Leaves constituted the plant part primarily used for treatment of ailments (48.9%), followed by fruits (10.5%). From the number of plants used, it appeared that various gastrointestinal disorders were the major ailments prevalent among the villagers of Shitol Para. 29 plants were used for treatment of gastrointestinal disorders. 14 plants each were used to treat liver diseases, skin disorders, and respiratory tract disorders. Helminthiasis, gingivitis, urinary tract disorders, and reproductive tract disorders (infertility, lack of libido) were the other major problems affecting the people. 11 plants were used to treat helminthiasis. 9 plants each were used to treat urinary tract disorders and reproductive disorders, while 7 plants were used for treatment of gingivitis. Other diseases treated by the Kavirajes included fever, cuts and wounds, arthritis, pain, cardiovascular disorders, cholera, malaria, hypertension, bone fractures, stomatitis and angular stomatitis, thyroiditis, chicken pox, tuberculosis, sexually transmitted diseases, and diabetes. 8 plants had ethnoveterinary applications. Cumulatively, the plants present considerable potential for further studies and discovery of novel compounds for treatment of diseases, which cannot be effectively cured with modern medicine.

Key words: Folk medicine, medicinal plants, Jhalokati, Bangladesh

Introduction

The gathering of ethnomedicinal data is important for every country in the world, and particularly for

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countries like Bangladesh, where such data is scarce and not documented properly. It has been estimated that Bangladesh contains about 5,000 floral species of which 10-12% are possibly used in the various traditional medicinal systems of the country. Ethnobotanical data helps to identify medicinal plant species, which in turn can lead to sustainable cultivation and preservation of endangered medicinal plants. Bangladesh has a rich history of utilizing medicinal plants in the Ayurvedic, Unani, and the folk medicinal systems, which are practiced within the country. Among the above three systems, the folk medicinal practitioners (otherwise known as Kavirajes), rely almost exclusively on medicinal plants or plant parts for treatment of various ailments. They do not use complicated formulations but usually use decoctions or paste of a single plant or plant part for treatment. The expertise gained by any particular Kaviraj is kept a closely guarded secret and only communicated to an immediate member of the family in the successive generation or to a trusted disciple. This aspect has led to variations of use in the medicinal plants among the Kavirajes of different regions and even among Kavirajes of adjoining areas within the country(Mohammed Rahmatullah, 2010; Mohammed Rahmatullah, 2009; Mohammed Rahmatullah, 2009; Mohammed Rahmatullah, 2009). It is therefore important for obtaining a comprehensive picture the medicinal plants used in the country, to collect ethnomedicinal data from as many areas as possible and even going to individual villages, which form the primary unit of group habitation.

In many cases, the sources of modern drugs have been plants used by indigenous people (Cotton, C.M., 1996). The medicinal plants used by traditional healers have a history of usage which dates back centuries ago. It has been shown that the average success rate of obtaining new medicines from plant sources is 1 in 125 (McCaleb, R.S., 1997), while the success rate of obtaining efficacious medicines from synthetic chemicals is about 1 in 10,000 (Chadwick, D.J. and J. Marsh (eds), 1994). Since the advent of modern or allopathic medicine, researchers had for the most part overlooked medicinal plants. However, in recent years, the emphasis is shifting back to medicines from plant sources, because of the emergence of various drug-resistant microorganisms, serious side-effects observed with a number of modern drugs, and because modern medicine does not have any effective cures for diseases like diabetes and arthritis, to name only two common diseases affecting millions of people throughout the world today.

The objective of the present study was to conduct an ethnomedicinal survey among the Kavirajes of Shitol Para village in Jhalokati district, Bangladesh. Since village Kavirajes form the primary sources of such ethnomedicinal information, this particular village was selected following a preliminary survey of villages in the area. In the preliminary survey, it was observed that the village with a population approaching three thousand is serviced by four Kavirajes who are noted for their practices in both the village as well as adjoining areas. The village also has both primary and secondary forests in the general area, which form effective pools of medicinal plants, which are collected and used by the Kavirajes.

Materials and Methods

Area of survey

Jhalokati district lies in the south-western part of Bangladesh and is part of Barisal Division. The district has an area of 758.06 square kilometers. The annual average temperatures range from a high of 33.3^{o}C to a minimum of 12.1^{o}C; annual rainfall is 2506 mm. The district is divided into four sub-districts, namely Jhalokati sadar, Kathalia, Nalchity, and Rajapur. The village of Shitol Para lies within Nalchity sub-district. Agriculture and agricultural laborer forms the main occupation of the village people.

