



ISSN 2278-4136
JPP 2014; 3 (2):23-33
Received: 09-05-2014
Accepted: 30-05-2014

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Ethnomedicinal uses of herbs by indigenous medicine practitioners of Jhenaidah district, Bangladesh

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ABSTRACT

Since ancient time, the tradition of ethnomedicine practice has been established in Bangladesh and such medicine practitioners are called Kavirajes. Kavirajes generally work with different plants, particular parts of plants, plant extracts or use extract in different combination. But in spite of its acceptance, the knowledge of Kavirajes on ethnomedicine are not properly documented and preserved. The present survey deals with works four Kavirajes of Jhenaidah district involving 45 herbs as remedy of different diseases. The majority of the herbs belong to Fabaceae, followed by Cucurbitaceae, Liliaceae, Piperaceae and others. Bulb, bark, cord, fruits, flower, leaf, root, rhizome, seed pulp, seed oil, stem and even the whole plant were used for medicinal purposes. The proportion of use of different parts, however, was observed as leaf 35%, fruits 22.20%, roots, seeds 13.30% each; stem 11.10% and whole plant 8.90%. The indigenous practitioners indicated dilution, dose, administration time in their prescription and mixture played a key role in need of combinations of useful extracts. In some cases, carrier materials show a significant function. Knowledge of the ethnomedicine practitioners, if nurtured through proper analysis, quality assessment and with advance researches, would be an asset for treating and preventing diseases of the rural people at minimum cost.

Keywords: Jhenaidah, kaviraj, medicinal plants, ethnomedicine, infectious diseases, remedy, Bangladesh.

1. Introduction

Diseases and other related ailments are predictable in life and have led man to discover ways by which they could be treated. Plants have always been a successful source of remedy from nature. Such practice is as old as human existence and forms an integral part of traditional medicine. The term medicinal is applied to a plant indicates that it contains a substance or substances which modulate beneficially the physiology of sick mammals and that it has been used by man for that purpose^[1]. Medicinal plants are the wealthiest bio-resources of drugs of traditional system of medicines. About 80% of more than 4,000 million inhabitants of the world rely chiefly on traditional medicines for their primary health care needs (WHO1985)^[2]. The use of medicinal herbs is still a tradition adopted by ethnic communities who are living in flat delta and hilly areas spread over the northern and southern region of Bangladesh.

Herbalists, indigenous medicine practitioners or healers, otherwise known as Kavirajes or Vaidyas form an important section of the primary healthcare system of Bangladesh. Almost every village of the 86,000 villages of the country has one or more practicing Kavirajes^[3]. Two to three Kavirajes on average practice in every village administering phytomedicine thus fulfilling the primary healthcare needs of a large segment of the population. In fact, a survey report concluded that 39% of rural community members have knowledge about medicinal plants and 13% treat simple ailments with herbs^[4]. Kavirajes rely almost exclusively on medicinal herbs in their formulations, which are simple and mainly consist of plant juice, decoctions or pastes that is administered orally or topically depending upon the ailment^[5-6]. Three factors legitimize the role of the healer – their own beliefs, the success of their actions and the beliefs of the community^[7]. Kavirajes do not only treat the symptoms, but also try to find out underlying cause(s) behind the appearance of the ailment. Because of this holistic approach to treatment, the Kavirajes enjoy considerable trust and support from their patients^[8].

The herbal practitioners do not have their own medicinal books or follow any standardized customs. As a result, the selection of a medicinal plant by a Kaviraj for treatment of any specific ailment is unique to the Kavirajes and varies considerably between Kavirajes of a particular area

or even villages ¹⁹⁻¹¹. Each Kaviraj tends to keep his or her knowledge of medicinal plants within the family, which is passed from generation to generation. Over time, this knowledge becomes unique to the Kaviraj and his successor(s) ¹².

Bangladesh owing to its favorable climatic influences has been blessed with immense natural resources including explored and unexplored medicinal herbs. About 5000 species of phanerogams and pteridophytes grow in Bangladesh ¹³ and about 1000 of them are medicinally important. In Bangladesh, very few works have been done for the documentation of the works of Kavirajes. The present survey deals with works four Kavirajes of Jhenaidah district involving 45 herbs as remedy of different diseases.

