

Ethnomedicinal Survey of Plants in the Southern District Noakhali, Bangladesh

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Received: April 06, 2014;

Accepted: June 02, 2014;

Published (Web): July 23, 2014

Abstract

Many modern medicines used today were discovered by extracting active chemicals from plants used in traditional medicine. To identify and locate any new and potential therapeutic applications of commonly used medicinal plants by the folk medicinal practitioners of Noakhali, Bangladesh, we conducted a survey with a semi-structured questionnaire using the guided field-walk method. Detailed information was obtained on 143 plants belonging to 62 families. Leaves were mostly used (52%) followed by roots (30.55%) and whole plants (18.74%) along with fruits, barks, seeds, stems and flowers. Gastrointestinal disorders were the most common diseases treated followed by respiratory tract infections, weakness, fever, diabetes, skin disorders, sexually transmitted diseases, hepatic disorders, pain and rheumatism. Some plants were also used for the treatment of cancer, hypertension, nerve disorders, helmenthiasis, urinary tract infections, tuberculosis, leucorrhea, edema and chicken pox. The findings of this study may help the scientists to get a comprehensive view of the folk medicinal practices in Bangladesh and can use the results to identify medicinal plants of therapeutic interests.

Key words: Ethnomedicinal, Traditional medicine, folk medicine, medicinal plants

Introduction

Medicinal plants play a significant role in the primary healthcare systems for the majority of the rural population (WHO: Traditional medicine; Hamayun *et al.*, 2003). A number of important modern pharmaceuticals have been derived from plants used by indigenous people (Balick and Cox, 1996) including antibiotics, antimalarial drugs, cardiotonics, sympatho and parasympathomimetics etc. The ethnomedicinal knowledge about the use of medicinal plants can be a resource for the scientist to identify potential drugs, thus, proper documentation of these knowledges overtime is very essential to protect them from extinction (Cunningham *et al.*, 2002).

In this study, extensive ethnomedicinal surveys have been conducted amongst the folk medicine practitioners with an aim to document ethnomedicinal information of plants used by rural people in various upazila of Noakhali district and to find out any new and unknown therapeutic use of the plants. We have observed considerable variation in the use of medicinal plants by individual Kavirajes (folk medicinal practitioner). There were also many reports of an ethnomedicinal survey conducted amongst folk

medicinal practitioners of various district of Bangladesh (Akter *et al.*, 2012; Chowdhury *et al.*, 2011; Das *et al.*, 2012a; Das *et al.*, 2012b; Esha *et al.*, 2012; Hossan *et al.*, 2009a; Hanif *et al.*, 2009b; Mia *et al.*, 2009; Mollik *et al.*, 2009; Mawla *et al.*, 2012; Nawaz *et al.*, 2009a; Nawaz *et al.*, 2009b; Rahmatullah *et al.*, 2009; Rahmatullah *et al.*, 2010a; Rahmatullah *et al.*, 2010b; Rahmatullah *et al.*, 2010c; Rahmatullah *et al.*, 2010d; Rahmatullah *et al.*, 2010f; Rahmatullah *et al.*, 2011; Rahmatullah *et al.*, 2012a; Rahmatullah *et al.*, 2012b; Rana *et al.*, 2010; Shahidullah *et al.*, 2009; Uddin *et al.*, 2004; Uddin *et al.*, 2006). Previously ethnomedicinal surveys were conducted amongst folk medicinal practitioners in some parts of Noakhali and Feni (Rahmatullah, *et al.*, 2011a), here in this survey we have covered all nine upazila of Noakhali district.

Methods

The survey was conducted in the villages under the different Upazilla (upazila) of Noakhali district namely Begumganj, Maizdi, Senbagh, Chatkhil, Sonaimuri, Kabirhat, Hatiya, Subarnochor and Companigong. A total

of 20 traditional medical practitioners were interviewed, with their ages ranging between 35 to 70 years and 70% of them being older than 50 years. Out of the 20 informants interviewed, 18 of them were men and only two were women. The Kavirajes were briefed extensively about the purpose of the visit and told that any information obtained from them may be disseminated in both national and international scientific journals and conferences. Interviews were conducted in the Bangla language (spoken by all Kavirajes) with the help of a semi-structured questionnaire. The basic method followed was that of Martin and Maundu (1995). In this method, the Kavirajes took the interviewers on guided field-walks through areas from where they collected their medicinal plants, pointed out the plants and mentioned their local names, uses and method of use, formulations, diseases for which the formulations were used and dosages. Information was also collected on the season of collection of plants, which plant

parts used and whether combination of plants were used to treat any particular disease or if any single plant was used to treat multiple diseases. Data collected from one person were verified with others by asking the same questions. The information reported here is based on the local knowledge.