Data collection and mode of survey

There were four Kavirajes in Shitol Para village. At their request, the Kavirajes were interviewed as a group. We believe that the Kavirajes did that to ensure that the supplied data is not duplicated, and at the same time, the Kavirajes can avoid conflict between themselves as to the particular use of any given plant. Such conflict, in front of the village people, can lead to loss of a Kavirajes ‘prestige’ and damage their professional credibility. Initially, informed consent was obtained from each Kaviraj. The Kavirajes were informed about the purpose of the survey and consent taken for dissemination of the obtained data both nationally and internationally. Surveys 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, one or more Kavirajes took the interviewers on guided field-walks through areas from where they collected their medicinal plants. Plants were pointed out to the interviewers along with provision of local names and description of their uses. Plant specimens as pointed out by the Kavirajes were collected on the spot, dried, and brought to Bangladesh National Herbarium for identification.

Results

It was observed that the Kavirajes of Shitol Para village used 95 plants for treatment of various ailments. These plants were classified as belonging to 48 families. The Fabaceae family contributed 11 plants, followed by the Asteraceae family with 5 plants. The results are summarized in Table 1. The Kavirajes declined to provide detailed information as to formulations and dosages. However, they mentioned the plant parts used and the ailments they were used for. With the exception of certain plants, most plants were collected from the wild, which included primary forests, secondary vegetative growth, and weeds, that would grow by the wayside, around homesteads, or on fields in between cultivation. The plants that were cultivated for commercial purposes as well as used as medicinal plants included *Mangifera indica*, *Annona squamosa*, *Cocos nucifera*, *Terminalia chebula*, *Lagenaria vulgaris*, *Momordica charantia*, *Dillenia indica*, *Cajanus cajan*, *Tamarindus indica*, *Cinnamomum tamala*, *Punica granatum*, *Moringa oleifera*, *Psidium guajava*, *Syzygium cumini*, *Syzygium samarangense*, *Averrhoa bilimbi*, *Averrhoa carambola*, *Piper betle*, *Zizyphus mauritiana*, *Aegle marmelos*, *Citrus aurantifolia*, and *Curcuma longa*. The above-mentioned plants were mostly cultivated for their fruits, which are eaten; however, *Cajanus cajan* was cultivated to obtain its edible seeds; *Curcuma longa* for its rhizome, which was also used as a spice; *Lagenaria vulgaris*, whose stems, leaves and fruits were cooked and taken as vegetable; and *Piper betle*, whose leaves were chewed by a substantial number of the village population as a habit. The leaves of *Cinnamomum tamala* were also used as a spice in cooking.

Table 1: Medicinal plants used by Kavirajes of Shitol Para village, Jhalakathi district, Bangladesh

