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## A Survey on Medicinal Plants Usage by Folk Medicinal Practitioners in Different Villages of Jhenaigati Upazila, Sherpur District, Bangladesh

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### Abstract

Folk medicinal practitioners play an important role in the primary health-care system of a substantial segment of the rural and urban population of Bangladesh. For hundreds of years, the population of Bangladesh has mainly relied on traditional medicinal practitioners known locally as “Kavirajes” or “Vaidyas” for treatment of various ailments. The mainstay of their formulation is medicinal plants, which is either administered orally or topically in the form of decoction, paste, pill, juice or direct administration of whole plant or plant part. The objective of this survey was to find out about medicinal plants used by the folk medicinal practitioners (Kavirajes) of Jhenaigati upazila to treat various ailments. Detailed information was collected from Kavirajes about plants, plant parts or combination of plants used, formulation of medicines, dosages as well as ailments for which the plants are used. Plant specimens were collected and dried on the field and later brought back and identified at the Bangladesh National Herbarium. It was observed that the Kavirajes used more than 140 plants. These plants were distributed into 65 families. The Fabaceae family provided the largest number of species (8) followed by both Cucurbitaceae (7) and Apocynaceae (7) families. The Myrtaceae, Apiaceae, Lamiaceae, Arecaceae, Asteraceae, Moraceae and Liliaceae families provided 4 plants each. The Combretaceae, Piperaceae, Araceae, Malvaceae, Acanthaceae families provided 3 plants each. The Anacardiaceae, Lythraceae, Lauraceae, Solanaceae, Asparagaceae, Zingiberaceae, Poaceae, Annonaceae, Phyllanthaceae, Rosaceae, Boraginaceae families provided 2 plants each. The rest of the families contain single plant. Leaf formed the most frequently used part (51.16%), followed by fruit (36.43%), root (30.23%), bark (22.48%), seed (20.93%), flower (13.95%), and stem (11.62%). The percentage of whole plant used in treatment is 13.95%. Sixty-two plants were shown to have beneficial effects in the treatment of gastrointestinal problems including diarrhea, dysentery, constipation, loss of appetite, and acidity etc. Forty-four plants were effective in the treatment of respiratory illness like asthma, coughs, and colds. Thirty-one plants were found to inhibit adverse inflammatory reactions. Twenty plants have beneficial effects on diabetes treatment. Almost eighteen plants have the potential to treat kidney and urinary tract disorders. Thirteen plants were used to treat jaundice and poisonous stings including snake bite, insect bite and scorpion stings. Nine plants have been found to treat eye problems including infections, sore eyes, eye pain etc. Eight plants were found to be useful in the treatment of mental complications. Additionally, many of these plants were used also to treat worm, infection, infertility, gout, malaria, skin problem, abdominal pain, allergy, cancers, dementia, dyspepsia, cut, burn, menstrual problems, sexual disorders, bleeding from cuts and wounds, helminthiasis, leprosy, vomiting, hypertension, heart disorders, tumors, rheumatism etc. The medicinal plants used by the Kavirajes can form a rich source of plants for further scientific studies leading to discovery of novel therapeutic compounds.

**Keywords:** Folk medicine, medicinal plants, ailments, Jhenaigati, Bangladesh

### 1. Introduction

Bangladesh is a south Asian country resides on the Bay of Bengal. About more than 150 million people live in this country. Majority of this people live in the 86,000 villages broaden throughout the country. Most of the village people are poor, so the rural peoples largely depend on the folk medications and with other complicated medications. These types of medications are called Kaviraje. This folk medication depends on various medicinal plants. They collect medicinal plants from village and use in various ailments. Almost every village has one or two kavirajes and the village people use their medication. Modern treatment facilities like clinics or hospitals are very rare in village and the kavirajes are primary level health care providers to the rural people of the country. This kavirajes are not well educated but they are very experienced in their medication. They have been practicing it from so many years.

rely on simple decoctions, paste or direct oral and topical administration of medicinal plants for healing of various ailments. The rural kaviraj uses very simple and uncomplicated methods for treatment, they have no educational degree but their treatments satisfy the patient. Most of the kavirajes gather their extensive knowledge from their forefather and they have been using it from generation to generation. The ethno-medicinal data of the kavirajes are collected and this document is important because the distinctive uses of medicinal plants are valuable source of information for discovery of effective allopathic drugs [1]. The rural people believe this kaviraj because they are villagers, they find him whenever they want. On the other hand the cost of allopathic drug is very high, so it is easier for them to use this cheap medicinal plants based treatment [2, 3]. Folk medicine practice has been established from the ancient period in our country. It is also widely accepted by general people of our country. We have performed ethno-medicinal surveys in Jhenaigati upazila to find a comprehensive picture of the medicinal plants in our country. Our surveys focused on village kavirajes whom are the habitation units of Bangladesh. In our ethno-medicinal survey we have tried to find the considerable variation of uses of medicinal plants among kavirajes. The main objectives of our study were to conduct a survey on medicinal plants usage among selected Kavirajes of different village at Jhenaigati upazila in Sherpur district, Bangladesh, to focus the medicinal plants that are grown in Jhenaigati and to find out the uses of these medicinal plants for the treatment of the diseases.

## 2. Materials and Methods

We have designed our study on Jhenaigati upazila in Sherpur district with an area of 231 square kilometers. It is bounded

by Meghalaya state of India on the north, Nalitabari upazila on east, Sreebardi upazila on west and Sherpur district on south. It has population of 155067, from them 50.91% male and 49.09% female. The density of population is 670 per sq km. Literacy rate among the people is 36.5%. The upazila consists of 7 union parishads and 117 villages. This survey was conducted between May to December 2015. A number of visit (26, each visit consists 1-2 days) were made in Jhenaigati upazila. We have collected data from randomly selected 29 different kavirajes and some aged people of this area. From them 18 were male and the rest 11 were female. We conducted the survey based on semi structured questionnaire and the guided field-walk method of Martin [4] and Maundu [5]. We asked many questions on their traditional medicinal practice and their choice of medicinal plants. We also asked them about their age, educational status, number of family members, income source and monthly income, food habit and what they know about the disease as well as medical preference. 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 as internationally. The interview was conducted in Bengali language and both the Kavirajes and interviewers were spoken in Bengali. The interviews were taken through forest regions from where they collected their plants and the same time they showed the plants, and mentioned their local names and uses. Plant specimens were brought and identified at the Bangladesh National Herbarium at Dhaka.