Results and Discussion

The study revealed a rich diversity of medicinal plants used to treat various disease conditions of the various upazila in Noakhali district. It was further revealed a rich ethnobotanical knowledge amongst the residents of the various upazila in Noakhali district. The families like Solanaceae, Malvaceae, Ruffaceae, Moraceae, Asteraceae, Euphorbiaceae and Cucurbitaceae were the most dominant in this study are consistently recorded in other ethnomedicinal studies.

Table 1. Medicinal plants used for treating human diseases at various upazila in Noakhali.

Botanical name	Local name	Family	Plant parts used	Uses
<i>Andrographis paniculata</i> Nees.	Kalomegh	Acanthaceae	Leaf	Fever, headache, vertigo.
<i>Justicia gendarussa</i> L.	Bishdorun, Bisa katal	Acanthaceae	Leaf, Root	Eczema, rheumatism, wounds, helmenthiases, dysentery, jaundice.
<i>Justicia adhatoda</i> L.	Bashok	Acanthaceae	Leaf	Menstrual problems, asthma, jaundice, hepatitis.
<i>Barleria prionitis</i> L.	Jeuti, Jhingti	Acanthaceae	Leaf	Rheumatism, skin disorders, pain.
<i>Aptenia cordifolia</i>	Jara lebu	Aizoaceae	Whole plant, Fruit	Inflammation, deodorant, headache poultice.
<i>Glinus oppositifolius</i> (L.) Aug.DC.	Tita dima	Aizoaceae	Whole plant	Skin diseases, earache, indigestion, loss of appetite.
<i>Achyranthes aspera</i> L.	Apang	Amaranthaceae	Whole plant	Gonorrhea, leucorrhea.
<i>Aerva sanguinolenta</i> L.	Rokto-keshob	Amaranthaceae	Whole plant	Rheumatism, leucorrhea.
<i>Alternanthera sessilis</i> (L.) DC.	Haicha	Amaranthaceae	Leaf	Gonorrhea, leucorrhea.
<i>Lannea grandis</i> (Dennst.) Engl.	Jigar	Anacardiaceae	Meristem, Gum	Veneral diseases.
<i>Mangifera indica</i> L.	Aam	Anacardiaceae	Leaf, Seed	Dysentery, helminthiases, liver disorder.
<i>Daucus carota</i> L.	Gajor	Apiaceae	Root	Appetite stimulant.
<i>Coriandrum sativum</i> L.	Dhonia	Apiaceae	Seed	Loss of appetite.
<i>Alstonia scholaris</i> (L.) R.Br.	Chatim	Apocynaceae	Bark, Stem exudates.	Ulcer, diabetes.
<i>Rauwolfia serpentina</i> (L.) Benth. ex. Kurz.	Shorpogonda	Apocynaceae	Whole plant	Irregular and painful menstration, women fertility.
<i>Alocasia macrorrhizos</i> (L.) G. Don.	Fenkochu, Mankochu	Araceae	Root, Stem, Rhizome	Rheumatism, diabetes.
<i>Typhonium giganteum</i> Engl.	Kala kochu	Araceae	Whole plant, Stem	Stop bleeding, kidney stones.
<i>Stendnera virosa</i> Prain.	Bishkochu	Araceae	Root	Rheumatism.