Botanical name	Family	Local name	Parts used	Ailments treated
Andrographis paniculata (Burm. f.) Wall. ex Nees	Acanthaceae	Kalomegh	Leaf	Liver diseases, anthelmintic.
Justicia adhatoda L.	Acanthaceae	Bauk	Leaf	Coughs, asthma, bleeding from piles.
Achyranthes aspera L.	Amaranthaceae	Uvudh lenga	Whole plant, leaf	Leucorrhea, dysentery, jaundice.
Mangifera indica L.	Anacardiaceae	Aam gach	Leaf	Gingivitis (gum disease with inflammation of the gums), pus formation, scabies.
Annona squamosa L.	Annonaceae	Ata-phol	Leaf	Appetite stimulant (humans), lice infestation in animals (42).
Catharanthus roseus (L.) G.Don	Apocynaceae	Noyon-tara	Young leaf	Indigestion, stomachache.
Plumeria rubra L.	Apocynaceae	Kath gulap, Lal guloncho	Leaf, root, bark, flower	Diarrhea, fever, contraceptive.
Alocasia indica (Lour.) Spach	Araceae	Man-kochu	Stem of yellow leaf	Rhinitis (inflammation of the nasal mucous membranes).
Colocasia esculenta (L.) Schott	Araceae	Bon kochu	Whole plant	Severe jaundice, digestive aid, constipation.
Cocos nucifera L.	Arecaceae	Narkel	Young leaf, fruit, fibrous covering of fruit	Ringworm, oral infection, gingivitis, pain in animal.
Calotropis gigantea (L.) Ait.f.	Asclepiadaceae	Aahon pata	Leaf	Swelling, gingivitis.
Eclipta alba (L.) Hassk.	Asteraceae	Keshraj	Leaf	To stop bleeding.
Enydra fluctuans Lour.	Asteraceae	Hinchae	Leaf	Any problem related to blood, leucorrhea.
Mikania cordata (Burm.f.) B. L. Robinson	Asteraceae	Rait lota, Vuchi lota, Sara lota	Leaf	To stop bleeding.
Tagetes erecta L.	Asteraceae	Gada	Leaf	Infections, to stop bleeding, bone fractures.
Sida cordifolia L.	Asteraceae	Bhringoraaz	Leaf	Gingivitis, tooth problems.
Bombax ceiba L.	Bombacaceae	Shimul	Root, bark, flower	Acne, spermatorrhea, leucorrhea, rokto-pitto (local term indicating presence of blood in vomit or bleeding through nose due to liver disorders, blood clotting problems or tuberculosis).
Garcinia cowa Roxb.	Clusiaceae	Kau-pata	Leaf	Gastrointestinal problems, diarrhea.
Mesua ferrea L.	Clusiaceae	Nagmutha	Flower, seed oil	Piles, arthritis, abscess.
Ipomoea aquatica Forssk.	Convolvulaceae	Kolmi shak	Leaf	Increase lactation in nursing mothers, leucorrhea.
Ipomoea mauritiana Jacq.	Convolvulaceae	Vrommi lota	Leaf, stem, root	Reduce excessive bile acid secretion, infrequent urination, to increase strength, to increase lactation in nursing mothers, pain in bones, gastric pain.
Terminalia arjuna (Roxb. ex DC.) Wight & Arn.	Combretaceae	Arjun	Bark	Cardiovascular diseases, cholera, bloody dysentery, piles with bleeding (42).
Terminalia chebula Retz.	Combretaceae	Horitoki	Fruit	Constipation, nausea.
Ipomoea batatas (L.) Lam.	Convolvulaceae	Mishti alu	Leaf	Gingivitis and toothache in animals.
Kalanchoe pinnata (Lam.) Pers.	Crassulaceae	Pathorchuna	Leaf	Diarrhea, to stop bleeding, irregular urination, burning sensations in urinary tract.