2. Materials and Methods

Jhenaidah district is located in the south-western part of Bangladesh under Khulna Division. It covers an area of 1949.62 km² with 1,771,304 people ¹⁴. The present survey was conducted in three adjoining villages of Jhenaidah district, namely Solemanpur, Kaluhuda and Shahpur. A total of four Kavirajes were interviewed in the three villages. Of them Kavirajes Mohammad Abdul Kari (73) and Mohammad Abdur Rashid (65) were from Solemanpur, Kaviraj Ansar Ali was from Kaluhuda and Kaviraj Nozrul Rahman (54) was from Shahpur and had been practicing for 32, 18-20 and 29 years, respectively.

Interviews were conducted with the help of a semi-structured questionnaire and the guided field-walk method of Martin ¹⁵ and Maundu ¹⁶. Briefly, the Kavirajes were interviewed on day time guided field-walks through areas from where they usually collect their medicinal plants, pointed out the plants, local name and described their uses. Kavirajes Mohammad Abdul Kari and Mohammad Abdur Rashid had more than one acre of land around their homesteads to cultivate various medicinal plants for use. All of them were very cooperative in providing the names of medicinal plants that they used for treatment of ailments, methods of formulation and dosages. During the field interview, the information was noted in the note book including the plant species name, biological forms, habitat, and uses.

3. Results and Discussion

A total of 45 plants distributed in 31 families were observed to be used by the Kavirajes of the area surveyed. The results are summarized in Table 1. Fabaceae contributed the largest number of plant species (4), followed by Cucurbitaceae (3), Liliaceae (3), Piperaceae (3) and others. Existing scientific reports validate the folk medicinal use of highest medicinal plants of the Fabaceae family included in Chittagong ¹⁷⁻¹⁸ and Tangail ¹⁹ districts, Khulna division ²⁰ of Bangladesh and also in Paschim Medinipur district of West Bengal, India ²¹.

Table 1: Medicinal plants used by Kavirajes of Jhenaidah district, Bangladesh.

Serial Number	Scientific name	Family	Local Vernacular name	Utilize Part used	Ailments
01	<i>Abroma augusta</i> L.	Sterculiaceae	Ulot kombol	Stem	Dysentery. 1 inch size stems of <i>Abroma augusta</i> are cut into 2-3 pieces and soaked in water for one night. The water is taken daily in the morning for 5 days.
02	<i>Abrus precatorius</i> L.	Fabaceae	Kuch	Seed pulp	Pregnancy control. The reddish portion of <i>Abrus precatorius</i> seed pulp is grinded. The powder is then entered into banana (fruit of <i>Musa sapientum</i>). It is taken orally before sleeping at night. It can prevent of being pregnant till 1 year. Note that nothing is to be eaten before and after 1 hour during eating it.
03	<i>Aegle marmelos</i> L. Corr.	Rutaceae	Bel	Fruit	Dysentery. Unripe fruit of <i>Aegle marmelos</i> is burnt. Then juice is prepared from the burnt fruit and molasses prepared from <i>Saccharum officinarum</i> juice. It is taken one cupful twice a day for five days. Constipation. Juice is prepared from ripe fruit of <i>Aegle marmelos</i> . It is taken one cupful once a day until cure.
04	<i>Allium cepa</i> L.	Liliaceae	Peyaz	Bulb	Catarrh (cold). 1 teaspoon juice of <i>Allium cepa</i> and 2 teaspoonfuls water are mixed. It is taken trice a day after taking meal in the early stage of cold. Vomiting. 4-5 drops juice of <i>Allium cepa</i> , mixed with cold water is taken instantly. Constipation. 1-1.5 teaspoon juice of <i>Allium cepa</i> is mixed with equal volume of warm water. It is taken before sleeping at night.