Botanical name	Local name	Family	Plant parts used	Uses
<i>Lasia spinosa</i> (L.) Thwaites.	Bonadi	Araceae	Leaf, Root	Joint pain, edema, dysentery, increase lactation.
<i>Areca catechu</i> L.	Supari	Arecaceae	Seed	Carcinogenic, toothache, addictive.
<i>Cocos nucifera</i> L.	Narikel	Arecaceae	Leaf, Fruit	Keep head cool, diabetes.
<i>Tylophora indica</i> (Burm.f.) Merr.	Onontomul	Asclepiadaceae	Root	Leucorrhea.
<i>Calotropis gigantea</i> (L.) R.Br.	Apon	Asclepiadaceae	Leaf, Flower	Fever, rheumatoid arthritis, asthma, diabetes.
<i>Asparagus racemosus</i> Willd.	Shatamuli	Asparagaceae	Bark, Root	Edema, microbial infections, increases lactation, weakness.
<i>Tagetes erecta</i> L.	Gada phool	Asteraceae	Leaf	Stop bleeding and pain.
<i>Mikania cordata</i> (Burm.f.) B.L. Robinson.	Libuji lota	Asteraceae	Whole plant, Leaf	Dysentery, diabetes, wounds, gastric ulcer.
<i>Blumea lacera</i> DC.	Hialmutra ,Shiyal- modi	Asteraceae	Leaf,Root	Weakness, edema, piles, cholera, diuretic, microbial infections.
<i>Ageratum conyzoides</i> L.	Ati chada	Asteraceae	Leaf	Diarrhea, boils, skin diseases, joint pain.
<i>Basella alba</i> L.	Pui shak	Basellaceae	Leaf, Stem	Anemia, cough.
<i>Oroxylum indicum</i> Vent.	Thona	Bignoniaceae	Bark, Seed, Stem	Jaundice, diarrhea, scabies.
<i>Bombax ceiba</i> L.	Shimul	Bombacaceae	Root, Fruit	Hypertension.
<i>Ananas comosus</i> (L.) Merr.	Anarosh	Bromeliaceae	Leaf	Jaundice, helminthiasis.
<i>Carica papaya</i> L.	Papae	Caricaceae	Fruit	Indigestion, jaundice, toothache, kidney stones.
<i>Terminalia chebula</i> Retz.	Haritaki	Combretaceae	Bark	Stomachic, acidity.
<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn.	Arjun	Combretaceae	Bark	Asthma, dysentery, heart disorder, sexual diseases.
<i>Terminalia belerica</i> (Gaertn.) Roxb.	Bohera	Combretaceae	Fruit	Asthma, allergy.
<i>Commelina benghalensis</i> L.	Kola duma	Commelinaceae	Leaf, Root	External poisoning, burns.
<i>Cuscuta reflexa</i> Roxb.	Swarnalata	Convolvulaceae	Leaf, Stem	Hypertension, skin disease, liver cirrhosis.
<i>Ipomoea aquatica</i> Forssk.	Kalmi lota	Convolvulaceae	Leaf	Gastric and intestinal disorders, diabetes.
<i>Kalanchoe pinnata</i> (Lam.) Pers.	Pathorkuchi	Crassulaceae	Leaf	Urinary problems, kidney or gall bladder stones.
<i>Raphanus sativus</i> L.	Mula	Cruciferae	Root	Increase digestion, decreases acidity.
<i>Momordica charantia</i> L.	Korolla	Cucurbitacea	Leaf	Diabetis, helminthiasis, jaundice, ulcer, constipation.
<i>Citrullus lanatu</i> (Thunb.)	Tormuj	Cucurbitaceae	Fruit	Heart disorders, typhoid fever.
<i>Cucurbita maxima</i> Duchesne.	Mishti kumra	Cucurbitaceae	Fruit	Gastrointestinal problems, joint pain, piles.
<i>Lagenaria siceraria</i> (Molina) Standl.	Lau	Cucurbitaceae	Fruit	Keep head cool, cholera.
<i>Momordica cochinchinensis</i> (Lour.) Spreng.	Kakroal	Cucurbitaceae	Fruit	Diabetes.
<i>Cyperus rotundus</i> L.	Mutha	Cyperaceae	Root	Weakness, fever, diarrhea, wound, cholera, vomiting.
<i>Ricinus communis</i> L.	Arono mul	Euphorbiaceae	Leaf, Seed	Gastric distress, liver or gall bladder disorder, constipation, headache, joint pain.
<i>Phyllanthus fraternus</i> G.L.Webster.	Vui amloki	Euphorbiaceae	Whole plant, Root, Leaf	Fever, joint pain, gonorrhoea, diarrhea, liver or gall bladder disorder.
<i>Phyllanthus emblica</i>	Amloki, Amla	Euphorbiaceae.	Bark, Fruit	Diabetes, dysentery, venereal diseases.