Table 1: Continue

Benincasa hispida (Thunb.) Cogn.	Cucurbitaceae	Chal-kumra	Leaf	Constipation, flatulence, stomachache.
Coccinia grandis (L.) J. Voigt	Cucurbitaceae	Telakura	Leaf	Burning sensations in the body, blood dysentery, scabies, leucoderma, diabetes.
Lagenaria vulgaris Ser.	Cucurbitaceae	Kodu pata	Leaf juice, stem, fruit	Pain in the umbilicus due to worm, vitamin source, anemia.
Momordica charantia L.	Cucurbitaceae	Korolla	Fruit	Diabetes.
Cuscuta reflexa Roxb.	Cuscutaceae	Shorno lota	Stem	Jaundice, liver diseases, uterus and liver pain.
Dillenia indica L.	Dilleniaceae	Chalta	Leaf	Dysentery of animals.
Diospyros ebenum J. König	Ebenaceae	Pechurra, Deshi gab	Leaf, fruit, seed	Stomatitis (Inflammation of the mucous lining of any of the structures in the mouth, which may involve the cheeks, gums, tongue, lips, and roof or floor of the mouth), angular stomatitis (inflammation at the corners of the mouth, associated with a wrinkled or fissured epithelium that does not involve the mucosa), skin lesions due to abscess or infection.
Acalypha indica L.	Euphorbiaceae	Muktajhuri	Leaf	Leucoderma, asthma, intestinal worms in children.
Euphorbia neriifolia L.	Euphorbiaceae	Haizi pata	Leaf	Pneumonia, cough in children.
Phyllanthus emblica L.	Euphorbiaceae	Amloki	Fruit	Burning sensations in urinary tract, leucorrhea, hair loss, reduce graying of hair.
Albizia lebbeck (L.) Benth.	Fabaceae	Shirish	Leaf, root, bark, fruit	Asthma, coughs, thyroiditis (inflammation of thyroid), night blindness, diabetes, toothache, insect and animal bite.
Butea monosperma (Lam.) Taub.	Fabaceae	Polash	Flower	To stop bleeding, infertility.
Cajanus cajan (L.) Millsp.	Fabaceae	Orohoro	Leaf, seed	Jaundice, stomatitis, snake bite, bronchitis, coughs, piles.
Cassia alata L.	Fabaceae	Krimigraho, Dadmari	Leaf	Ringworm.
Cassia fistula L.	Fabaceae	Honail	Leaf	Anthelmintic.
Clitoria ternatea L.	Fabaceae	Aparajita	Leaf, root	Rhinitis, pain and burning sensations in eyes, pain due to piles.
Dalbergia sissoo Roxb. ex DC.	Fabaceae	Shishu	Bark	Piles.
Erythrina variegata L.	Fabaceae	Paldi madar	Leaf juice	Head lice infestation, lice infestation in animals.
Mimosa pudica L.	Fabaceae	Lozzaboti	Stem	Dental pain, gingivitis.
Mucuna pruriens (L.) DC.	Fabaceae	Biral achra	Stem	Jaundice.
Tamarindus indica L.	Fabaceae	Tetul	Leaf	Bleeding due to piles.
Clerodendrum indicum (L.) Kuntze	Lamiaceae	Bamon hati	Root, bark	Asthma, chicken pox in children.
Clerodendrum viscosum Vent.	Lamiaceae	Bait	Leaf	Nausea, vomiting, puerperal fever (an illness resulting from infection of the endometrium following childbirth or abortion, marked by fever and septicemia).
Mentha viridis L.	Lamiaceae	Pudina pata	Leaf	Flatulence, stomachache, digestive aid, indigestion with vomiting tendency, to increase pressure of urination and maintain color of urine, burning sensations in urinary tract
Ocimum gratissimum L.	Lamiaceae	Tulshi	Leaf	Chest pain, rhinitis, coughs, itching, anthelmintic, poisonous snake or reptile bite, ear ache.
Cinnamomum tamala (Buch.-Ham.) Nees & Eberm.	Lauraceae	Tejpata	Leaf	Excessive sweat, appearance of small pustules due to excessive heat or sweating on the body which itches.
Litsea glutinosa (Lour.) C.D.Robins.	Lauraceae	Pipol jongi	Leaf	Stomachache, debility, constipation, flatulence.
Barringtonia acutangula (L.) Gaertn.	Lecythidaceae	Hijol	Bark	Gingivitis, toothache, foul odor in mouth.
Aloe vera (L.) Burm.f. ghrit-komol	Liliaceae	Ghrito-kochu,	Leaf, slippery pulp within leaf	Burns due to fire, energizer, low semen density, to increase eyesight, spermatorrhea, constipation, to improve texture of skin.
Asparagus racemosus Willd.	Liliaceae	Shotomuli	Root	Diabetes, tuberculosis.
Gloriosa superba L.	Liliaceae	Ulot-chondal	Leaf, root	Anthelmintic, acne, irregular menstruation, stomachache, gonorrhea.
Lawsonia inermis L.	Lythraceae	Mendi	Leaf	Jaundice, swelling and burning sensations due to burns caused by fire, dandruff.
Punica granatum L.	Lythraceae	Dalim	Bark, flower	Menorrhagia, constipation, dysentery.

