



A Survey on Medicinal Plant Usage by Folk Medicinal Practitioners in Different Villages at Nalitabari Upazilla, Sherpur District, Bangladesh

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Authors' contributions

This work was carried out in collaboration between all authors. Authors AF and MMR are designed the study, performed the statistical analysis and wrote the protocol. Author SM wrote the first draft of the manuscript. Authors SM, MSI, ASAS and MFH managed the analyses of the study and the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Medicinal plants are an important and often the only component in the formulations used by the folk medicinal practitioners of Bangladesh for treatment of various ailments. Folk medicinal practitioners, well known as *Kavirajes*, form the primary line of health-care among a substantial section of the rural and urban population of Bangladesh. They rely on administration of medicinal plants for treatment of diseases. Since the medicinal plants used by the *Kavirajes* differ widely even between adjoining areas, the objective of the present study was to conduct a survey among the selected *Kavirajes* of different villages at Nalitabari Upazilla situated in Sherpur district, Bangladesh. A semi structured questionnaire and the guided field walk method was used to obtain data from selected *Kavirajes*. Plant specimen as pointed out by them were collected and identified

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at the Bangladesh National Herbarium. It was observed that the *Kavirajes* of the selected areas used a total of 115 plants distributed into 68 families for treatment of various ailments. Of the total 160 uses found in the present survey, leaves formed the most frequently used plant part (26.87%), followed by fruits (18.12%), seeds (16.25%), roots (13.75%), stems (11.27%), flower (6.23%), bark (5%) and whole plant (2.6%). Most of cases, a single plant part was used for treatment of any given ailment. Most of the plants were used to treat common ailments such as respiratory tract problems, gastrointestinal disorders, fever and loss of hair, vomiting, menstrual problems, skin disorders, dental diseases, cracked foot, bleeding, insect bites and bone fracture. However, a number of plants were also used to treat more complicated ailments like cardiovascular disorders, hepatic disorders, mental disease, epilepsy, piles, leprosy, diabetes and cancer or tumors.

Keywords: Folk medicine; medicinal plants; ailment; sherpur; Bangladesh.

1. INTRODUCTION

Bangladesh is a densely populated country. About 150 million people live in the 55 thousand square mile area, the majority of which resides in the 86,000 villages broaden throughout the country. Overall, the rural population depends on the healing of these ailments together with other complicated ailments on folk medicinal practitioners, otherwise known as *Kavirajes*. Such medicinal practitioners rely almost solely on various medicinal plants for treatment of diverse ailments. Almost every village has one or two practicing *Kavirajes*, depending on the village population. In absence of modern clinics or hospitals in the villages, the *Kavirajes* form the first level of primary health-care providers to the rural population of the country. The *Kavirajes* rely on simple decoctions, paste or direct oral and topical administration of medicinal plants for healing of various ailments. Their methods are uncomplicated; yet by the extent of patient visits, it emerges that there is a substantial degree of patient satisfaction in their treatments. Since this practice by *Kavirajes* have continued from ancient times, most *Kavirajes* have attained extensive knowledge about medicinal plants – a knowledge, which is reserved within the family and usually passed on from generation to generation. The ethno-medicinal data of the *Kavirajes* are yet to be extensively documented. On the other hand, this documentation is important because medicinal plants and their indigenous uses can form a valuable source of information for discovery of effective allopathic drugs [1]. *Kavirajes* with whom they have developed social relationships. Moreover, the cost of modern allopathic medicine also deters villagers from seeking allopathic doctors. The fact also remains that folk medicinal practices have been present in Bangladesh from time immemorial, and the villagers have developed a reliance on such practices. That folk medicinal

practices have continued for centuries testifies to their efficacy in the treatment of various ailments. We have been performing ethno-medicinal surveys throughout Bangladesh to find a comprehensive picture of the medicinal plants used by the folk medicinal practitioners of the country. Since villages are the crucial units of habitation in Bangladesh, our ethno-medicinal surveys have focused on the village *Kavirajes*. During the course of these surveys, it was observed that there is considerable variation between uses of medicinal plants between *Kavirajes*, even of adjoining areas [2-7] The objective of the present study was to conduct a survey on medicinal plant usage among selected *Kavirajes* of different village at Nalitabari Upazilla in Sherpur district, Bangladesh.

2. MATERIALS AND METHODS

This study was carried out in Nalitabari Upazila (Sherpur district) with an area of 327.61 sq km, is bounded by the Meghalaya State of India on the north, Sherpur Sadar and Nakla upazilas on the south, Haluaghat upazila on the east and Jhenaigati upazila on the west. Nalitabari is located at 25.0833°N 90.1954°E. The Upazila consists of 7 union parishads, 108 mouzas and 138 villages (Fig. 1).

Traditional medicinal healers (*Kavirajes*) were randomly chosen in the Nalitabari areas. All *Kavirajes* were interviewed with the help of a semi-structured questionnaire and the guided field-walk method as described by Martin (1995) and Maundu (1995). The purpose of the interview was carefully explained and consent was obtained from the *Kavirajes* that they have no objections to providing the names of plants and the ailments that were used for treatment and no objection to the information being disseminated in publication or any other form of presentation form both within the country as well



Fig. 1. Location Map of Survey area, Nalitabari Upazila, Sherpur District, Bangladesh

as internationally. Interviews were conducted in the Bengali language, the language being spoken by both *Kavirajes* and the interviewers. The informants took the interviewers through forest regions from where they collected their plants, showed the plants, and mentioned their local names and uses. Plant specimens were brought and identified at the Bangladesh National Herbarium at Dhaka.