Botanical name	Local name	Family	Plant parts used	Uses
<i>Euphorbia prostrata</i> Aiton.	Khair-kakoli	Euphorbioaceae	Whole plant	Piles, hemorrhoids.
<i>Mimosa pudica</i> L.	Lojjaboti	Fabaceae	Whole plant, Root	Piles, wound, dysentery, prevent decaying of gums, urine tract stone, skin diseases.
<i>Tamarindus indica</i> L.	Tetul	Fabaceae	Leaf, Fruit	Cold, dysentery, rheumatic pain, burning sensations in hands or feet, oral lesions.
<i>Convolvulus Pluricaulis</i>	Shonkapuspo	Gentianaceae	Leaf, Flower	Tumor, anxiety, neurosis, epilepsy.
<i>Leonurus sibiricus</i> L.	Raktodrone	Labiatae	Leaf, Root	Cancer, helminthiasis.
<i>Ocimum sanctum</i> L.	Tulsi	Lamiaceae	Leaf	Fever, cough, indigestion.
<i>Hyptis suaveolens</i> Poit.	Tokma	Lamiaceae	Seed, Leaf	Gonorrhoea, microbial infections.
<i>Leucas aspera</i> Willd.	Dron pushpo	Lamiaceae	Leaf, Stem, Flower	Eye inflammation, external bleeding and dysentery.
<i>Barringtonia acutangula</i> (L.) Gaertn.	Hijal	Lecythidaceae	Leaf, Seed, Root	Diarrhea, headache, chest pain.
<i>Clitorea tarreteia</i> (L.) Gaertn.	Aparajita Nila	Leguminosae	Leaf	Eye disease, cataract.
<i>Cassia alata</i> (L.) Gaertn.	Daud pata	Leguminosae	Leaf	Skin diseases, microbial infections.
<i>Cajanus cajan</i> (L.) Millsp.	Aral pata	Leguminosae	Leaf, Seed	Jaundice, helminthiasis, lower cholesterol level, diabetes.
<i>Cassia fistula</i> L.	Sonalu	Leguminosae	Leaf, Bark, Root, Fruit	Helminthiasis, constipation.
<i>Pterocarpus santalinus</i> L.f.	Roktochondon	Leguminosae	Bark	Tuberculosis, debility, burning sensations during urination.
<i>Dalbergia sisso</i> Roxb.	Shishu	Leguminosae	Leaf, Root	Inflammation, astringent.
<i>Saraca asoca</i> (Roxb.) de Wilde.	Ashok	Leguminosae	Leaf, Bark	Dysentery, irregular menstration, piles.
<i>Abrus precatorius</i> L.	Jastimadhu	Leguminosae	Root	Debility, fever, cough.
<i>Erythrina variegata</i> L.	Mandar	Leguminosae	Leaf, Seed,	Piles, asthma, epilepsy, astringent.
<i>Allium cepa</i> L.	Piyaz	Liliaceae	Seed	Dandruff, hair loss, insect bite, induces sleep.
<i>Allium sativum</i> L.	Roshun	Liliaceae	Bulb	Cold, hair loss, diabetes, helminthiasis.
<i>Aloe barbadensis</i> Mill.	Ghritokumari	Liliaceae	Leaf	Diabetes, constipation, asthma, flatulance, hair tonic, burning sensation during sexual ejaculation.
<i>Lygodium Flexuosum</i> (L.) Sw.	Dheki shak	Lygodiaceae	Whole plant, Root, Leaf	Rheumatism, eczema, cough, wounds.
<i>Punica granatum</i> L.	Dalim	Lythraceae	Leaf, bark	Inflammation, heart disorder, loss of appetite, blood dysentery.
<i>Lawsonia inermis</i> L.	Mehandi	Lythraceae	Leaf	Keep head cool, dandruff.
<i>Hibiscus mutabilis</i> L.	Sthol-padma	Malvaceae	Leaf	Reduce burning sensations in the body.
<i>Abroma augusta</i>	Ulot kombol	Malvaceae	Bark, Root	Dysmenorrhoea, diabetes.
<i>Hibiscus rosa sinensis</i> L.	Roktojoba	Malvaceae	Leaf, Flower	Dysentery, leucorrhoea.
<i>Malvaviscus arboreus</i> Dill. ex Cav.	Morich-phool	Malvaceae	Leaf, Flower	Skin diseases.
<i>Sida rhombifolia</i> L.	Bailodi	Malvaceae	Leaf, Stem Root	Rheumatic pain.
<i>Urena lobata</i> L.	Bilai-kan	Malvaceae	Leaf, Root, Flower	Malaria, gonorrhoea, wound, toothache, ear infections.
<i>Aphanamixis polystachya</i> (Wall.) R. Parker.	Pitraj	Meliaceae	Stem, Leaf, Bark	Cancer, insecticide.
<i>Azadirachta indica</i> A. Juss.	Neem	Meliaceae	Leaf, Bark, Seed	Diabetes, measles, pox, scabies, indigestion, cataract, abscess.
<i>Tinospora sinensis</i> (Lour.) Merrill.	Guloncho	Menispermaceae	Stem	Tuberculosis, debility, burning sensations during urination.