05	<i>Allium sativum</i> L.	Liliaceae	Roshun	Bulb	Rheumatism. 10 seed vessels of <i>Allium sativum</i> is fried in 50 g oil obtained from seeds of <i>Brassica campestris</i> . This oil is applied to the infected area. This is done daily 2-3 times. Tuberculosis. 1 seed vessel of <i>Allium sativum</i> mixed with hot milk is useful for the prevention of tuberculosis. High blood pressure. 1 seed vessel of <i>Allium sativum</i> is taken after taking meal. It is done twice daily for 15 days.
06	<i>Amaranthus spinosus</i> L.	Amaranthaceae	Kanta notae	Root	Constipation. 250 ml root juice of <i>Amaranthus spinosus</i> is taken every morning for 3 days.
07	<i>Asparagus racemosus</i> L.	Liliaceae	Shotomuli	Root	Blood dysentery. 4 teaspoons juice of <i>Asparagus racemosus</i> root is mixed with 7-8 teaspoons milk. It is taken twice daily for 2-3 days. Hematemesis. 3-4 teaspoons juice of <i>Asparagus racemosus</i> root are mixed with 1 cup milk and 1 cup water and then boiled to concentrate. It is taken daily at morning until cure.
08	<i>Benincasa hispida</i> (Thunb.)	Cucurbitaceae	Chal kumra	Fruit	Constipation. 4-5 teaspoons juice of <i>Benincasa hispida</i> fruit is mixed with hot milk. It is taken twice a day for 2-3 days. Hematemesis. 3-4 teaspoons juice of ripe fruit is mixed with 1-2 teaspoon juice of <i>Adhatoda vasica</i> leaf and trace amount of sugar. It is taken twice a day for 4-5 days.
09	<i>Brassica campestris</i> L.	Cruciferae	Shorisha	Seed oil	Abdominal pain. Oil obtained from seeds of <i>Brassica campestris</i> is put on the straight part of <i>Calotropis procera</i> leaf and rubbed. The leaf is applied to painful areas. This process is repeated 3-4 times daily till cure. Rheumatism. 10 seed vessels of <i>Allium sativum</i> is fried in 50 g oil obtained from seeds of <i>Brassica campestris</i> . This oil is applied to the infected area. This is done daily 2-3 times. Rheumatism. Leaves of <i>Datura metel</i> are macerated to obtain juice. Equal volume juice and oil obtained from seeds of <i>Brassica campestris</i> are mixed and heated slightly. The warm mixture is applied to places where there is rheumatic pain. This is done 2-3 times daily till cure of the pain.
10	<i>Caesalpinia bonducella</i> L. Roxb.	Caesalpinaceae	Nata	Seed pulp	Spermatorrhea. 10 g seed pulp of <i>Caesalpinia bonducella</i> , 10 g leaves of <i>Ficus religiosa</i> and 10 g seeds of <i>Ocimum sanctum</i> are mixed and crushed. The powder of the mixture is macerated. Pills are prepared from the mixture. 1 pill is to be taken with 1 cup of cow milk twice a day.
11	<i>Calotropis procera</i> (Aiton) W. T. Aiton.	Asclepiadaceae	Akondo, Mudar	Leaf	Abdominal pain. Oil obtained from seeds of <i>Brassica campestris</i> is put on the straight part of <i>Calotropis procera</i> leaf and rubbed. The leaf is applied to painful areas. This process is repeated 3-4 times daily till cure.
12	<i>Centella asiatica</i> (L.) Urban	Apiaceae	Thankuni	Leaf	Dysentery. Leaves of <i>Centella asiatica</i> are washed and macerated. The juice obtained is then heated slightly. 3-4 teaspoons warm juice mixed with raw cow milk is taken 2-3 times