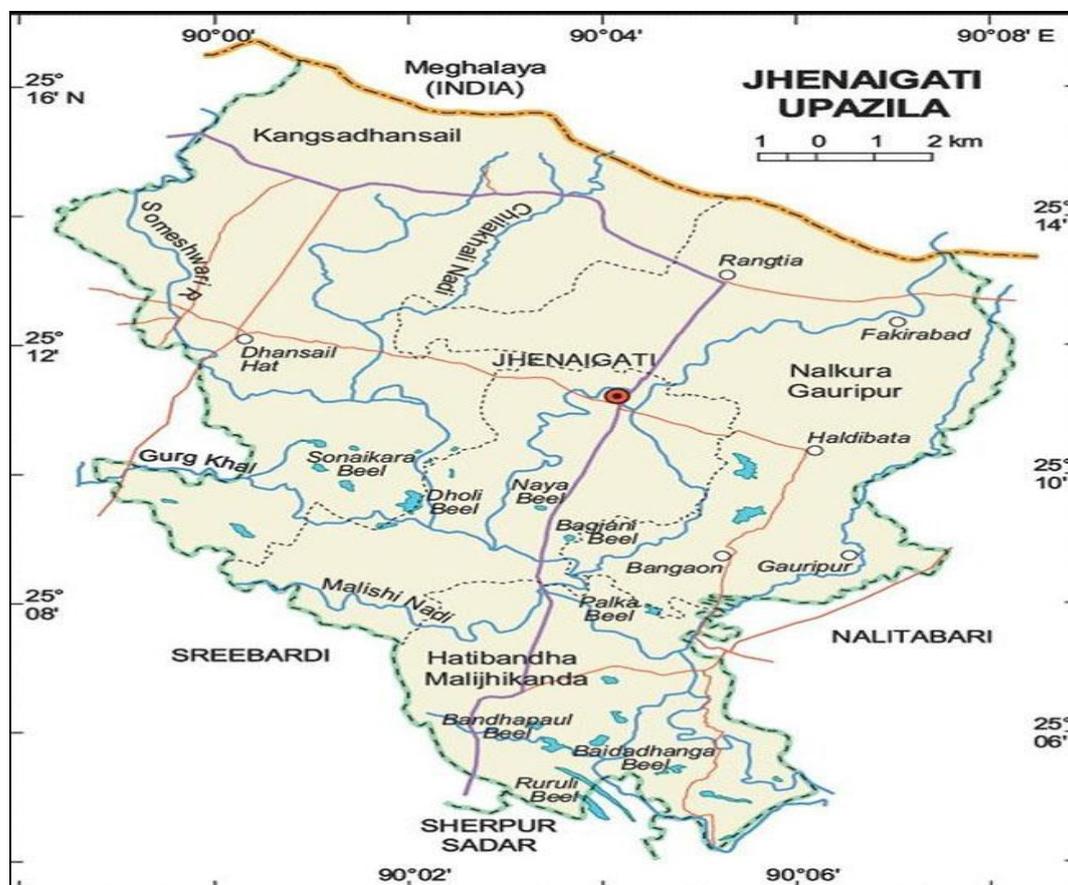


Fig 1: Location map of the survey area, Jhenaigati upazila.

### 3. Results and Discussion

#### 3.1. Plants and their Distribution into Families:

It was found that the Kavirajes of Jhenaigati area use more than 140 plants. These plants are distributed into 65 families. The Fabaceae family provided the largest number of species (8) followed by both Cucurbitaceae (7) and Apocynaceae (7) families. The Myrtaceae, Apiaceae, Lamiaceae, Arecaceae, Asteraceae, Moraceae and Liliaceae families provided 4 plants each. The Combretaceae, Piperaceae, Araceae, Malvaceae, Acanthaceae families provided 3 plants each. The Anacardiaceae, Lythraceae, Lauraceae, Solanaceae, Asparagaceae, Zingiberaceae, Poaceae, Annonaceae, Phyllanthaceae, Rosaceae, Boraginaceae families provided 2 plants each. The rest of the families contain single plant. Plants were obtained from both wild and cultivated area. The fruits and spices are used for consumption as well as commercial purpose.

#### 3.2 Uses of Plant Parts for ailment of Diseases

Various plant parts are used in the treatment of diseases. These parts include leaves, flowers, stems, barks, rhizomes, roots, fruits, seeds, tubers, wood, shoot, spikes etc. In the table, whole plant of 18 species is used to treat various kind of illness. In the survey of these selected plants, leaves form the most frequently used part (51.16%), followed by fruit (36.43%), root (30.23%), bark (22.48%), seed (20.93%), flower (13.95%), and stem (11.62%). The percentage of whole plant used in treatment is 13.95%.

#### 3.3 Medical Applications

In the table, sixty-two plants were shown to have beneficial effects in the treatment of gastrointestinal problems including diarrhea, dysentery, constipation etc. And forty-four plants were effective in the treatment of respiratory illness. Thirty-one plants were found to inhibit adverse inflammatory reactions. Twenty plants have beneficial effect on diabetes treatment. Almost eighteen plants have the potential to treat kidney and urinary tract disorders. Thirteen plants were used to treat jaundice and poisonous stings including snake bite, insect bite and scorpion stings. Nine plants have been found to treat eye problems including infections, sore eyes, eye pain etc. Eight plants were found to be useful in the treatment of mental complications. Additionally, many of these plants were used also to treat worm, infection, infertility, gout, malaria, skin problem, abdominal pain, allergy, cancers, dementia, dyspepsia, cut, burn, rheumatism etc. *Azadirachta indica* has been used largely in disease treatment more than any other plants. Cancer and diabetes are two alarming illness in human. *Azadirachta indica* can be used as potential remedy for these illness. Gedunin and Azadiradione, two alkaloids present in *Azadirachta indica*, are potential inhibitor of pancreatic alpha-amylase. It can be used directly to develop antidiabetic agent [6]. It also shows effects of alteration in cell proliferation, apoptosis, and angiogenesis in mammary carcinogenesis [8]. Cisplatin, a platinum based drug used in the treatment of ovarian, cervical, NSCLC, causes nephrotoxicity. Methanolic leaves extract of *Azadirachta indica* show to attenuate this nephrotoxicity in rat model [9].