3. RESULTS AND DISCUSSION

3.1 Pants and their Distribution into Families

The result of the present study shows that 115 species of plants are used by the *Kavirajes* of Nalitabari area in Sherpur district, Bangladesh. These medicinal plants belong to 68 families. The *Liliaceae* family provided the largest number of species (6), followed by the *Cucurbitaceae*, *Fabaceae*, *Zingiberaceae* family (5), *Rosaceae*, *Myrtaceae*, *Apiaceae* (4) and most of the family contain single plant (Table 1). Not all plants were obtained from the wild. Several plants were cultivated for home consumption of fruits; the fruits were also sold commercially.

3.2 Uses of Plant Parts for ailment of Diseases

The various plant parts used included whole plant, leaves, stems, barks, roots, fruits, seeds

and flowers. Table 2 shows that, of the total 160 uses found in the present survey, leaves formed the most frequently used plant part (26.87%), followed by fruits (18.12%), seeds (16.25%), roots (13.75%), stems (11.25%), flowers (6.25%), barks (5%) and whole plant (2.5%). For human ailments, whole plant or plant parts were either orally administered or topically applied. This could take a number of forms.

3.3 Medical Applications

Fourteen plants were used for treatment of gastrointestinal disorders, suggesting that this is the most common ailment suffered by the village population. Twelve plants were used for treatment of fatigue or weariness. Twelve plants were used for male sexual problems such as – lacking of sperm, liquidness of semen, sexual instability and Nine plants were used in female gynecology diseases, such as—irregular menstrual cycle, painful menstrual cycle, leucoriaetc, to treat piles. Eleven plants were used asthma and skin diseases, seven plants were used kidney diseases, five plants were used mental depression, four plants were hypertension and diabetes and three plants were used for ailment of heart disease. Several plants obtained in the present survey have been scientifically studied for their pharmacological activities. The scientific reports validate the use of the medicinal plants by the *Kavirajes*.

Table 1. Medicinal plants used by the folk medicinal healers (*Kavirajes*) of different village at Nalitabari Upazilla in Sherpur district, Bangladesh

Sl. no.	Scientific name	Family	Local name	Plant types	Part(s) used	Ailment	Formulation and Dosage
1	<i>Abroma augusta</i>	Sterculiaceae	Olotkambal	Strangling shrub	Roots	Use in many gynecology diseases, such as—irregular menstrual cycle, painful menstrual cycle, leucoria etc, to treat Piles.	Liquid extract of the juvenile roots to be used 3 times daily.
2	<i>Abrus precatorius</i>	Papilionaceae	Kunch	Woody climber tree	Fruits and seeds	Remove many diseases of gastrointestinal tracts.	Tablets are made from powder of dried fruits and seeds. To be used 3 times daily.
3	<i>Acacia arabica</i>	Mimosaceae	Arobi gach	Tree	Leaves, stem extracts.	Remove Catarrh, cough, catarrh caused by smoking.	Extract of leaves and stems to be used 3 times daily, with sugar and water.
4	<i>Adhatoda vasica</i>	Acanthaceae	Bashok	Bushy shrub	Leaves	Remove the storage cough, dry catarrh, asthma, bronchitis.	Juvenile leaves are mashed, tablet is made, then dry. 3 tablets to be taken per day.
5	<i>Adiantum caudatum</i>	Adiantaceae	Mayurshikha	Herb	Leaves	To treat Fever and Diabetes	Leaves are expectorant and antipyretic. leaves juice are used in coughs and other chest affections.
6	<i>Aegle marmelos</i>	Rutaceae	Bel	Medium sized deciduous Tree	Leaves, Fruits	Remove diarrhea, disorders of stomach, vomiting tendency, and thirst.	Juice of fruits to be used 3 time daily.
7	<i>Allium cepa</i>	Liliaceae	Piyanj	Perennial or biennial low Herb	Converted roots	Remove the catarrh, cough, weariness and fatigue, and dandruff.	Liquid extract of the roots to be used daily.
8	<i>Allium sativum</i>	Liliaceae	Roshun	Low Herb	Converted roots	To remove wound, septic, hypertension, diabetes, increase the power of heart.	Burned Rashun is used daily and properly.

Sl. no.	Scientific name	Family	Local name	Plant types	Part(s) used	Ailment	Formulation and Dosage
9	<i>Aloe vera</i>	Liliaceae	Gritakumari	Xerophytic perennial herb	Internal part of stems	Remove the physical weakness, gout and pain, sexual stimulant both for male and female.	Internal portion of the leaves or stem is separated which is whitish in color and as like as jelly (turbid, semisolid). To be taken as a juice, daily one time.
10	<i>Alpinia galanga</i>	Zingiberaceae	Bach gach	Herb	Roots or converted stems	Remove mental weakness, kidney weakness, sexual weakness, maintain heart-beat.	Tablets are made from powder of dried Roots or converted stems (sun dry or fire heat dry). To be used 3-4 times daily.
11	<i>Alstonia scholaris</i>	Apocynaceae	Satim	Evergreen tree	Barks	Remove fever, diarrhea, dysentery.	Tablets are made from powder of dried barks. To be used 3 times daily.
12	<i>Althaea officinalis</i>	Malvaceae	Khaitay gach	Small tree with few lateral branches.	Seeds	Remove hopping cough, dry catarrh, weakness of lung.	sPowder is made from the dry seed. to be taken 3 times per day.
13	<i>Amomum subulatum</i>	Zingiberaceae	Elachi	Tree	Fruit with seeds	Remove gastric, stomach disorder, bad smell of mouth, clean the throat, increase the appetite and the power of stomach.	Tablets are made from powder of dried fruits/seeds, to be used 4 times daily.
14	<i>Ananas comosus</i>	Bromeliaceae	Pineapple	Herbaceous	Fruit juice	Increase appetite, remove gastrointestinal disorders, helps to digest, destroy the worms	Fruit or fruit juice is directly taken.
15	<i>Andrographis paniculata</i>	Acanthaceae	Kalomegh	Annual herb	Leaves and roots	Remove hypertension, overweight and high level cholesterol of the blood.	Roots and leaves are mashed and tablets are made from the mashed product. Then dry it. To be used 4 times daily.
16	<i>Areca catechu</i>	Palmae	Shupari	Tall slender	Seeds	Remove lekoria, sickness	Directly consume (raw) or