Botanical name	Local name	Family	Plant parts used	Uses
<i>Stephania japonica</i> (Thunb. ex Murray) Miers.	Modiani, mucchani	Menispermaceae	Whole plant, Leaf, Root	Fever, diarrhea, urinary diseases.
<i>Artocarpus heterophyllus</i> Lam.	Kathal	Moraceae	Leaf, Fruit, Seed	Ulcer, constipation, diuretic, carminative, diarrhea.
<i>Ficus benghalensis</i> L.	Bot, Bar	Moraceae	Bark, Root, Leaf, Seed	Piles, astringent, aphrodisiac.
<i>Ficus racemosa</i> L.	Jogh-dumur	Moraceae	Fruit, Bark, Root, Fruit	Leucorrhea, diabetes, piles, astringent.
<i>Ficus religiosa</i> L.	Ashoth	Moraceae	Bark, Leaf, Fruit	Gonorrhoea, constipation, astringent.
<i>Streblus asper</i> Lour.	Hapra	Moraceae	Whole plant	Fever, chicken pox, diarrhea, rheumatic fever.
<i>Moringa oleifera</i>	Sajna	Moringaceae	Bark, Fruit	Hypertension, indigestion.
<i>Psidium guajava</i> L.	Piyara	Myrtaceae	Leaf	Diarrhea, menstrual problems, tooth infections.
<i>Boerhaavia diffusa</i> L.	Punarnava	Nyctaginaceae	Leaf, Root, Stem	Jaundice, anemia, gonorrhoea, abdominal pain, dysentery, elephantiasis.
<i>Nyctanthes arbor tristis</i> L.	Shefali, Sheuli	Oleaceae	Leaf, Bark	Fever, rheumatism, cough.
<i>Ludwigia hyssopifolia</i> (G Don) Exell.	At-tika	Onagraceae	Stem	Liver or gall bladder disorders.
<i>Ludwigia prostrata</i> Roxb.	Kalo-keshari, agni-dolon	Onagraceae	Whole plant	Abscess, leucorrhea.
<i>Rhynchostylis retusa</i> Blume.	Rashna	Orchidaceae	Leaf, Root	Rheumatic pain, wound, fungus infections.
<i>Pandanus foetidus</i> Roxb.	Keya kanta	Pandanaceae	Root	Diarrhea, central nervous system stimulant.
<i>Piper nigrum</i> L.	Gol morich	Piperaceae	Fruit, Seed	Chest and joint pain, dysentery, hair loss, frequent urination.
<i>Piper longum</i> L.	Pipul	Piperaceae	Whole plant, Fruit	Tuberculosis, asthma, bronchitis, indigestion.
<i>Piper betle</i> L.	Paan pata	Piperaceae	Leaf	Stomach disorders, breast and prostate cancer.
<i>Piper chaba</i> W. Hunter.	Bon pipul	Piperaceae	Whole plant, Fruit, Root	Weakness, asthma, rheumatic pain.
<i>Piper cubeba</i> L.f.	Kabab-chini	Piperaceae	Whole plant	Irregular and painful menstruation.
<i>Plumbago zeylanica</i> L.	Chitamool	Plumbaginaceae	Root	Ulcer, gastrointestinal disorder, antiseptic.
<i>Oryza sativa</i> L.	Dhan pata	Poaceae	Leaf	Piles, loss of appetite, scurvy, flatulence.
<i>Bambusa arundinacea</i> (Retz.) Willd.	Bash	Poaceae	Leaf, Stem, Root	Cough, asthma, joint pain, stops bleeding.
<i>Cynodon dactylon</i> (L.) Pers.	Durba	Poaceae	Whole plant	Piles, bronchitis, flatulence, loss of appetite.
<i>Saccharum spontaneum</i> L.	Moyda	Poaceae	Whole plant	Vomiting.
<i>Rosa damascene</i> Mill.	Golap phool	Rosaceae	Leaf, Flower	Menstrual problems, skin spots.
<i>Paederia foetida</i> L.	Gondho badali	Rubiaceae	Leaf, Root, Fruit	Indigestion, weakness, cancer, toothache, dysentery.
<i>Hedyotis corymbosa</i> (L.) Lam.	Khetrao	Rubiaceae	Whole plant	Jaundice, liver disorders, fever, heat eruptions.
<i>Citrus aurantiifolia</i> (Christm.) Swingle.	Batabi lebu	Rutaceae	Fruit	Diabetes, indigestion, insect bite, oral lesions, increases eye sight.
<i>Citrus aurantium</i> L.	Komla	Rutaceae	Skin of fruit	Diarrhea.
<i>Citrus acida</i> Roxb.	Lebu	Rutaceae	Fruit, Skin of Fruit	Indigestion, vomiting, loss of appetite, acne, dandruff.
<i>Citrus grandis</i> (L.) Osbeck.	Jaambura	Rutaceae	Fruit	Loss of appetite, fever.