**Table 1:** Medicinal plants used by the folk medicinal healers (Kavirajes) of different villages at Jhenaigati upazila in Sherpur district, Bangladesh

Sl No	Scientific Name	Family	Local Name	Used Part	Ailments (according to the Kavirajes) (References represent the same uses of these plants in many others survey studies conducting at different villages of Bangladesh)	Plant types
1	<i>Aegle marmelos</i>	Rutaceae	Bel	Fruit	Diarrhea, dysentery [10].	Tree
2	<i>Anthocephalus chinensis</i>	Rubiaceae	Kodom	Bark, leaves, fruit	Inflammation, fever, cough, diarrhea, vomiting, ulcers [11].	Tree
3	<i>Averrhoa carambola</i>	Oxalidaceae	Kamranga	Fruit, root, flower, leaves	Cough sore throat, food poisoning, colds, gastroenteritis, diabetes, fever, malaria [12].	Tree
4	<i>Azadirachta indica</i>	Meliaceae	Neem	Leaves, bark	Leprosy, eye problem, skin ulcers, fever, piles, diabetes, scabies, toothache [13].	Tree
5	<i>Syzygium cumini</i>	Myrtaceae	Jaam	Leaves, fruit, seed	Sore throat, bronchitis, asthma, thirst, biliousness, dysentery and ulcers [14].	Tree
6	<i>Spondias mombin</i>	Anacardiaceae	Amra	Fruit, bark and leave	Diarrhea, dysentery, haemorrhoids, gonorrhoea and leucorrhoea [15].	Tree
7	<i>Ziziphus jujuba</i>	Rhamnaceae	Boroi	Fruit, seed, leaves	Vomiting, tuberculosis, blood diseases, dysentery, smallpox, diarrhea [16].	Tree
8	<i>Terminalia chebula</i>	Combretaceae	Horitoki	Fruit	Gastritis and abdominal pain [10].	Tree
9	<i>Tamarindus indica</i>	Fabaceae	Tetul	Fruit	Headache, high pressure [10]	Tree
10	<i>Punica granatum</i>	Lythraceae	Dalim	Fruit, bark, root, leaves	Heart problems, stomach disorders, dental plaque, cancer, osteoarthritis, diabetes, anemia [17].	Shrub
11	<i>Terminalia belerica</i>	Combretaceae	Bohera	Fruit	Cough, diarrhea [10].	Tree
12	<i>Terminalia arjuna</i>	Combretaceae	Arjun	Bark, leaves	Fracture, ulcers, leukorrhoea, diabetes, anemia, cardiopathy, cirrhosis, earache, hypertension [18].	Tree
13	<i>Psidium guajava</i>	Myrtaceae	Peyara	Fruit, leaves	Diarrhea [10].	Tree
14	<i>Coriandrum sativum</i>	Apiaceae	Dhonia	Leaves and seed	Hyperglycemia, swelling and pains, inflammation, headache, sore throat, heartburn, nausea [19].	Herb

15	<i>Piper betle</i>	Piperaceae	Pan	Leaves	Bad breath, boils and abscesses, conjunctivitis, constipation, headache, itches, mastitis, mastoiditis, leucorrhoea, otorrhoea, swelling of gum, rheumatism, cuts, bronchitis, cough, asthma <sup>[20]</sup> .	Climber
16	<i>Ocimum tenuiflorum</i>	Lamiaceae	Tulsi	Leaves	Coughs, diabetes, infections, heal wounds <sup>[21]</sup> .	Herb
17	<i>Piper longum</i>	Piperaceae	Pipul	Leaves	Increase the sexual power of the male, penis make strong; remove the bad smell of the mouth.	Herbaceous Shrub
18	<i>Dillenia indica</i>	Dilleniaceae	Chalta	Flower, fruit	Stem-bark of <i>D. indica</i> serve as component of medicine for sores caused by mercury poisoning, chronic progredient sores and carbuncle and as a prophylactic in the cholera season. Stem extract applied on and around the wound caused by spider bite, helps to remove the poison. Leave of <i>D. indica</i> are used as an astringent, antiamphetamine <sup>[11]</sup> .	Tree
19	<i>Colocasia esculenta</i>	Araceae	Kochu	Whole plant	Latex of stem is used to treat bee or ant bite <sup>[12]</sup> .	Herb
20	<i>Coccinia grandis</i>	Cucurbitaceae	Telakucha	Leaves, root	Diabetes, GI disturbances, cooling effect to the eye, gonorrhoea, skin diseases, urinary tract infection, tuberculosis, eczema, inflammation, asthma, bronchitis, skin diseases <sup>[22]</sup> .	Climber
21	<i>Citrus maxima</i>	Rutaceae	Jambura	Leaves, fruit, root and seed	Epilepsy, chorea, convulsive cough, hemorrhage, leprosy, asthma, cough, hiccough, mental aberration, vomiting, diarrhea, headache and eye troubles <sup>[23]</sup> .	Tree
22	<i>Citrus limon</i>	Rutaceae	Lebu	Fruit, leaves	Vomiting, cholera, fever, stomach pain, sickness <sup>[24]</sup> .	Shrub
23	<i>Cinnamomum tamala</i>	Lauraceae	Tejpata	Leaves	Cardiac disorders, inflammations, dyspepsia, diarrhea, hepatopathy <sup>[11]</sup> .	Tree
24	<i>Datura metel</i>	Solanaceae	Dhutura	Leaves, root, flower	Asthma, cough, tuberculosis, bronchitis, hemorrhoid, skin diseases, rheumatism, headache, toothache, cholera <sup>[25]</sup> .	Shrub
25	<i>Cocos nucifera</i>	Arecaceae	Narikel	Fruit	Urinary, kidney and bladder problems. Promote healthy growth of hair. Protect wounds and burns from infections <sup>[26]</sup> .	Tree
26	<i>Centella asiatica</i>	Apiaceae	Thankuni	Leaf	Leaf juice is used in digestive problem, dysentery, gastritis <sup>[10]</sup> .	Herb
27	<i>Carica papaya</i>	Brassicales	Pepe	Fruit	Digestive and abdominal disorders, dyspepsia, hyperacidity, dysentery, constipation <sup>[27]</sup> .	Shrub
28	<i>Bombax ceiba</i>	Malvaceae	Shimul	Root, bark	Dysentery, influenza, skin troubles, inflammation, gonorrhoea. Heal wounds <sup>[28]</sup> .	Tree
29	<i>Musa balbisiana</i>	Musaceae	Bichi kola	Fruit	Urinary stones, bronchitis, dysentery, ulcers, diabetes, hysteria, epilepsy, leprosy, fevers, hemorrhages, acute dysentery and diarrhea <sup>[29]</sup> .	Herb
30	<i>Clerodendrum viscosum</i>	Verbenaceae	Bhati	Leaf	Skin diseases. Equal amounts of leaves from <i>Clerodendrum viscosum</i> and <i>Azadirachta indica</i> are taken, crushed thoroughly, and 21 pills prepared from the mixture. The pills are thoroughly dried in the sun and kept in airtight container. One pill is taken daily with water on an empty stomach.	Shrub
31	<i>Andrographis paniculata</i>	Acanthaceae	Kalomegh	Whole plant	Snake-bite, poisonous stings, dyspepsia, influenza, dysentery, malaria, respiratory infections, fever, colic pain, diarrhea <sup>[30]</sup> .	Herb
32	<i>Asparagus officinalis</i>	Asparagaceae	Shotomuli	Whole plant	Infertility, gout, rheumatism, arthritis, kidney stones, nausea, muscle spasm, stomachic, edema, skin diseases <sup>[31]</sup> .	Herb
33	<i>Moringa oleifera</i>	Moringaceae	Sojina	Leaves, root, seed, bark, fruit, flower	Tumor, inflammation, ulcer, diabetes, bacterial and fungal infections <sup>[32]</sup> .	Tree
34	<i>Curcuma longa</i>	Zingiberaceae	Holud	Rhizomes and tubers	Fever, dyspepsia, skin diseases, helminthic infections, eczema, bruises, wounds <sup>[33]</sup> .	Herb
35	<i>Ananas comosus</i>	Bromeliaceae	Anarosh	Fruit, leaves	Tumor, blood coagulation, inflammation, burn <sup>[34]</sup> .	Herb