Sl. no.	Scientific name	Family	Local name	Plant types	Part(s) used	Ailment	Formulation and Dosage
				trunk		of uterus, irregular menstrual cycle, inflammation of uterus.	seeds are mashed and tablets are made from the mashed product . Then dry it. To be used 4 times daily.
17	<i>Artocarpus heterophyllus</i>	Moraceae	Kanthal gachh	Large sized tree	Fruits and seeds	Provides vitamins and minerals, remove malnutrition and maintain body temperature.	Fruits are directly consumed. Seeds are fried and then consumed.
18	<i>Asarum europaeum,</i>	Aristolochiaceae	Shugandhabala	Herb, perennial and has prostrate stems	Leaves	Remove many gastrointestinal diseases; increase the power of stomach and liver.	Leave extracts (liquid) to be used or Tablets are made from powder of dried leaves, to be used 4 times daily.
19	<i>Asparagus racemosus</i>	Liliaceae	Satamuli	Stout strangling climber	Roots, stems, leaves	Remove many sexual disease of male, such as –lacking of sperm, liquidness of semen, sexual instability.	Leaves, root and young stem are mashed, then dried. tablets are produced from the mashed product. to be used 3 times daily.
20	<i>Azadirachta indica</i>	Meliaceae	Nim	Tropical tree	Leaves	Remove different kinds of skin disease, constipation, gastrointestinal disorder, remotic fever, pimple and pierce.	Liquid extract of leaves to be used.
21	<i>Bacopa moniera</i>	Serophulariaceae	Brammi	Low herb	Leaves and whole plant	Used in nerve and brain disease, increase the memorizing power.	Leaves and whole plant are mashed and tablets are made from the mashed product. Then dry it. To be used 2 times daily.
22	<i>Bambusa arundinaceae</i>	Graminae	Bash	Shrub	White extract of young bamboo	It is a stimulant for male, encouraging, increase the energy of the penis.	Juvenile bamboo is cut and whitish liquid juice is collected from the wounded place. To be taken once

Sl. no.	Scientific name	Family	Local name	Plant types	Part(s) used	Ailment	Formulation and Dosage
23	<i>Bauhinia purpurea</i>	Caesalpiniaceae	Rakta kanchan	Medium sized tree	Leaves	Removes skin disease, pimple, and bruise of skin	per day. Tablets are made from powder of dried leaves. To be used 4 times daily.
24	<i>Berberis aristata</i>	Berberidaceae	daruhoridra	Tree	Roots and stems.	Remove itching in the anus, pain during toilets, constipation, and irregular toilets.	Tablets are made from powder of dried Roots and stems. To be used 4 times daily.
25	<i>Boerhaavia repens</i>	Nyctaginaceae	Punornova	Herbaceous	Roots, stems, leaves	Remove gout, dropsy, irregular urine, kidney disorder.	Leaves and juvenile stems, roots are mashed and tablets are made from the mashed product. Then dry it. To be used 3 times daily.
26	<i>Borago officinalis</i>	Boraginaneae	Jabani gach	Annual Herb.	Leaves	Remove jaundice, inflammation and many other disease of uterus of women.	Tablets are made from powder of dried leaves, to be used 4 times daily.
27	<i>Calotropis gigantea</i>	Asclepiadaceae	Akanda	Large Shrub	Stems, leaves	Remove the flexibility of penis, sexual weakness of male, curviness of the penis.	Leaves and young stem are mashed, then dried. Tablets are produced from the mashed product. To be used 3-4 times daily.
28	<i>Cassia angustifolia</i>	Caesalpiniaceae	Sonapata gach	Shrubby plant	Leaves	Remove many skin disease, bruise, itching (dad), and blood pollution.	Leaves are mashed and tablets are made from the mashed product. Then dry it. To be used 4 times daily.
29	<i>Centella asiatica</i>	Apiaceae	Dolmandarer pata (Thankuni)	Herb	Leaves, young stems	Remove itching of eye, dry catarrh, bronchitis.	Liquid extract of leaves to be used in eye. In another cases, green leaves are mashed, then tablet are made and dry these. To be taken 4 times per day.
30	<i>Cichorium</i>	Asteraceae	Kashni gach	Herbaceous	Roots,	Remove fever, jaundice,	Tablets are made from