Botanical name	Local name	Family	Plant parts used	Uses
<i>Aegle marmelos</i> (L.) Corr.	Bel	Rutaceae	Fruit, Leaf, Root	Constipation, dysentery, cancer.
<i>Glycosmis pentaphylla</i> (Retz.) DC.	Hotik khira	Rutaceae	Whole plant, Leaf, Stem, Fruit	Jaundice, fever, cough, anemia, eczema, pimple, rheumatism, dysentery, dental caries.
<i>Santalum album</i> L.	Shethchondon	Santalaceae	Bark	Tuberculosis, debility, burning sensations during urination.
<i>Litchi chinensis</i> Sonn.	Lichu	Sapindaceae	Seed	Indigestion, loss of appetite.
<i>Scoparia dulcis</i> L.	Modhu maloti, chini pata	Scrophulariaceae	Whole plant, Leaf	Diabetes, wounds, ulcer, weakness, fever, edema, bronchitis, diarrhea, toothache.
<i>Smilax ovalifolia</i> Roxb.	Koaria mul	Smilacaceae	Root	Wound.
<i>Solanum nigrum</i> L.	Kakmachi	Solanaceae	Leaf, Fruit	Weakness, edema, fever, diarrhea.
<i>Solanum violaceum</i> Ortega.	Bihuti	Solanaceae	Leaf, Root	Vomiting, asthma, toothache, fever, helmenthiasis.
<i>Datura metel fastuosa</i>	Kal dhutura	Solanaceae	Leaf, Root, Seed	Insanity, rheumatic swellings, abscess, piles
<i>Nicotiana plumbaginifolia</i> Viv. var. bigelovii Torr.	Bon tamak	Solanaceae	Root	Piles
<i>Cestrum nocturnum</i> L.	Hasna-hena	Solanaceae	Leaf	Stop bleeding.
<i>Datura stramonium</i> L.	Dhutura	Solanaceae	Leaf, Root, Seed	Asthma, scabies, diarrhea, mental illness, induce unconsciousness.
<i>Capsicum frutescens</i> L.	Kacha morich	Solanaceae	Fruit	Helmenthiasis, loss of appetite, urinary disorder, indigestion.
<i>Lycopersicon esculentum</i> Mill.	Tomato	Solanaceae	Whole plant	Headache, burns, induces sleep.
<i>Solanum melongena</i> L.	Baegun	Solanaceae	Leaf, Fruit	Obesity, vomiting, cough, loss of appetite.
<i>Solanum indicum</i> L.	Brihoti	Solanaceae	Leaf, Stem	Rheumatism, skin diseases.
<i>Solanum surattense</i> Burm.f.	Kondikari	Solanaceae	Whole plant, Leaf, Root, Seed	Veneral diseases, asthma, chest and joint pain.
<i>Corchorus capsularis</i> L.	Paat	Tiliaceae	Leaf, Stem	Constipation, stomachic, loss of appetite, flatulence.
<i>Centella asiatica</i> (L.) Urb.	Thankuni	Umbelliferae	Whole plant, Leaf	Weakness, dysentery, cataract, skin problem, gonorrhea, leucorrhea.
<i>Premna integrifolia</i> L.	Goniar	Verbenaceae	Leaf, Root	Fever, cold, inflammation, rheumatism.
<i>Gmelina arborea</i> Roxb.	Gamir	Verbenaceae	Bark, Root	Leucorrhea, immunomodulator.
<i>Clerodendrum indicum</i> (L.) Kuntze.	Bamon haki	Verbenaceae	Root	Asthma.
<i>Clerodendrum viscosum</i> Vent.	Vait, Bandigach	Verbenaceae	Leaf, Root	Snake bites, asthma, stomach pain, fever, gonorrhea, leucorrhea, skin diseases.
<i>Cissus quadrangularis</i> L.	Haar-mochkanor	Vitaceae	Whole plant	Bone fracture, rheumatic fever, hemhorroid.
<i>Vitis quadrangularis</i> L.	Hapta vanga	Vitaceae	Whole Plant	Rheumatic fever, joint pain.
<i>Leea indica</i> (Burm. f.) Merr.	Huria	Vitaceae	Leaf, Root	Boils, eczema, skin diseases, intestinal and uterus cancer.
<i>Zingiber officinale</i> Roscoe.	Ada	Zingiberaceae	Rhizome	Increase digestion.
<i>Elettaria cardamomum</i> (L.) Maton.	Elachi	Zingiberaceae	Fruit	Loss of appetite.
<i>Curcuma zedoaria</i> (Berg) Rosc.	Shoti	Zingiberaceae	Rhizome	Sores, stomach pain.
<i>Curcuma longa</i> L.	Kacha holud	Zingiberaceae	Rhizome	Allergy, inflammation.