36	<i>Justicia adhatoda</i>	Acanthaceae	Bashok	Leaves, root, flower and stem bark	Cough, bronchitis, asthma, common cold <sup>[35]</sup> .	Shrub
37	<i>Cynodon dactylon</i>	Poaceae	Durba gash	Whole plant	It has hepato-protective, immune-modulatory activity, anticancer activity, antioxidant activity. Heal wounds <sup>[36]</sup> .	Herb
38	<i>Abroma augusta</i>	Sterculiaceae	Ulot-kombol	Root, bark	Uterine disorders, diabetes, rheumatic pains of joints and headache with sinusitis <sup>[37]</sup> .	Tree
39	<i>Alternanthera sessilis</i>	Amaranthaceae	Chenchi-shak	Aerial parts	Alleviate pain. Reduce hyperglycemia <sup>[38]</sup> .	Herb
40	<i>Annona squamosa</i>	Annonaceae	Ata	Fruit	Common cold, diarrhea, fever, stomachache, rheumatism <sup>[39]</sup> .	Tree
41	<i>Mikania micrantha</i>	Asteraceae	Jarmany-lota	Whole plant	Inflammation, bacterial infections <sup>[40]</sup> .	Climber
42	<i>Opuntia dillenii</i>	Cactaceae	Fonimonosha	Whole plant	Bronchitis, asthma, whooping cough, snake bite, gonorrhea <sup>[33]</sup> .	Herb
43	<i>Momordica cochinchinensis</i>	Cucurbitaceae	Kakroal	Whole plant	Sore, wounds, infections, measles, hepatitis, fever, diabetes, dysentery, rheumatism, gout, toothache, liver disease. Heal wounds <sup>[41]</sup> .	Climber
44	<i>Mimosa pudica</i>	Fabaceae	Lajjaboti	Whole plant	Heal wound. To treat hyperglycemia, snake bite, microbial, fungal and viral infections, hemothermia, piles, diarrhea, dysentery <sup>[42]</sup> .	Herb
45	<i>Tagetes erecta</i>	Asteraceae	Gada-ful	Leaves, flower	Coughs, eczema. Heal wounds <sup>[43]</sup> .	Shrub
46	<i>Phyllanthus emblica</i>	Phyllanthaceae	Amloki	Fruit	Diabetes, cough, asthma, bronchitis, dyspepsia, anemia, biliousness, colic, hyperacidity, peptic ulcer, skindiseases, leprosy, inflammations, anemia, jaundice, dysentery, hemorrhages, cardiac disorders, headache and dizziness, snake-bite and scorpion-sting <sup>[44]</sup> .	Tree
47	<i>Diospyros blancoi</i>	Ebenaceae	Gab	Fruit, bark and leaves	Snakebite, diarrhea, dysentery, fungal infections <sup>[45]</sup> .	Tree
48	<i>Hibiscus rosa-sinensis</i>	Malvaceae	Joba	Flower, leaves and root	Fever, cough, alopecia, gonorrhea, seminal weakness, piles <sup>[46]</sup> .	Shrub
49	<i>Artocarpus heterophyllus</i>	Moraceae	Kathal	Fruit, leaves, bark and root	Inflammations, fungal infections, diabetes, helminthic infections <sup>[47]</sup> .	Tree
50	<i>Rosa centifolia</i>	Rosaceae	Golap	Flower	Inflammation, diabetes, HIV, dementia, cardiovascular problems <sup>[48]</sup> .	Shrub
51	<i>Cassia fistula</i>	Fabaceae	Banor-lathi	Fruit, leaves	Constipation. Leaf juice is taken thrice daily for 2 weeks for constipation.	Tree
52	<i>Aloe vera</i>	Xanthorrhoeaceae	Ghritokumari	Leaves	Wounds, burns, skin problems, diabetes, arthritis, eye diseases, tumor, vomiting, bronchitis, jaundice, ulcers, constipation, spleen enlargement <sup>[49]</sup> .	Herb
53	<i>Bryophyllum pinnatum</i>	Crassulaceae	Patharkuchi	Leaves	Diarrhea, vomiting, pains, inflammations, infections, stomach ulcers, fever, allergy, cancer, bruises, kidney stones, skin disorders, bleeding <sup>[50]</sup> .	Herb
54	<i>Ficus benghalensis</i>	Moraceae	Bot-gach	Milky juice and bark	Pains, bruises, sores, ulcers, rheumatism, toothache, diarrhea, gonorrhea <sup>[33]</sup> .	Tree
55	<i>Hemidesmus indicus</i>	Apocynaceae	Anonto-mool	Root, stem	Diarrhea, blood diseases, dysentery, respiratory disorders, skin diseases, syphilis, fever, leprosy, leukoderma, bronchitis, asthma, rheumatism <sup>[51]</sup> .	Shrub
56	<i>Calotropis gigantea</i>	Apocynaceae	Akondo	Whole plant	Dysentery, anemia, cholera, cold, cough, asthma, eczema, hysteria, gonorrhea, jaundice, joint pain, piles, snake bite, leprosy, whooping cough, ulcers, dyspepsia <sup>[52]</sup> .	Shrub
57	<i>Heliotropium indicum</i>	Boraginaceae	Hatishura	Whole plant	Skin diseases, poison bites, stomachache, nervous disorders, malaria, abdominal pain, dermatitis, fever, ulcers, sore throat, kidney stones, rheumatism, gonorrhea <sup>[53]</sup> .	Herb
58	<i>Capparis zeylanica</i>	Capparaceae	Apang	Root, bark, leaves.	Remove irritant, promote digestions. To treat cholera, swollen parts, piles, headache, gastritis <sup>[54]</sup> .	Shrub
59	<i>Mangifera indica</i>	Anacardiaceae	Aam	Bark, leaves, fruit	Diarrhea, dysentery, asthma, sinus trouble, rash, dandruff, hiccups, cough, toothache,	Tree