Sl. no.	Scientific name	Family	Local name	Plant types	Part(s) used	Ailment	Formulation and Dosage
	<i>intybus</i>			plant	seeds	increase the power of liver and kidney.	powder of dried roots and seeds combined, to be used 4 times daily.
31	<i>Cinnamomum zeylanicum</i>	Lauraceae	Daruchini	Tree	Bark	Increase the appetite, remove the anorexia, cure the bruise of mouth.	Dried bark are turned to powder, tablet are produce from powder. To be used 6 time daily.
32	<i>Citrullus lanatus</i>	Cucurbitace	Tarmuj	Herb	Fruits	Make the body charmed, removes worms from the intestine.	It is directly consumed as fruit.
33	<i>Citrus aurantifolia</i>	Rutaceae	Lebu	Strong thorny Herb	Juice	Fill up the lacking of Vitamin C, remove scurvy, bruise of mouth and palate, dandruff.	Juice of the lemon to be used.
34	<i>Citrus sinensis</i>	Rutaceae	Orange	Trees	Fruit juice	Remove scurvy, bruise in mouth and lips, provide vitamin C.	Fruit juice is taken directly.
35	<i>Clitoria ternatea</i>	Fabaceae	Aporajita	Perennial Herbaceous plant	Flowers and leaves	Remove pimple of face, many skin disease, and disease of urinary tracts.	Flowers and leaves are mashed and tablets are made from the mashed product. Then dry it. To be used 4 times daily.
36	<i>Cochlospermum religiosum</i>	Bixaceae	Katira gach	Small tree	Leaves, stem extracts	Remove catarrh and cough.	Extract of leaves and stems to be used 4 times daily, with sugar and water.
37	<i>Cocos nucifera</i>	Arecaceae	Narical	Tall tree	Fruits	It concentrates the semen; remove sexual instability, longer the time of intercourse.	Fruits are taken directly with many other plant parts.
38	<i>Cordia dichotoma</i>	Boraginaceae	Sapesh gach	Small to moderate-sized Deciduous	Leaves, some time roots	Asthma, dry catarrh inflammation of the vocal cord.	Leaves and roots are mashed, and then tablets are made and dry them. To be taken 4 times per day.

Sl. no.	Scientific name	Family	Local name	Plant types	Part(s) used	Ailment	Formulation and Dosage
				Tree			
39	<i>Coriandrum sativum</i>	Umbelliferae	Dhonia pata	Annual Herb	Leaves	Increase the appetite, provide minerals, clean the cough of the throat, and remove the anorexia.	Mashed leaves with water are to be taken 3 times per day.
40	<i>Crocus sativus</i>	Liliaceae	Jafran gach	Low herb	Leaves, stems	Remove dysentery, blood dysentery, diarrhea, stomach disorder, and cholera.	Tablets are made from powder of dried leaves and young roots, to be used 5-6 times daily.
41	<i>Cucumis melo</i>	Cucurbitaceae	Kharmuz gach	Long climbing plant	Fruits	Remove different disorder of urinary tracts, jaundice, and fever.	Tablets are made from powder of dried seeds, to be used 4 times daily.
42	<i>Cuminum cyminum</i>	Apiaceae	Zira	Herb	Fruits	Used as anti oxidant, remove many disease of larynx.	Tablets are made from powder of dried fruits. To be used 2 times daily.
43	<i>Curcuma domestica</i>	Zingiberaceae	Holud	Herb	Rhizomes	Remove many skin disorder, bruise.	Mashed products are directly applied on the skins.
44	<i>Cuscuta reflexa</i>	Convolvulaceae	Sonaloti gach	Herb	Leaves with young stems	Remove jaundice, hepatitis and the inflammation of liver	Leaves and juvenile stems are mashed, then dried. Powders are produced from the dry product. powder to be taken 6 times daily
45	<i>Cydonia oblonga</i>	Rosaceae	Bihi dana	Deciduous tree	seeds	Remove dry catarrh, hopping cough, increase the lung activity	Powders are produced from dry fruits. Powder with water to be taken 3 times per day.
46	<i>Cyperus rotundus</i>	Cyperaceae	Nagori gach	Herb	Leaves, fruits	Remove pain in hips, cough, cold, and breathe problem.	Tablets are made from powder of dried leaves and stems, to be used 3 times daily.
47	<i>Datura metel</i>	Solanaceae	Dhutura	Herb	Seeds and leaves	Remove breath problem, asthma, bronchitis,	Tablets are made from powder of dried seeds and

Sl. no.	Scientific name	Family	Local name	Plant types	Part(s) used	Ailment	Formulation and Dosage
						maintain and bring sleep.	leaves. To be used 1 time daily.
48	<i>Daucus carota</i>	Umbelliferae	Gajar	Annual or biennial Herb	Converted roots	Source of vitamins and minerals, Removes the weariness and fatigue	To be taken as a fruits.
49	<i>Dillenia indica</i>	Dilleniaceae	Chalta	Tree	Fruits	Provides vitamin C, remove scurvy, mouth and lips bruise.	Fruit is directly consumed or can be taken as chutney, and many other modification.
50	<i>Eclipta alba</i>	Compositae	Vingu gach	Herb	Leaves extract	Remove the fatigue and weariness, excitation, increase the biological demand.	Powder of dried leaves or liquid extract of green leaves to be used 4 times daily.
51	<i>Elettaria cardamomum</i>	Zingiberaceae	Elachi gach(small)	Perennial Herbaceous plant	Seeds	Remove the storage cough, dry catarrh, asthma, bronchitis and breath-problem. Clean the throat. Acts as a good tonic.	Tablets are made from powder of dried seeds and fruits (dried by fire heat), to be used 4 times daily.
52	<i>Ephedra vulgaris</i>	Ephedraceae	Shemakalpalata	Shrub	Leaves and juvenile stems	Remove cough, cold, catarrh, asthma, hopping cough, bronchitis, breath problem, inflammation of larynx, throat pain.	Leaves and juvenile stems are mashed and tablets are made from the mashed product. Then dry it. To be used 3 times daily.
53	<i>Eucalyptus citriodora</i>	Myrtaceae	Eucalyptus tree	Tree	Oil or Extracts	Use as a antiseptic, remove teeth pain, many skin disease, stomach disorder and pneumonia.	Liquid and oily extract of the tree to be used properly and daily.
54	<i>Eugenia caryophyllata</i>	Myrtaceae	Labango	Clove tree	Labango (seed)	Remove cough, catarrh, asthma, cold, increase the stomach activity, breath problem	Tablets are made from powder of dried seeds, to be used 3 times daily.