A total of 143 plants were identified by the Kavirajes along with their medicinal uses. The plants were distributed into 62 families (Table 1). Whole plants as well as plant parts like leaf, stem, root, bark, fruit, flower, seed and gum were used for treatment. Leaves constituted the major plant part used (52%), followed by roots (30.55%) and whole plants (18.74%). Other plant parts used

included fruits (18.74%), barks (13.19%), stem (11.11%), seeds (11.80%) and flowers (4.86%). The results are shown in Figure 1. Majority of the plant remedies were prepared by boiling along with crushing or pounding or soaking in cold water and concoction. But, we could not collect the data about the amount of plant extracts used by the Kavirajes as they did not want to disclose it.

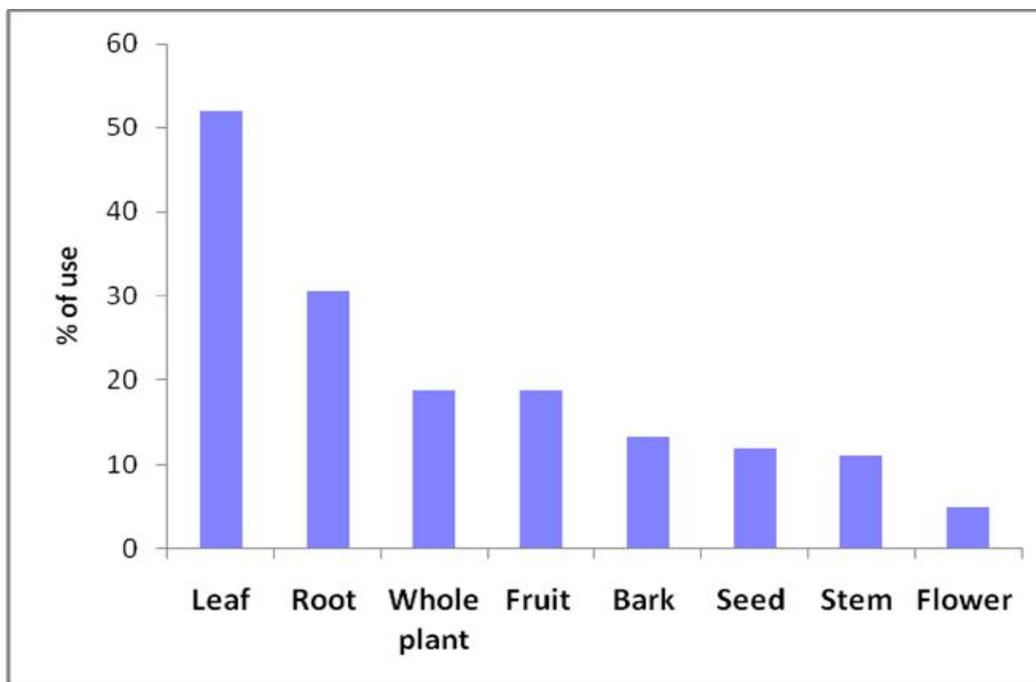


Figure 1. Percentage of use of plant parts.

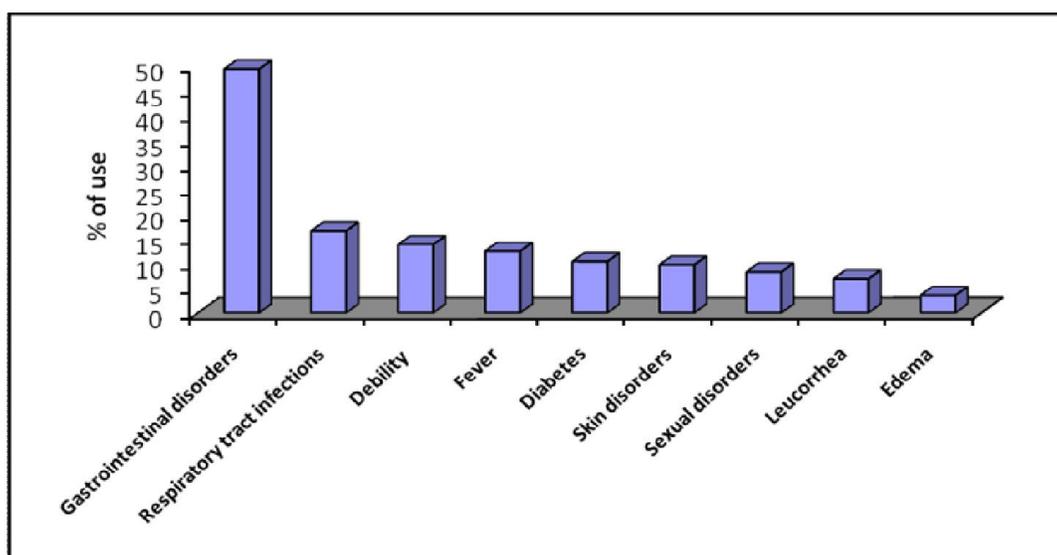


Figure 2. Percentage of use of ethnomedicine in various diseases.