					helminthic infection, amoebiasis, hyperglycemia, inflammation, fungal infections <sup>[55]</sup> .	
60	<i>Ipomoea aquatica</i>	Convolvulaceae	Kolmi	Leaf, top of stem	Skin disorders like scabies or eczema. Skin disorders occur more in the rural population at certain periods of the year. During these periods, ½ cup amount of juice obtained from macerated leaves is taken daily as a preventive measure. Alternately, leaves and top of stems are boiled in water and consumed. This measure is also advised for people who are susceptible to skin disorders like scabies or eczema.	Herb
61	<i>Acacia nilotica</i>	Fabaceae	Babla	Root, leaves, gums, pods, seed, stem bark	Helminthic infection, hemorrhage, wound, ulcers, leprosy, leukoderma, small pox, skin diseases, burning sensation, toothache, dysentery, cold, bronchitis, diarrhea, dysentery, bleeding piles <sup>[56]</sup> .	Tree
62	<i>Daucus carota</i>	Umbelliferae	Gajar	Converted root	Source of vitamins and minerals, Removes the weariness and fatigue <sup>[57]</sup> .	Annual or biennial herb
63	<i>Piper longum</i>	Piperaceae	Pipul	Stem, root, leaves, spike	Bronchial disease, dyspepsia, amoebiasis, cough, leprosy, diabetes, piles, anemia, insomnia, tumor, paralysis, gout <sup>[58]</sup> .	Shrub
64	<i>Solanum capsicoides</i>	Solanaceae	Tit-begun	Fruit	Skin problems, toothache, ulcerated nose <sup>[59]</sup> .	Shrub
65	<i>Momordica charantia</i>	Cucurbitaceae	Korola	Fruit, seed, shoot, root, leaves	Leprosy, piles, jaundice, ringworm, cough, congestion, chest pain, scars in small pox, diabetes, hydrophobia, gout, malaria, pneumonia <sup>[60]</sup> .	Climber
66	<i>Mucuna pruriens</i>	Fabaceae	Alkushie	Seed	Parkinson's disease, epilepsy, snake bite, inflammation, male infertility <sup>[61]</sup> .	Climber
67	<i>Hyptis suaveolens</i>	Lamiaceae	Tokma	Fruit	Rheumatism, stomach problem, gastrointestinal parasites, fever, skin rashes, eczema, dysentery <sup>[54]</sup> .	Herb
68	<i>Lagerstroemia speciosa</i>	Lythraceae	Jarul	Leaves, root and bark	Diabetes, ulcers, abdominal pains, high glucose level, obesity <sup>[62]</sup> .	Tree
69	<i>Eucalyptus citriodora</i>	Myrtaceae	Eucalyptus	Oil or Extract	Use as an antiseptic, remove teeth pain, many skin disease, stomach disorder and pneumonia <sup>[63]</sup> .	Tree
70	<i>Nyctanthes arbortristis</i>	Verbenaceae	Shefali	Flower, seed, bark, stem	Snake bite, spleen enlargement, rheumatism, malaria, ulcer, inflammation, helminthes infection <sup>[64]</sup> .	Shrub
71	<i>Phyla nodiflora</i>	Verbenaceae	Koi-okra	Whole plant	Skin problems, cancer, inflammation, hepatitis, wound, burning, fever <sup>[65]</sup> .	Herb
72	<i>Polyalthia longifolia</i>	Annonaceae	Devdaru	Bark	Fever, skin disease, hypertension, blood pressure, inflammation, ulcer <sup>[66]</sup> .	Tree
73	<i>Alstonia scholaris</i>	Apocynaceae	Chaiton	Bark, leaves and fruit	Malaria, cancer, leprosy, skin diseases, ulcers, asthma, bronchitis, diarrhea, syphilis, epilepsy, blood pressure <sup>[67]</sup> .	Tree
74	<i>Borassus flabellifer</i>	Arecaceae	Tal	Root, flowering stalk, juice, bark, leaves, fruit	Hiccup, gastric, secondary syphilis, gonorrhoea, respiratory diseases, enlarged liver and spleen, diabetes <sup>[68]</sup> .	Tree
75	<i>Enhydra fluctuans</i>	Asteraceae	Helencha	Whole plant	Gastric, ulcer, constipation, pimples, kidney stones, skin diseases, diabetes <sup>[69]</sup> .	Herb
76	<i>Xanthium indicum</i>	Asteraceae	Hagra	Root, leaves	Control blood sugar in diabetic patients. To treat rheumatic pain, helminthic infection, leukoderma, urinogenital diseases, insect bites, itch <sup>[70]</sup> .	Herb
77	<i>Cuscuta reflexa</i>	Cuscutaceae	Aloklota	Seed, stem and fruit	Jaundice, rheumatism, gout, headache, bilious disorders, body pain, itchy skin, constipation, mental illness <sup>[71]</sup> .	Climber
78	<i>Jatropha gossypifolia</i>	Euphorbiaceae	Vela	Whole plant	Headache, toothache, malaria, eye pains, diarrhea, cancer, infection, inflammation, burns, gastrointestinal disorders, gonorrhoea, leprosy, skin diseases, rheumatism <sup>[72]</sup> .	Shrub
79	<i>Albizia saman</i>	Fabaceae	Renti-koroi	Bark, leaves root, seed	Constipation, diarrhea, sore throat <sup>[73]</sup> .	Tree