Sl. no.	Scientific name	Family	Local name	Plant types	Part(s) used	Ailment	Formulation and Dosage
55	<i>Foeniculum vulgare</i>	Apiaceae	Mouri	Aromatic Plant	Roots, seeds	Remove fever, kidney disorder and maintain the regulatory if menstrual cycle.	Tablets are made from powder of dried roots and seeds combined, to be used 4 times daily.
56	<i>Gloriosa superba</i>	Liliaceae	Olatchandal	Tall Herb	Leaves and flowers	Use in many gynecology diseases, such as—irregular menstrual cycle, painful menstrual cycle, leucoria etc, to treat pails.	Tablets are made from powder of dried leaves and flower. To be used 3 times daily.
57	<i>Glycyrrhiza glabra</i>	Liguminosae	Josthi modhu	Perennial Herbaceous plant	Leaves, stems	Cough, dry catarrh, hopping cough, asthma.	Leaves and young stems are mashed, then tablets are made and dry them. To be taken 3 times per day.
58	<i>Hiptag madablota</i>	Malpighiaceae	Madhobilata	Thick and woody perennial climber plant	Flowers	Remove many diseases of gastrointestinal tracts.	Tablets are made from powder of dried flowers. To be used 2 times daily.
59	<i>Holarrhena antidysenterica</i>	Apocynaceae	Kurchi gach / Indrojab	Shrub or small tree	Bark	Remove diarrhea, disorders of stomach,	The barks are mashed and tablets are made from it. Then dry it. To be used 3 time daily.
60	<i>Hordeum vulgare</i>	Poaceae	Jab	Herb	seeds	Remove pain of belly, irregular digestion, vomiting tendency and lack of vitamins of baby.	Tablets are made from powder of dried seeds. To be used 4 times daily or directly consumed.
61	<i>Hyssopus officinalis</i>	Lamiaceae	Jufagach	Perennial Herbaceous /sub shrub plant	Flowers	Remove cough, cold, catarrh, asthma, hopping cough, bronchitis, breath problem, inflammation of larynx.	Flowers are mashed and tablets are made from the mashed product. Then dry it. To be used 3 times daily.
62	<i>Ipomoea alba</i>	Convolvulaceae	Dudhi kalmi	Herb	Leaves	To treat snakebites	Leaves are applied to boils and wound

Sl. no.	Scientific name	Family	Local name	Plant types	Part(s) used	Ailment	Formulation and Dosage
63	<i>Lagenaria vulgaris</i>	Cucurbitaceae	Lau	Large climber plant	Fruits	Wonderful treatment for cholera.	Used as vegetable. Consumed as a form of curry
64	<i>Luffa cylindrick</i>	Cucurbitaceae	Dhundol	Large climber plant	Leaves and roots	Removes many skin disease, pimple, make the skin soft and glorious.	Mashed leaves and roots are used directly or the liquid extract of leaves and roots to be used regularly.
65	<i>Malva sylvestris</i>	Malvaceae	Khabba gachh	Shurb	Seeds	Remove asthma, weakness of lung, catarrh caused by smoking.	Powders are made from dry seeds, then tablet are made from the powder. To be taken 3 times per day.
66	<i>Mangifera indica</i>	Anacardiaceae	AAM	Large sized tree	Leaves	Dental disease, hypertension, indigestions, gastric, and stomach disorder.	Juvenile leaves are mashed, then dry it. Power is produced from it. To be taken 3 times per day.
67	<i>Mentha arvensis</i>	Lamiaceae	Pudina pata	Perennial Herbaceous plant	Leaves	Removes many skin disease, pimple, make the skin soft and glorious.	Mashed leaves are used directly or the liquid extract of leaves to be used regularly.
68	<i>Menthe viridis</i>	Lamiaceae	Pahari Pudina	Perennial Herbaceous plant	Leaves	Treatment of hiccup, bilious vomiting, flatulence, colicky pain and cholera	Mashed leaves are used directly or the liquid extract of leaves juices to be used regularly.
69	<i>Momordica charantia</i>	Cucurbitaceae	Corolla	Herbaceous	Fruits	Treatment for diabetes, used as antioxidant, remove gout, heart problem, used as anticancer agent.	Used as vegetable. Consumed as a form of curry.
70	<i>Moringa oleifera</i>	Moringaceae	Sajna gachh	Deciduous tree	Leaf, fruit	Remove chicken pox	As a preventive measure against chicken pox, ½ cup juice obtained from macerated leaves is taken