					daily till cure.
13	<i>Citrus aurantiifolia</i> (Christm.) Swingle	Rutaceae	Kagoji lebu	Fruit	Influenza. Juice obtained from 1 <i>Citrus aurantiifolia</i> fruit is mixed 1 glass warm water and 2 teaspoons honey. It is taken twice a day for 2-3 days.
14	<i>Clitoria ternatea</i> L.	Fabaceae	Oporajita Nilkonthi	Root and leaf	Hysteria. 1 teaspoon juice of <i>Clitoria ternatea</i> root and leaves is to be taken immediately in the acute condition.
15	<i>Cynodon dactylon</i> L. Pers.	Poaceae	Durba, Dublo	Whole plant, top of stem	External bleeding. Paste of <i>Cynodon dactylon</i> plant is applied to cuts and wounds. Note that water is not used for paste preparation. Paste is prepared from fresh plant and is applied as soon as possible after preparation. Internal bleeding (passing of blood with urine, stool, excessive bleeding during menstruation). 20-25 ml juice of <i>Cynodon dactylon</i> is mixed with 1-2 teaspoon honey. It is taken thrice daily for 7-10 days. Delayed menstruation of adults. 2 g powder of <i>Cynodon dactylon</i> is mixed with 2 g powder of <i>Oryza sativa</i> and macerated. 7 pills are prepared from the mixture. One pill is to be taken once daily for 7 days.
16	<i>Datura metel</i> L.	Solanaceae	Kalo dhutura	Leaf, Root	Rheumatism. Leaves of <i>Datura metel</i> are macerated to obtain juice. Equal volume juice and oil obtained from seeds of <i>Brassica campestris</i> are mixed and heated slightly. The warm mixture is applied to places where there is rheumatic pain. This is done 2-3 times daily till cure of the pain. Dog bite. 2.5 fruits of <i>Piper nigrum</i> and 3g root of <i>Datura metel</i> are grinded. It is orally administered immediately.
17	<i>Diospyros peregrine</i> (Gaertn.) Gurke	Ebenaceae	Gaab	Fruit	Excessive bleeding during menstruation. 7-8 g young fruit of <i>Diospyros peregrine</i> is macerated to obtain juice. It is taken orally twice a day for three days. Note that it should not be taken during first 3 days of menstruation.
18	<i>Heliotropium indicum</i> L.	Boraginaceae	Hatishuro	Leaf	Typhoid. Juice obtained from <i>Heliotropium indicum</i> leaf is heated. 10 drops of juice are mixed with water. It is taken 2-3 times daily till cure. Ophthalmia. Leaves of <i>Heliotropium indicum</i> are washed with hot water and macerated to obtain juice. 1-2 drop juice is applied to the infected eye. This is done 2-3 times daily till cure.
19	<i>Hibiscus rosa-sinensis</i> L.	Malvaceae	Joba	Flower	Hemorrhoids. 7 flowers of <i>Hibiscus rosa-sinensis</i> and 3 leaves of <i>Adhatoda vasica</i> are fried thoroughly and taken with a handful of boiled rice, which is still warm. The process is repeated daily in the morning for 7 days. Chronic dysentery. 1 flower juice of <i>Hibiscus rosa-sinensis</i> is mixed with <i>Musa sapientum</i> stem juice. It is taken twice a day for 2-3 days.
20	<i>Holarrhena antidysenterica</i> (L.) R. Br.	Apocynaceae	Kurochi	Bark	Blood dysentery. 1 cupful bark of <i>Holarrhena antidysenterica</i> is boiled with 4 cup water to make 1 cup. 1.5 g solution with trace amount of honey is licked 3-4 times daily till cure.