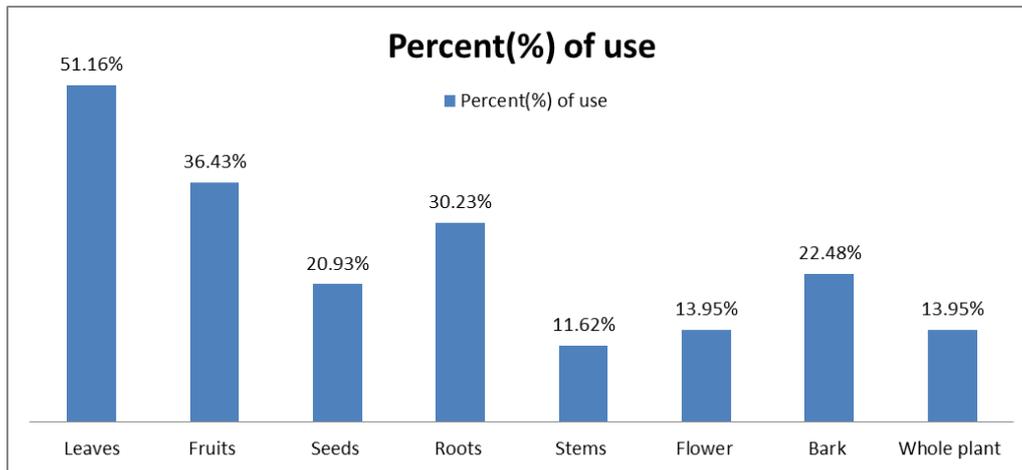
80	<i>Dalbergia sissoo</i>	Fabaceae	Shishu	Root, bark, wood, leaves and seed	Emesis, ulcers, leukoderma, dysentery, stomach troubles, skin diseases, blood diseases, syphilis, dysentery, nausea, eye and nose disorders <sup>[74]</sup> .	Tree
81	<i>Eclipta alba</i>	Asteraceae	Kalo-keshrai	Leaf	Dandruff, hair loss, to blacken hair. Fruits of <i>Phyllanthus emblica</i> are mixed with leaves of <i>Eclipta alba</i> , macerated and soaked in oil. The oil is warmed. Following cooling a little amount of camphor is mixed with oil and a small amount of oil is applied to the scalp.	Herb
82	<i>Saraca asoca</i>	Caesalpiniaceae	Ashok-gach	Bark and seed	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 <sup>[75]</sup> .	Tree
83	<i>Datura metel</i>	Solanaceae	Kalo-dhutura	Leaf	Joint pain.	Shrub
84	<i>Glycyrrhiza glabra</i>	Fabaceae	Josthi-modhu	Root	It is diuretic, aphrodisiac, intellect promoting. To treat cough, bronchitis, urelcosis, gastralgia, fever, skin diseases <sup>[11]</sup> .	Shrub
85	<i>Lablab purpureus</i>	Fabaceae	Shim	Leaves, seed	It is laxative, diuretic, galactagogue, stomachic. To treat inflammations, agalactia, strangury <sup>[11]</sup> .	Herb
86	<i>Swertia chirayita</i>	Gentianaceae	Chirata	Whole plant	Skin diseases, inflammations, malaria, hyperglycemia, helminthic infections, fever, and constipation <sup>[76]</sup> .	Herb
87	<i>Vitex negundo</i>	Lamiaceae	Nishinda	Root, leaves, bark, flower	Asthma, bronchitis, spleen enlargement, gonorrhea, dysentery, arthritis, helminthic infections, toothache, encephalitis, joint pain, jaundices <sup>[77]</sup> .	Tree
88	<i>Ficus hispida</i>	Moraceae	Khoksha	Leaves, fruit	Dysentery, ulcers, biliousness, psoriasis, anemia, piles, diarrhea, jaundice <sup>[78]</sup> .	Shrub
89	<i>Polygonum hydropiper</i>	Polygonaceae	Bish-kathal	Leaves, seed	Gynecological bleeding, colds, coughs, dysentery, gout, sores, ulcers, toothache, hemorrhoids <sup>[79]</sup> .	Herb
90	<i>Justicia gendarussa</i>	Acanthaceae	Bish-jaron	Root and leaves	Rheumatism, facial paralysis, cough, bronchitis, arthritis, hemorrhages, fever <sup>[11]</sup> .	Shrub
91	<i>Carissa carandas</i>	Apocynaceae	Koromcha	Root, fruit and leaves	Acidity, fever, flatulence, poor digestions, diabetic ulcer, constipation, diarrhea. Heal wounds <sup>[80]</sup> .	Shrub
92	<i>Catharanthus roseus</i>	Apocynaceae	Noyontara	Whole plant	Malaria, diarrhea, dengue, skin diseases, cancers, toothache, stomach ulcers, dysentery, neurological complications <sup>[25]</sup> .	Herb
93	<i>Nerium indicum</i>	Apocynaceae	Korobi	Whole plant	Cardiac illness, asthma, cancer, epilepsy, skin diseases, inflammation, fever, headache, hypertension. To treat wound <sup>[81]</sup> .	Shrub
94	<i>Baccaurea motleyana</i>	Phyllanthaceae	Lotkon	Fruit, fruit peel	Treatment of sore eyes, antibacterial activity.	Tree
95	<i>Cajanus cajan</i>	Fabaceae	Arhor	Leaves, seed and stem	Food poisoning, constipation, parasitic infections, intoxication, oral ulcers, inflammations, measles <sup>[82]</sup> .	Shrub
96	<i>Cassia sophera</i>	Fabaceae	Thon-thoni (Kolkasunda)	Leaves, bark, root, seed	Osteoarthritis, asthma, allergic rhinitis, ringworm infection, syphilitic sores, coughs, snake bites, hiccups, gonorrhea, jaundice, acute bronchitis, fever, common colds <sup>[83]</sup> .	Shrub
97	<i>Cinnamomum zeylanicum</i>	Lauraceae	Daruchini	Bark and leaves	Infections, insulin resistance, metabolic diseases, hypocholesteremia, arthritis, asthma, cancer, impotence, eye inflammation, wounds, toothache, bronchitis, common cold <sup>[84]</sup> .	Shrub
98	<i>Syzygium aromaticum</i>	Myrtaceae	Labanga	Flower	Headache, aching teeth, vomiting stomach sickness, arthritis, rheumatism, mouth infections, cough, acnes <sup>[85]</sup> .	Tree
99	<i>Manilkara zapota</i>	Sapotaceae	Sofeda	Fruit, seed, and bark	Diarrhea, pulmonary diseases, bladder stones, kidney stones, stings, blood pressure, constipation <sup>[85]</sup> .	Tree
100	<i>Smilax ovalifolia</i>	Liliaceae	Kumarilota	Leaves, root, shoot and areal part	Skin problems, jaundice, toothache, scabies, muscular pain, stomach pain, urinary problems, arthritis, dysentery, malaria, tuberculosis, rheumatism <sup>[86]</sup> .	Climber
101	<i>Clerodendrum viscosum</i>	Lamiaceae	Foksha	Root and leaves	Skin diseases, dental carries, abdominal pain, scorpion sting, snake bites, swelling,	Shrub