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							once daily. Leaves are also consumed in the fried form, or boiled in water and taken in the mashed form. The fruits are cooked and eaten as vegetable. When small pox used to be present, the above preventive measures used to also taken against small pox.
71	<i>Musa sapientum</i>	Musaceae	Kola gach	Herbaceous	Fruits	Remove constipation, stomach disorder, malnutrition, provides vitamins and minerals.	Fruits are directly consumed.
72	<i>Nigella sativa</i>	Ranunculaceae	Kalogira gach	Herb	Seeds	Remove cough, catarrh, and asthma, cold, increase the stomach activity.	Fried or dried seeds are turned to powder. The powder to be taken 4 times per day.
73	<i>Nymphaea nouchali</i>	Nymphaeaceae	Shapla	Herb	Flowers	Cough inflammation of the vocal cord, catarrh.	Flowers are dried, then powder are made tablets are produced from powder. To be taken 6 times per day.
74	<i>Ocimum sanctum</i>	Labiatae	Tulshi	Sub-shrub	Leaves	Remove cough, cold, catarrh, many kinds of skin disease, pimple, and pierce.	Liquid extract of leaves are used about 5 times daily.
75	<i>Operculina turpethum</i>	Convolvulaceae	Thaury gach	Herbaceous	Roots	Remove pimple of face, many skin disease, fatigue, itching during urination.	Roots are mashed and tablets are made from the mashed product. Then dry it. To be used 4 times daily
76	<i>Pandanus tectorius</i>	Pandanaceae	Keura	Tree	Leaves extract	Remove fatigue, weakness, make the body	Liquid extract of leaves to be used 4 times daily.

Sl. no.	Scientific name	Family	Local name	Plant types	Part(s) used	Ailment	Formulation and Dosage
77	<i>Phoenix dactylifera</i>	Arecaceae	Khejur	Tree	Dry fruit without seeds	Increase the sexual power, remove sexual instability, increase the power of penis, concentrate the semen, and make the body charmed.	Taken directly as fruit items daily.
78	<i>Phyllanthus emblica</i>	Euphorbiaceae	Amloki	Medium sized tree	Fruits	Loss of hair, to stop vomiting, scurvy, bruise of mouth and leap, dysentery, blood dysentery, diarrhea.	50 g juice obtained from crushed leaves is mixed with 20 g sugar and taken twice daily for 2 weeks.
79	<i>Piper betle</i>	Piperaceae	Pan	Herbaceous Shrub	Leaves	Increase the sexual power of the male, penis make strong; remove the bad smell of the mouth.	Juice of the green leaves to be used 3 to 4 times daily.
80	<i>Piper cubeba</i>	Piperaceae	Kabab sugar	Herb	Seeds or fruits	Remove the storage cough, dry catarrh, asthma, bronchitis and breath-problem.	Tablets are made from powder of dried seeds and fruits, to be used 4 times daily.
81	<i>Piper nigrum</i>	Piperaceae	Golmorich	Climber Herbaceous shrub	Fruits	Increase the appetite; remove the vomiting tendency, indigestions and many other gastrointestinal disorders.	Tablets are produced from mashed product. Then dry. To be used 2 times daily.
82	<i>Pistacia lentiscus</i>	Anacardiaceae	Ruman gach	Shrub or dioecious tree	Roots, young stems	It is a stimulant for male, encouraging, increase the energy of the penis, use to treat gonorrhoea.	Liquid extract of root and juvenile stem to be used. Or, Tablets are made from powder of dried root and stem, to be used 4 times daily
83	<i>Plantago ovata</i>	Plantaginaceae	Ispaghool	Herb	Husk	Remove constipation, old	Husk is collected and dry.

Sl. no.	Scientific name	Family	Local name	Plant types	Part(s) used	Ailment	Formulation and Dosage
						dysentery, diarrhea, stomach disorder, and cholera. Effective to treat ORSHO DISEASE,	To be used with water in daily morning.
84	<i>Polianthes tuberosa</i>	asparagaceae	Rajanigandha	Herb	Flowers	Remove many skin disease, bruise.	Mashed flowers are directly applied on the skins.
85	<i>Portulaca oleracea</i>	Portulacaceae	Nune shak	Annual herb	Leaves, young stems	Pain in belly, increase the activity of stomach	Leaves with stems are mashed; tablet is made, then dry. 3 tablets to be taken per day
86	<i>Prunus amygdalus</i>	Rosaceae	Kagozi badam	dioeciously tree	Seeds	Concentrate the semen of the male, remove the constipation.	Liquid and oily extract of the seeds is collected and use. Or, Tablets are made from powder of dried seeds, to be used 3 times daily.
87	<i>Psidium guajava</i>	Myrtaceae	Peyara	Shrub or small tree	Fruits	Remove the fatigue and weariness, excitation.	The fruits are mashed and tablets are made. Then dry these. To be taken 6 times per day.
88	<i>Pterocarpus santalinus</i>	Fabaceae	Rakta chandan	Tree	Mashed stems, leaves	Remove gout, pain of gout, many skin disease and ARSHO disease.	Leaves and stems are mashed and tablets are made from the mashed product. Then dry it. To be used 3 times daily.
89	<i>Punica granatum</i>	Lythraceae	Anar	Shurb	Fruit extracts	Remove the weakness of heart and liver, physical and mental weakness, maintain the heart beat.	Fruit juice or normal fruit is directly consumed.
90	<i>Quercus infectoria</i>	Fagaceae	Maizay gach	Tree	fruits	Remove the leukemia, weakness of uterus, pain during menstrual cycle, make the menstrual cycle	Fruits are mashed, then dried, and tablets are made from the mashed product. Then dry it. To be used 4