Table 1: Continue

Hibiscus esculentus (L.) Moench	Malvaceae	Dherosh	Seed	Coughs.
Hibiscus rosa sinensis L.	Malvaceae	Joba	Leaf, root, flower	Gonorrhea, constipation, sex stimulant, hematemesis (vomiting of blood), amenorrhea (absence or suppression of normal menstrual flow).
Sida cordifolia L.	Malvaceae	Berela	Root, seed	Gonorrhea, infection or abscess due to insect bite.
Azadirachta indica A. Juss.	Meliaceae	Neem	Leaf, stem	Itch, scabies, allergy, pus formation, skin disorders.
Tinospora cordifolia (Willd.) Hook.f. & Thoms.	Menispermaceae	Ghurachini, Ghamchilota	Stem	Skin disease, anthelmintic, old fever.
Ficus racemosa L.	Moraceae	Bohoi	Fruit	Prodor disease (local term indicating any diseases prior to, during or following menstruation).
Ficus religiosa L.	Moraceae	Ashwattha gach	Bark	Aphrodisiac, infections.
Streblus asper Lour.	Moraceae	Harra pata	Leaf	Bone disease in cattle.
Moringa oleifera Lam.	Moringaceae	Sajina	Flower, fruit	Appetite stimulant, carminative, heart disorders, rheumatic fever, paralysis, liver pain, to increase bile secretion, sex stimulant, contraceptive.
Psidium guajava L.	Myrtaceae	Goiaa	Leaf	Dental pain, gingivitis, scabies.
Syzygium cumini (L.) Skeels	Myrtaceae	Kalijaam	Seed	Diabetes.
Syzygium samarangense (Blume) Merr. & L. M. Perry	Myrtaceae	Jamrul	Leaf, fruit	Appetite stimulant, energizer (fruit); pain under umbilicus or in umbilicus due to worm (leaf).
Nymphaea nouchali Burm.f.	Nymphaeaceae	Nil-shapla	Stem	Anemia, biliary disorders, menstrual disorders.
Averrhoa bilimbi L.	Oxalidaceae	Belombo	Leaf	Skin diseases.
Averrhoa carambola L.	Oxalidaceae	Kamranga	Leaf, fruit	To stop bleeding, bone fractures.
Piper betle L.	Piperaceae	Paan pata	Leaf	Swelling of hand, leg, nose or skin, dyspepsia or flatulence, aphrodisiac.
Piper cubeba L.f.	Piperaceae	Chini chapa	Leaf juice	Leucorrhea.
Cynodon dactylon (L.) Pers.	Poaceae	Durba ghas	Leaf	Stop topical bleeding
Polygonum hydropiper L.	Polygonaceae	Bish katali	Leaf, bark, flower	To reduce fat in body, to reduce obesity, nose bleed, burning sensations in body.
Zizyphus mauritiana Lam.	Rhamnaceae	Kool	Bark	Dysentery with blood and mucus.
Rosa damascena Mill.	Rosaceae	Gulap	Flower	To increase bile secretion, gall bladder problems.
Hedyotis corymbosa (L.) Lam.	Rubiaceae	Khet-papra	Leaf	Diarrhea, stool with bad smell.
Paederia foetida L.	Rubiaceae	Gondhobadhuli, Padgurani	Leaf, leaf juice	Dyspepsia, constipation, cholera, dysentery of domestic animals..
Aegle marmelos (L.) Corr.	Rutaceae	Bel	Leaf, fruit	Pain under the umbilicus and stomachache due to worm, constipation, anthelmintic, decreased sperm count, aphrodisiac.
Citrus aurantiifolia (Christm.) Swingle	Rutaceae	Lebu pata	Fruit	Vitamin C source.
Murraya paniculata (L.) Jack	Rutaceae	Kamini	Leaf	Stomatitis (inflammation of the mucous membrane of mouth).
Bacopa monnieri (L.) Pennell	Scrophulariaceae	Brahmi	Whole plant	Blood pressure, dyspnea (labored or difficult breathing).
Smilax zeylanica L.	Smilacaceae	Kumaira lota	Leaf, stem	Arthritis, gonorrhea, syphilis, blood dysentery, joint pain, knee joint pain, loss of libido (humans), infections in shoulder of cattle.
Datura metel L.	Solanaceae	Dhutura	Leaf	Head lice, pain and swelling in female breasts.
Solanum torvum Swartz	Solanaceae	Tit baegun	Leaf	Arthritis.
Solanum xanthocarpum Schrad. & Wendl.	Solanaceae	Sial kata, Kontikari	Leaf, root, seed	Scabies, piles, eye allergy, leprosy, skin disorders, pain due to trauma.
Abroma augusta L.f.	Sterculiaceae	Ulot-kombol	Leaf stalk, stem	Dyspepsia, dysentery, physical sickness, urinary incontinence, burning sensations in the urinary tract.
Centella asiatica (L.) Urb.	Umbelliferae	Thankuni	Whole plant or leaf	Dysentery, stomachache, to increase memory.
Nyctanthes arbor tristis L.	Verbenaceae	Sheuly, Shefali	Leaf, bark of root	Arthritis, malaria, expectorant.
Vitex negundo L.	Verbenaceae	Nishindi	Leaf	Arthritis, body pain, flu with fever, headache.
Curcuma longa L.	Zingiberaceae	Kancha holud	Rhizome	Jaundice, skin disorders, to increase brightness of skin.
Curcuma zedoaria (Christm.) Roscoe	Zingiberaceae	Shoti gach	Fruit	Splenomegally (enlargement of spleen), fatty liver, indigestion, weakness following childbirth, fever with mucus; also used as substitute for barley for feeding children.Ethnoveterinary applications are indicated in bold lettering.