About 49.30% of the plants were used to treat gastrointestinal disorders (e.g. dysentery, blood dysentery, diarrhea, stomach pain, indigestion, acidity, helminthiasis and piles) followed by respiratory tract infections (e.g. cold, coughs, asthma) (16.66%), skin disorders (eczema, boils, itch) (9.72 %), fever (12.49%) and sexual disorders or sexually transmitted diseases (8.33%).

Fever, sexual disorders and urinary disorders are the other major afflictions treated by the Kavirajes. The most common disorder leucorrhea treated with 10 medicinal plants (6.95%). However, the Kavirajes used 24 plants (13.88%) were used for treatment of debility and 5 different plants (3.50%) for treatment of edema, which suggests it to be a common disorder among the inhabitants of Noakhali district.

Encouragingly 15 (10.41%) of the plants including *Phyllanthus emblica*, *Citrus aurantiifolia*, *Allium sativum*, *Cocos nucifera*, *Momordica cochinchinensis*, *Azadirachta indica*, *Mikania cordata*, *Aloe barbadensis*, *Piper nigrum*, *Citrullus lanatu* and *Scoparia dulcis* are used to treat diabetes. Three plants namely *Lagenaria siceraria*, *Cyperus rotundus* and *Blumea lacera*, were used to treat cholera. *Piper longum*, *Tinospora sinensis*, *Santalum album*, *Pterocarpus santalinus* were used to treat tuberculosis, *Solanum indicum* for the treatment of small pox and *Momordica charantia*, *Streblus asper* for the treatment of chicken pox, *Clitorea tarreteia* and *Centella asiatica* for treating cataract.

Some plants were used to treat multiple diseases, while some were used as remedy for a single disease. For instance, the leaves of *Tamarindus indica* were used to treat chronic dysentery, rheumatic pain, cold, oral lesions. On the other hand, the leaves and flowers of *Hibiscus rosasinensis* were combined for treatment of leucorrhea. There were some instances where a number of plants in combination were used, for example, the whole plant of *Achyranthes aspera*, leaves of *Centella asiatica*, roots of *Clerodendrum viscosum* and leaves of *Alternanthera sessilis* are mixed together for treatment of gonorrhoea, low semen, and leucorrhea. A mixture made from juice of crushed whole plant of *Euphorbia prostrata*, juice of whole plant of *Cynodon dactylon* was used for the treatment of piles. The plants *Saraca asoca*, *Withania somnifera*, *Piper cubeba*, *Abroma augusta*, and *Rauwolfia*

serpentina were combined and administered with iron for the treatment of irregular menstruation, burning sensations in the uterus and uterine disorders. *Tinospora sinensis* was combined with *Santalum album* and *Pterocarpus santalinus* for the treatment of tuberculosis, debility, and burning sensations during urination.

We have also noticed some distinguished uses of several medicinal plants in these localities. For example, the leaves of *Andrographis paniculata* are used to cure fever, headache and vertigo in Noakhali whereas the whole plants instead of leaves are used to treat only digestion in Bagherhat district of Bangladesh. On the other hand, even the Kavirajes of Noakhali used the seed of the plant *Hyptis suaveolens* to treat gonorrhoea whereas the Kavirajes of Khulna used the leaf, bark of this plant to treat constipation (Rahmatullah et al., 2010b). The roots of *Achyranthes aspera* are used in jaundice in Rajshahi, Bangladesh, while in Noakhali the whole plants are used to treat leucorrhea and gonorrhoea (Nawaz et al., 2009b). These differences are quite common in the practice of traditional medicines. Different plants have different medicinal uses in different parts of Bangladesh.

Conclusion

It is thus important that modern scientific studies to be done on these medicinal plants, so that the plants may be used as remedies in a more rational and scientific manner. The results of this study revealed a rich diversity of medicinal plants used to treat various disease conditions and ethnomedicinal knowledge, amongst the residents at the various upazila in Noakhali which may through proper scientific investigations may yield novel compounds to treat both old and emerging diseases. The study should be extended to other parts of the country to discover any unknown potential use of any medicinal plants that have not been mentioned before, but is being used for the centuries to treat many difficult diseases.

Acknowledgement

The authors would like to thank the Chairman, Department of Pharmacy, Noakhali Science and Technology University, Noakhali for providing support to conduct the project work. The authors are also grateful to

the informants and local administrators in the study area for their cooperation.

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