Sl. no.	Scientific name	Family	Local name	Plant types	Part(s) used	Ailment	Formulation and Dosage
						regular.	times daily. Or tablets are produced from the powder of the dried fruits. To be used 4 times daily.
91	<i>Rauvolfia serpentina</i>	Apocynaceae	Sharpagandha	Herb	Bark of roots	Remove hypertension, insomnia and high level cholesterol of blood.	Tablets are made from powder of dried bark of roots. To be used 3 times daily.
92	<i>Rosa damascena</i>	Rosaceae	Golap gach	Shurb	Flowers extract	Remove fatigue, weakness, make the body charmed	Liquid extract of flowers to be used 4 times daily.
93	<i>Rumex vesicarius</i>	Polygonaceae	Chukka palang	Herb	Seeds	Use to treat diabetes militias.	Tablets are made from powder of dried seeds, to be used 4 times daily.
94	<i>Salvia plebeia</i>	Labiatae	Bhui-tulsi	Herb	Leaves, Seeds	Seed to treat Gonorrhoea, menorrhagia	Liquid extract of leaves are used taken internally
95	<i>Santalum album</i>	Santalaceae	Sadac handan	Evergreen tree	Stems	Remove pain of body, blood pollution, many skin disease, bruise, itching, DAD.	Stems are mashed and tablets are made from the mashed product. Then dry it. To be used 3 times daily.
96	<i>Saraca asoca</i>	Caesalpiaceae	Ashok gach	Tree	Bark	Use in many gynecology diseases, such as—irregular menstrual cycle, painful menstrual cycle, severe pain during menstrual cycle etc, increase the power of the uterus of woman	Tablets are made from powder of dried barks, to be used 4 times daily. Or, Liquid extract of the barks.
97	<i>Senna alata</i>	Fabaceae	Datmardan	Shrub	Leaves	Remove many skin disease, bruise.	Leaves are mashed and tablets are made from the mashed product. Then dry it. To be used 3 times daily. Or directly mashed leaves

Sl. no.	Scientific name	Family	Local name	Plant types	Part(s) used	Ailment	Formulation and Dosage
98	<i>Sesamum indicum</i>	Pedaliaceae	Tilgach	Herb	Seeds or fruits	Remove night pollution, sexual instability, cold, cough, catarrh, loss of hair, concentrate the semen, make the hair strong.	are applied. Liquid and oily extract of seeds is collected, and to be used 2-3 times daily according to role.
99	<i>Sida acuta</i>	Malvaceae	Urusia /Bon-methi	Shrub	Areal parts, seeds Roots	Used to treat demulcent and diuretic, rheumatic affections ,gonorrhoea and chronic dysentery	Leaves juice are used to treat demulcent and diuretic, Infusion of roots with ginger is given in intermittent fever and chronic boil complaints.
100	<i>Spinacia oleracea</i>	Amaranthaceae	Palang shak	Herb	Leaves and juvenile stems	Remove constipation, make the feces soft, remove digestion problem.	Leaves and stems are mashed and tablets are made from the mashed product. Then dry it. To be used 6 times daily.
101	<i>Syzygium cumini</i>	Myrtaceae	Jam	Large evergreen tree	Bark, Internal part of seed	Gargle and mouth wash, Pain in bone joint, asthma, gout, infection in throat, hypertension, diabetes.	Powder is made from the dry fruits, and then the powder is eaten with water 3 times daily.
102	<i>Tagetes patula</i>	Asteraceae	Gada	Herb	Flowers	Used as a antiseptics, stop bleeding.	Mashed products are directly applied on the wounded skins.
103	<i>Tamarindus indica</i>	Eaesalpiniaceae	Tetul	Tree	Seeds	Concentrate the semen, clean the urine, and remove many sexual disease of male.	Tablets are made from powder of dried seeds, to be used 3 times daily.
104	<i>Tamarix dioica</i>	Tamaricaceae	Jhau gach	Shurb	Leaves, root and young	A wonderful treatment of the jaundice.	Leaves, root and young stem are mashed, then