21	<i>Ipomoea reptans</i> L.	Convolvulaceae	Kolmi	Whole plant, top of stem	Gonorrhoea. Young plants of <i>Ipomoea reptans</i> are macerated. 4-5 teaspoons of juice obtained from macerated mixture are slightly singed in clarified butter (ghee). It is taken twice a day for 7 days. Inadequate mother's milk. Young plants of <i>Ipomoea reptans</i> are macerated. 3-4 teaspoonfuls of juice obtained from macerated mixture are slightly singed in clarified butter (ghee). It is taken orally twice a day for 15 days.
22	<i>Kalanchoe pinnata</i> (lam.) Pers.	Crassulaceae	Pathor kuchi	Leaf	Muscle pain, joint pain. Paste obtained from macerated leaves of <i>Kalanchoe pinnata</i> is heated slightly. The warm paste is applied to painful areas and bandaged. Jaundice. 1 handful leaves of <i>Kalanchoe pinnata</i> is washed and macerated to obtain juice. The juice is mixed with 1 banana (fruit of <i>Musa sapientum</i>) and yogurt (coagulated milk). 125 ml of the mixture is to be taken twice daily for 7 days.
23	<i>Lannea coromandelica</i> (Houtt.) Merr.	Anacardiaceae	Vadi	Bark	Loss of sexual power of males. Barks of <i>Lannea coromandelica</i> are mixed with barks of <i>Aegle marmelos</i> , barks of <i>Syzygium cumini</i> and barks of <i>Artocarpus heterophyllus</i> and soaked in water for one night. The solution is then filtered and 500 ml is taken orally with 62 ml honey. This procedure is repeated daily in the morning for 3 days.
24	<i>Mangifera indica</i> L.	Anacardiaceae	Aam	Seed pulp, Young leaf	Diabetes. 1 seed pulp of <i>Mangifera indica</i> is macerated. 1 teaspoon corn flour is mixed with it. 30 pills are prepared from the mixture. 1 pill is to be taken in morning on an empty stomach for 1 month. Dysentery. Equal amount young leaves of <i>Mangifera indica</i> and <i>Syzygium cumini</i> are macerated to obtain juice. It is heated slightly. 2-3 teaspoonfuls warm juice are taken daily for 2-3 days.
25	<i>Marsilea minuta</i> L.	Marsileaceae	Shusuni, Sursuri shak	Leaf	Insomnia. 15 g <i>Marsilea minuta</i> leaf is boiled in 3-4 cup water to make 1 cup. The mixture is then filtered. 2-4 teaspoons of the solution mixed with cow milk are taken daily in the evening for 15 days.
26	<i>Momordica charantea</i> L.	Cucurbitaceae	Uste	Fruit	Diabetes. 1 cup juice of <i>Momordica charantea</i> fruit are taken daily in the morning on an empty stomach.
27	<i>Mucuna pruriens</i> (L.) DC.	Fabaceae	Alkushi	Seed	Spermatorrhea. Seeds of <i>Mucuna pruriens</i> are soaked in water or hot milk for 1 night. The seed pulp is then boiled in water and macerated to form paste. The paste is fried in small amount of clarified butter (ghee) and mixed with sugar. 2 spoons of the mixture is taken twice daily for 7 days. 1 cup milk is to be taken after eating it. Pain in vagina, enlargement of vagina due to parturition. Root of <i>Mucuna pruriens</i> is boiled in water. A sterile cloth soaked in the warm solution is applied on the vagina. This fomentation is repeated each day for 7 days.
28	<i>Nyctanthes arbor-tristis</i> L.	Verbenaceae	Sheuli	Young leaf	Cough. 1 teaspoon juice of <i>Zingiber officinale</i> is mixed with 2 teaspoons juice of <i>Nyctanthes</i>