The various plant parts used included whole plant, leaf, stem, root, bark, flower, fruit, seed, and rhizome. Leaves constituted 48.9% of the total uses, followed by fruits (10.5%), roots (9.0%), bark (8.3%), stem (7.5%), flower (6.8%), seed (5.3%), and rhizome (0.8%). We did not observe any use of combination of plants by the Kavirajes of Shitol Para. Any part of a single plant may be used to treat a single ailment or for treatment of multiple ailments. For instance, the leaves of *Andrographis paniculata* were used to treat both liver diseases and helminthiasis. On the other hand, the leaves of *Eclipta alba* were used for stopping bleeding from cuts and wounds. Several plants had multiple parts used for treatment of diverse ailments. The leaves, roots, barks and fruits of *Albizia lebbeck* were used to treat many unrelated ailments like asthma, thyroiditis, night blindness, diabetes, toothache, and insect or animal bites.

From the number of plants used, gastrointestinal disorders seemed to be the most prevalent disorder among the inhabitants of Shitol Para. This is not surprising, since the village people of Bangladesh lack proper sanitation facilities. The water used for drinking comes straight from the tube well or is surface water, which is taken without further boiling or filtration. As a result, dysentery and diarrhea are endemic in the villages of Bangladesh. A total of 29 plants were used for treatment of gastrointestinal disorders, followed by 14 plants each for treatment of respiratory tract disorders, liver diseases, and skin disorders. Nine plants each were used for treatment of urinary tract disorders or reproductive disorders like infertility and impotency. It is interesting that 2 plants were used for treatment of cholera, against which modern medicine has no direct treatment except administration of oral saline to mitigate the dehydration caused during this disease. The Kavirajes of Shitol Para also used 5 plants for treatment of diabetes, a debilitating disease against which modern medicine has no known cure. Gingivitis also appeared to be quite common in the villagers of Shitol Para; a total of 7 plants were used for treatment of this condition. Five plants were used to treat arthritis, which is once again a disease against which modern medicine does not have any cure. Five plants had ethnoveterinary applications as well as human applications. These plants were *Annona squamosa*, *Cocos nucifera*, *Erythrina variegata*, *Paederia foetida*, and *Smilax zeylanica*.

Discussion

The folk medicinal practitioners or Kavirajes of various regions in Bangladesh differ considerably in their choice of medicinal plants for treatment of ailments. A single comparative analysis of plants used by Kavirajes of Dhamrai sub-district, Dhaka district with Kavirajes of Shitol Para village in Jhalokati district highlights this point. *Colocasia esculenta* (L.) Schott was observed to be used in Shitol Para for treatment of severe jaundice, as a digestive aid, and for constipation. The same plant was reportedly used in Dhamrai to stop bleeding, as a blood purifier, and to strengthen bones. *Mikania cordata* (Burm.f.) B.L. Robinson, used at Shitol Para to stop bleeding was used at Dhamrai for treatment of bloating, stomachache, helminthiasis, sprain, fracture, as well as cuts and wounds. *Coccinia grandis* (L.) J. Voigt, used at Shitol Para to treat burning sensations in the body, blood dysentery, scabies, leucoderma, and diabetes was used at Dhamrai for treatment of dysentery and oral lesions. *Tamarindus indica* L. used at Shitol Para for treatment of bleeding due to piles was used at Dhamrai to treat dysentery, and burning sensations due to urination. *Hibiscus rosa sinensis* L. used at Dhamrai to treat frequent urination was used at Shitol Para for treatment of gonorrhea, constipation, as a sex stimulant, and for hematemesis, and amenorrhea. Cumulatively speaking, these differences point to the importance of conducting ethnomedicinal surveys throughout various villages of the country as well as its various tribes for getting a comprehensive picture of folk medicinal practices.