					dysentery, gastric disorders, chest pain, fever, rheumatisms <sup>[75]</sup> .	
102	<i>Amorphophallus campanulatus</i>	Araceae	Oal	Tuber	Inflammations, hemorrhoids, cough, vomiting, bronchitis, asthma, piles, dysentery, urinary diseases, dyspepsia, rheumatism, gastrointestinal disorders, lung swelling <sup>[85]</sup> .	Herb
103	<i>Alocasia macrorrhizos</i>	Araceae	Man-kochu	Stem, tuber and leaves	Relieves pain; heal wounds, to treat diarrhea, malaria, cough, headache, inflammation, skin disorders, and indigestions <sup>[87]</sup> .	Herb
104	<i>Cyperus rotundus</i>	Cyperaceae	Mutha	Tuber or Rhizomes	Fever, diarrhea, eczema, ulcer, cough, dysentery, dyspepsia, vomiting, cholera. Heal wounds and act as anti-helminthic <sup>[33]</sup> .	Herb
105	<i>Erythrina variegata</i>	Fabaceae	Madar	Bark, leaves	It has antibacterial, antioxidant, analgesic, diuretic, anti-inflammatory, smooth muscle relaxant, anti-helminthic activity. To treat fever. Enhances myocardial contractility <sup>[88]</sup> .	Tree
106	<i>Tinospora cordifolia</i>	Menispermaceae	Goloncho	Whole plant	Enhances memory, digestive ailments hyperacidity, colitis, worm infestations, loss of appetite, abdominal pain, excessive thirst, vomiting and liver disorders. Remedy of raktapitta, anemia, cardiac debility, diabetes, sexual debility and splenic disorders <sup>[89]</sup> .	Shrub
107	<i>Ipomoea mauritiana</i>	Convolvulaceae	Bhuikumra	Fruit, root, tuber	Tuberculosis, kidney pain. Increases appetite and reduces miscarriage <sup>[87]</sup> .	Climber
107.	<i>Cucurbita moschata</i>	Cucurbitaceae	Kumro	Fruit, seed and flower	Anti-helminthic. To treat skin infection, inflammations, jaundice. Prevents kidney stones.	Climber
108	<i>Clitoria ternatea</i>	Fabaceae	Aparajita	Root, leaves and flower	Promote memory and intelligence. To treat throat and eye infections, skin diseases, urinary troubles, ulcer, insomnia, respiratory disorders <sup>[90]</sup> .	Perennial herb
109	<i>Santalum album</i>	Santalaceae	Chondon	Wood	Headache, stomachache, urogenital disorders, skin disorder, gonorrhea, diarrhea, dysentery, nausea, abdominal pain <sup>[91]</sup> .	Medium sized hemi parasitic tree
110	<i>Usnea longissima</i>	Parmeliaceae	Shailaj-gach	Root and leaves	Removes nerve sickness, malnutrition, overweight, lack of vitamins, increases mental power <sup>[92]</sup> .	Herb
111	<i>Tribulus terrestris</i>	Zygophyllaceae	Gokhra-gach	Plant extract	Removes complexity of kidney, fever, cleans the urine and maintains its regularity <sup>[93]</sup> .	Herb
112	<i>Trachyspermum ammi</i>	Apiaceae	Jaiun-gach	Fruit extract	Increases the appetite, remove indigestion and many other gastrointestinal disorders.	Herb
113	<i>Tamarix dioica</i>	Tamaricaceae	Jhau-gach	Leaves, root	A wonderful treatment for jaundice.	Tree
114	<i>Sida acuta</i>	Malvaceae	Bon-methi	Areal part, seed, root	To treat demulcent and diuretic, rheumatic affections, gonorrhea and chronic dysentery <sup>[92]</sup> .	Shrub
115	<i>Sesamum indicum</i>	Pedaliaceae	Til-gach	Seed or fruit	Removes sexual instability, cold, cough, catarrh, loss of hair, concentrate the semen, and make the hair strong <sup>[94]</sup> .	Herb
116	<i>Senna alata</i>	Fabaceae	Datmardan	Leaves	Removes many skin disease, bruise.	Shrub
117	<i>Acacia arabica</i>	Mimosaceae	Arobi	Leaves, stem extract	Removes catarrh, cough, catarrh caused by smoking <sup>[95]</sup> .	Tree
118	<i>Allium cepa</i>	Liliaceae	Piyanj	Converted root	Removes the catarrh, cough, weariness and fatigue, dandruff <sup>[96]</sup> .	Herb
119	<i>Allium sativum</i>	Liliaceae	Roshun	Converted root	To remove wound, septic, hypertension, diabetes. Increases the power of heart <sup>[97]</sup> .	Herb
120	<i>Amomum subulatum</i>	Zingiberaceae	Elachi	Fruit with seed	Remove gastric, stomach disorders, bad smell of mouth, clean the throat, and increases the appetite and the power of stomach <sup>[98]</sup> .	Herb
121	<i>Areca catechu</i>	Palmae	Shupari	Seed	Removes sickness of uterus, irregular menstrual cycle, inflammation of uterus <sup>[99]</sup> .	Tree
122	<i>Bacopa moniera</i>	Serophulariaceae	Brammi	Leaves and whole plant	To treat nerve and brain diseases. Increases the memorizing power <sup>[90]</sup> .	Herb
123	<i>Bauhinia purpurea</i>	Caesalpiniaceae	Rakta-kanchan	Leaves	Removes skin disease, pimple and bruise of skin <sup>[100]</sup> .	Shrub
124	<i>Boerhaavia repens</i>	Nyctaginaceae	Punor-nova	Root, stem, leaves	Removes gout, dropsy, irregular urine, kidney disorders <sup>[101]</sup> .	Herb