Sl. no.	Scientific name	Family	Local name	Plant types	Part(s) used	Ailment	Formulation and Dosage
					stem		dried. Tablets are produced from the mashed product. To be used 4-6 times daily.
105	<i>Terminalia arjuna</i>	Combretaceae	Arjun	Tree	Barks	A wonderful treatment for heart disease.	Cutting pieces of bark is dipped into water overnight, and then the water is consumed daily.
106	<i>Terminalia belerica</i>	Combretaceae	Bohera	Large Deciduous tree	Fruits	Remove acidity, constipation and stomach disorders.	Powder are made from dried fruits, the powder is to be used 3 time daily
107	<i>Terminalia chebula</i>	Combretaceae	Hortoki	Deciduous tree	Fruits	Remove dysentery, blood dysentery, diarrhea, stomach disorder, increase activity of liver.	Powder are made from dried fruits, the powder is to be used 3 time daily.
108	<i>Tinospora cordifolia</i>	Menispermaceae	Goloncha	Herbaceous /climbing shrub	Roots and leaves	Removes disease of urinary tracts, fatigue, physical and mental weakness.	Roots and leaves are mashed and tablets are made from the mashed product. Then dry it. To be used 3 times daily.
109	<i>Trachyspermum ammi</i>	Apiaceae	Jaiun gach	Tree	Fruit extracts	Increase the appetite, remove indigestions and many other gastrointestinal disorders.	Juice of the fruits to be used.
110	<i>Tribulus terrestris</i>	Zygophyllaceae	Gokhra gach	Tap rooted Herbaceous plant	Plant extract	Remove many complexity of kidney, fever, clean the urine and maintain its regularity.	Tablets are made from powder of dried external part of bark, to be used 3 times daily.
111	<i>Usnea longissima</i>	Parmeliaceae	Shailaj gach	Lichen	Roots and leaves	Remove nerve sickness, malnutrition, overweight, lack of vitamins, increase mental power.	Leaves and stems are mashed and tablets are made from the mashed product. Then dry it. To be used 3 times daily.
112	<i>Valeriana</i>	Valerianaceae	Tagar	Herb	Flowers	Remove the weakness of	Tablets are made from

Sl. no.	Scientific name	Family	Local name	Plant types	Part(s) used	Ailment	Formulation and Dosage
	<i>officinalis</i>					heart and liver, physical and mental weakness, maintain the heart beat.	powder of dried flowers. To be used 4 times daily.
113	<i>Vitex negundo</i>	Verbenaceae	Nishinda	Shrub or small tree	Leaves	Remove gouts	Leaves are mashed and tablets are made from the mashed product. Then dry it. To be used 4 times daily.
114	<i>Withania somnifera</i>	Solanaceae	Assha gach	Short Shrub	Leaves	Increase the appetite and stomach activity.	Tablets are produced from mashed leaves, then dry them. To be taken 4 times per day.
115	<i>Zingiber officinale</i>	Zingiberaceae	Aada	Herbaceous	Converted roots	Pain of belly, gastric, ulcer, indigestion and many other stomach disorders./evil wind	Juvenile zinger, with salt or dried zinger with salt to be taken 4 to 6 times daily.

The beneficial effects of this plant have been recorded in patients with myocardial infarction with angina and/or ischemic cardio-myopathy [8]. It has been shown that crude bark of this plant improved endogenous anti-oxidant compounds of rat heart and also prevented oxidative stress related with ischemic-reperfusion injury of the heart [9,10]. Extract of the bark of this plant, when given to patients with stable angina along with revocable ischemia on treadmill exercise, has been shown to improve clinical and treadmill exercise parameters compared to placebo trials [11].

The cardioprotective effect of an alcoholic extract of bark has been shown in isoproterenol-induced myocardial injury in Wistar albino rats [12]. The bark also reportedly protected rabbit heart against ischemic-reperfusion injury (Gauthaman et al. [10]). The bark powder also significantly reduced ischemic mitral regurgitation following acute myocardial infarction [13]. The defensive activity of ethanolic extract of bark of the plant against carbon tetrachloride-induced cardiac oxidative stress has been reported in mice. The protective effect of bark of this plant has also been described against doxorubicin induced cardiotoxicity in male Wistar rats [14] and against sodium fluoride-induced oxidative stress in murine heart [15].

The roots of *Asparagus racemosus* are used with other plant parts and spices by the people as remedy for tuberculosis. The root of this plant reportedly has anti-bacterial properties [16].

Heat stroke, headache, dizziness, physical weaknesses, vomiting tendency, loss of appetite, a general feeling of hotness in the body are common symptoms for agricultural laborers working manually under the sun for times, which may stretch for a period of several hours without any breaks. The Kaviraj recommend such people of consuming the soft pulp within the fleshy leaves of *Aloe vera* by itself or with sugar or molasses. Notably, this preparation was recommend to be taken in the morning, i.e. prior to the workers commencing any work. [17]

Moringa oleifera is usually advised by *Kavirajes* for the prevention of chicken pox. This plant is also used by *Kavirajes* in other regions of the country for treatment of chicken pox as well as small pox. In a survey conducted in Dinajpur district of the country by Rahmatullah et al. [18] have observed the use of *Moringa oleifera* as a preventive measure against chicken pox.

Table 2. Percentage use of various plant parts by *Kavirajes* of different traditional healers in Nalitabari Upazilla, Bangladesh

Plant part used	Percent(%) of use
Leaves	26.87
Fruits	18.12
Seeds	16.25
Roots	13.75
Stems	11.25
Flower	6.25
Bark	5.01
whole plant	2.5

4. CONCLUSION

Information on phyto-chemicals and pharmacologic activity studies conducted on a number of the plants (used by traditional healers) by modern scientific methods validated the traditional use of a number of plants and suggested that they can form a good source of newer drugs. The survey further highlighted the importance of gathering such ethno-medicinal information for effective conservation of medicinal knowledge and medicinally important plant species.

Medicinal plants compose an invaluable asset of a country. They contribute enormously to its health care system and also to its overall economy. Serious efforts should therefore be made by all concerned to develop and utilize medicinal plants to get maximum benefit from them. The best way to do this is to carry them under systematic and planned cultivation. They should be cultivated in profitable scale like other conventional cash crops. The agriculture scientists can play an important role in this effort by bringing wild medicinal plant, improving their quality and motivating the general farmers of conventional crops to produce medicinal plants in farm lands for commercial purpose.

ETHICAL APPROVAL

“All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.”

DECLARATION

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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