Some of the plants used by the Kavirajes of Shitol Para have been reported to possess relevant pharmacological activity in whole plant, plant part, or phytochemical constituents. To cite a few instances, *Andrographis paniculata* (Burm. f.) Wall. ex Nees (used by the Kavirajes for liver diseases) reportedly has demonstrated hepatoprotective effect by its constituents or the whole plant. The various reports include hepatoprotective effect of andrographolide against hexachlorocyclohexane-induced oxidative injury; protective activity of andrographolide and arabinogalactan proteins from the plant against ethanol-induced hepatic and renal toxicity in mice (Singha, P.K., 2007); hepatoprotective and antioxidant property of the plant in BHC induced liver damage in mice (Trivedi, N.P. and U.M. Rawal, 2001); protection of rat hepatocytes by andrographolide against paracetamol-induced damage(Visen, P.K., 1993); anti-hepatotoxic effects of major diterpenoids isolated from the plant (Kapil, A., 1993); hepatoprotective effect of the plant against carbon tetrachloride-induced liver damage (Rana, A.C. and Y. Avadhoot, 1991); hepatoprotective effect of andrographolide against galactosamine and paracetamol-induced hepatic damages (Handa, S.S. and A. Sharma, 1990); and hepatoprotective effect of andrographolide against carbon tetrachloride-induced liver damage (Handa, S.S. and A. Sharma, 1990).

Justicia adhatoda L. used by the Kavirajes for coughs and asthma has been reported to possess alkaloids with anti-inflammatory activity (Chakraborty, A. and A.H. Brantner, 2001). The anti-tussive effect of extract of the plant on mechanical or chemical stimulation-induced coughing in animals has also been reported (Dhuley, J.N., 1999). *Terminalia arjuna* (Roxb. ex DC.) Wight & Arn. (used by the Kavirajes for

cardiovascular disorders) has a long history of use as a cardiac tonic and use for treatment of angina, hypertension, arrhythmias, and congestive heart failure, which has been reviewed by Miller (1998). Other reports include hypolipidemic effect of the plant in experimentally induced atherosclerosis in rabbits (Shaila, H.P., 1998); used for cardioprotection by Sri Lankan traditional medicinal healers; anti-oxidative and anti-lipoperoxidative effects reported for extract of the plant (Munasinghe, J.T.C., 2001); significant cardiac protection in isoproterenol induced myocardial necrosis in rats by arjunolic acid obtained from the plant (Sumitra, M., 2001); cardio-protective action of ethanol extract of bark against carbon tetrachloride induced cardiac oxidative stress (Manna, P., 2007); bark exerts significant inotropic and hypotensive effect, increases coronary artery flow and protects myocardium against ischemic damage; bark has also been detected to have mild diuretic, antithrombotic, prostaglandin E(2) enhancing and hypolipidaemic activity; reviewed in (Dwivedi, S., 2007); protective effects of butanol extract of bark against doxorubicin-induced cardiotoxicity (Singh, G., 2008); and protective action of ethanol extract of bark against sodium fluoride-induced oxidative stress in murine heart (Sinha, M., 2008).

The anti-diabetic and hypoglycemic effects of *Momordica charantia* L. (used by the Kavirajes for treatment of diabetes) has been reviewed by Leung and others (Leung, L., 2009). Hypoglycemic activity has also been reported of the saponin fraction isolated from the plant (Han, C., Q. Hui and Y. Wang, 2008). Hypoglycemic effect has been observed with alcoholic extract of whole fruit powder; additionally, administration of the extract to alloxan-diabetic rats resulted in definite improvement in the islets of Langerhans (Singh, N., 2008). The seeds of *Syzygium cumini* (L.) Skeels are used by the Kavirajes of Shitol Para for treatment of diabetes. The seeds reportedly possess both a-amylase (Karthic, K., 2008), as well as a-glucosidase inhibitory activities (Shinde, J., 2008), which can be of relevance in this aspect. Ethanolic extract of seeds also reportedly decreased blood sugar level in alloxan diabetic albino rats (Singh, N. and M. Gupta, 2007).

The various published scientific studies indicate that the medicinal plants used by the Kavirajes of Shitol Para can prove to be a useful source for more efficacious drugs. It may be noted that only a few of the 95 plants used by the Kavirajes have been studied thus far. However, the existing scientific literature on some of the plants used by the Kavirajes not only validates the use of such plants but also suggests that hitherto un-researched plants need to be quickly studied for further validation and for possible identification of components of therapeutic values. It is expected that more studies shall put greater emphasis on conservation of many of these plants, which are becoming endangered in the wild.

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