125	<i>Borago officinalis</i>	Boraginaneae	Jabani-gach	Leaves	Jaundice, inflammation and many other diseases of uterus of women <sup>[92]</sup> .	Herb
126	<i>Citrullus lanatus</i>	Cucurbitace	Tarmuj	Fruit	To make the body charmed, removes worms from the intestine.	Climber
127	<i>Crocus sativus</i>	Liliaceae	Jafran-gach	Leaves, stem	Dysentery, blood dysentery, diarrhea, stomach disorder, and cholera <sup>[101]</sup> .	Shrub
128	<i>Eclipta alba</i>	Compositae	Vingu-gach	Leaves extract	Removes fatigue, weariness and excitation, increase the biological demand.	Herb
129	<i>Cydonia oblonga</i>	Rosaceae	Bihi dana	seed	Dry catarrh, hopping cough. Increases the lung activity.	Shrub
130	<i>Eugenia caryophyllata</i>	Myrtaceae	Labango	Fruit and seed	Removes cough, catarrh, asthma, cold, breath problem etc. and increases the stomach activity <sup>[102]</sup> .	Tree
131	<i>Foeniculum vulgare</i>	Apiaceae	Mouri	Root, seed	Removes fever, kidney disorder and maintains the regulatory if menstrual cycle <sup>[103]</sup> .	Hardy, perennial herb
132	<i>Hordeum vulgare</i>	Poaceae	Jab	Seed	Removes pain of belly, irregular digestion, vomiting tendency and lack of vitamins of baby <sup>[104]</sup> .	Herb
133	<i>Lagenaria vulgaris</i>	Cucurbitaceae	Lau	Fruit, leaves, stem, and flower	To treat fever, insomnia, epilepsy and other nervous diseases. Removes heart problems, digestive and urinary disorders <sup>[105]</sup> .	Climber
134	<i>Luffa cylindrick</i>	Cucurbitaceae	Dhundol	Seed, fruit and leaves	Asthma, skin diseases, splenic enlargement, rheumatism, back-pain, chest pains, fever, syphilis, tumor, bronchitis, splenopathy, leprosy, dropsy, nephritis, bronchitis <sup>[106]</sup> .	Climber
135	<i>Pandanus tectorius</i>	Pandanaceae	Keura	Anther, root, seed	Leprosy, urinary tract problems, asthma, back pain, leukoderma, headache, blood diseases and rheumatism <sup>[107]</sup> .	Shrub
136	<i>Phoenix dactylifera</i>	Arecaceae	Khejur	Fruit	Reliefs of sore-throat and prevents LDL cholesterol absorption in the gut, to treat gastric ulcer, intestinal worms <sup>[108]</sup> .	Tree
137	<i>Piper nigrum</i>	Piperaceae	Gol-morich	Fruit	Increases appetite; removes vomiting tendency, indigestions and many others gastrointestinal disorders.	Climber
138	<i>Plantago ovata</i>	Plantaginaceae	Isabgol	Seed and husk	To treat chronic dysentery, constipation, intestinal fluxes, gonorrhea, urethritis and hemorrhoids. Decreases cholesterol level <sup>[75]</sup> .	Herb
139	<i>Polianthes tuberosa</i>	Asparagaceae	Rajanigandha	Flower	Stress, anxiety, hypersensitivity, anger, disorientation, emotional conflict, sedating inflammations, frigidity <sup>[109]</sup> .	Herb
140	<i>Aristolochia indica</i>	Aristolochiaceae	Iche	Root, rhizome and leaves	It is anti-arthritis, anti-helminthic. Relieves snake bite, cough, impotency and leprosy. Reduces inflammations and biliousness <sup>[33]</sup> .	Shrub

**Table 2:** Percentages of various plant parts used by different traditional healers (Kavirajes) of Jhenaigati upazila, Bangladesh

Plant part used	Percent(%) of use
Leaves	51.16%
Fruits	36.43%
Seeds	20.93%
Roots	30.23%
Stems	11.62%
Flower	13.95%
Bark	22.48%
Whole plant	13.95%



**Fig 2:** Percentages of various plant parts used by different traditional healers (Kavirajes) of Jhenaigati upazila, Bangladesh.

The beneficial effects of this plant have been recorded in patients with myocardial infarction with angina and/or ischemic cardio-myopathy. Extract from *Allium sativum* is shown to be effective in reducing peripheral and central pressure. It also has the potential to improve inflammation, and other cardiovascular abnormalities in patients [110]. Garlic extract has also been shown to modulate human immunity [111].

Ethanol extract of *Piper betle* shows lipid lowering effect in Triton WR-1339-induced hyper-cholesterolemic rats [7]. So it can be used as anti-hypercholesterolemic agent in obese and hypercholesterolemic patients. In another experiment, hot aqueous extract and cold ethanolic extract of *Piper betle* shows gastro-protective activity in experimental rats [112]. *Phyllanthus emblica* extracts have been shown to prevent contrast-induced acute kidney injury in rat model [113]. another experiment, polyphenol extract of *Phyllanthus emblica* has been shown to inhibit cell proliferation and triggers apoptosis in cervical cancer [114]. *Bryophyllum pinnatum* is an important medicinal plant widely used by people in Bangladesh to treat various illnesses. One experiment suggested that *Bryophyllum pinnatum* leaf aqueous extract contains anti-nociceptive, anti-inflammatory and hypoglycaemic properties [115]. In another study, ethanolic extract of *Bryophyllum pinnatum* has been shown to have effectiveness as a topical anti-inflammatory agent in acute and chronic inflammatory processes [116]. It has also shown to have anti-neoplastic activity in chemically induced hepatocarcinogenesis in rat model [117].

#### 4. Conclusion

The people of Jhenaigati upazila use medicinal plants as primary treatment. We collected 140 medicinal plants of them. They used it especially for fever, cold, coughs, headache, body pain, diarrhea, dysentery, constipation, indigestion, wounds, boils, skin diseases, helminthiasis and urinary troubles. One of the most important finding of our study is that people were not concern about the documentation of this knowledge. Now people are now concern about modern medical system, although the kavirajes have great impact on primary health care of rural people. In this study we found some plants that are unique for their treatment.

Medicinal plants are worthless asset of a country. These contribute enormously to the health care system and also to the overall economy. It can provide easier treatment effort to both rural and urban people of our country. In this case proper

utilization of these medicinal plants is very necessary and this can be done under a systemic or planned cultivation process. These should cultivate as like as our cash crops. We can apply the modern breeding and propagation techniques for their rapid growth and production. Agriculture scientists can run research work to improve their quality and motivating the farmers to cultivate more medicinal plants for commercial purpose. Our present investigation created positive impact especially on the local people who expressed their interest after learning the fact that there is sufficient scientific basis of the healing power of the plants. This will help the people to increase awareness towards the conventional use of medicinal plants and bring the plant diversity for future generation.

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