					<i>arbor-tristis</i> leaves, 1 teaspoon juice of <i>Ocimum sanctum</i> leaves and 1 teaspoon honey. It is taken twice daily for 3 days.
29	<i>Ocimum sanctum</i> L. <i>Ocimum basilicum</i> L.	Lamiaceae	Tulshi	Leaf, Root, Seed	Cough. Equal volume juice of <i>Ocimum sanctum</i> leaves and honey are mixed. 1 teaspoon is taken daily 3-4 times till cure. Spermatorrhea. 10 g seed pulp of <i>Caesalpinia bonducella</i> , 10 g seeds of <i>Ocimum sanctum</i> and 10 g leaves of <i>Ficus religiosa</i> are mixed and crushed. The powder of the mixture is macerated. Pills are prepared from the mixture. 1 pill is to be taken with 1 cup of cow milk twice a day. Ring-worm. Equal volume of <i>Ocimum sanctum</i> leaf juice and lime (<i>Citrus aurantifolia</i>) juice are mixed. It is rubbed at the infected area. Gonorrhoea. 1 handful seeds of <i>Ocimum sanctum</i> are kept in water for half an hour. Three fourth cup of the solution is taken daily at morning. Insect bite. Juice of <i>Ocimum sanctum</i> leaf is rubbed at the infected area. It works as antiseptic.
30	<i>Phyllanthus emblica</i> L.	Euphorbiaceae	Amloki	Fruit	Urinary tract infection (symptom: pain during urination). 12g juice of <i>Phyllanthus emblica</i> fruit, 1 cup raw cow milk and trace amount of sugar candy are mixed. It is taken every morning for 7 days.
31	<i>Piper betle</i> L.	Piperaceae	Paan	Leaf	Cough (children). 1 leaf of <i>Piper betle</i> , 1 nutmeg (nut of <i>Myristica fragrans</i>) and 1 g powder of jowan (fruit of an undefined plant, possibly <i>Carum copticum</i>) is macerated and grinded. The paste is then heated. This is taken daily for 2-3 days.
32	<i>Piper longum</i> L.	Piperaceae	Pipul	Root	Catarrh with cough. Root of <i>Piper longum</i> is macerated to obtain juice. A red hot iron rod is immersed in the juice. 2 teaspoons are taken orally while still in a warm condition. This procedure is to be done thrice daily for 2-3 days.
33	<i>Piper nigrum</i> L.	Piperaceae	Gol morich	Fruit	Menstrual pain. Paste obtained from leaves of <i>Polygonum hydropiper</i> is mixed with 1 powdered fruit of <i>Piper nigrum</i> . Pills are prepared from the mixture. It is taken thrice daily for 2-3 days. Dog bite. 2.5 fruits of <i>Piper nigrum</i> and 3g root of <i>Datura metel</i> are grinded. It is orally administered immediately.
34	<i>Polygonum hydropiper</i> L.	Polygonaceae	Bishkatali	Leaf	Ulcer. 1 handful leaves of <i>Polygonum hydropiper</i> , 1 nutmeg (nut of <i>Myristica fragrans</i>), 1 fruit of <i>Terminalia chebula</i> , 2 g <i>Piper nigrum</i> , 3 g <i>Carum carvi</i> , 20 g young leaves of <i>Cynodon dactylon</i> are macerated. Pills are prepared from the mixture. 1 pill is to be taken with 1 cup of water thrice daily for 14 days. Abortion. 1 cup juice obtained from macerated leaves of <i>Polygonum hydropiper</i> is to be taken. Menstrual pain. Paste obtained from leaves of

					<i>Polygonum hydropiper</i> is mixed with 1 powdered fruit of <i>Piper nigrum</i> . Pills are prepared from the mixture. It is taken thrice daily for 2-3 days.
35	<i>Punica granatum</i> L.	Lythraceae	Dalim	Bark	Intestinal disease (Kaviraj term: Otishar). 12 g young fruit of <i>Aegle marmelos</i> , 12 g bark of <i>Punica granatum</i> , 12 g fruit bark of <i>Punica granatum</i> and 12 g bark of kutraj (an unidentified plant) are boiled in 1 liter water to make 250 ml. The mixture is then filtered. 30 ml is taken trice a day till cure.
36	<i>Saccharum officinarum</i> L.	Poaceae	Aakh	Stem juice	Urticaria (nettle-rash). 1 teaspoon juice of <i>Zingiber officinale</i> is mixed with 10 g molasses prepared from juice of <i>Saccharum officinarum</i> . It is taken daily in the morning for 1 month. Dysentery. Unripe fruit of <i>Aegle marmelos</i> is burnt. Then juice is prepared from the burnt fruit and molasses prepared from <i>Saccharum officinarum</i> juice. It is taken one cupful twice a day for five days.
37	<i>Solanum sisymbriifolium</i> Lam.	Solanaceae	Kontikari	Leaves and cord	Catarrh with cough. 5g leaves and cord of <i>Solanum sisymbriifolium</i> , 12 fruits of <i>Piper nigrum</i> , 12 leaves of <i>Cinnamomum tamala</i> , 2 fruits of <i>Piper longum</i> , 5-6 g bark of <i>Cinnamomum zeylanicum</i> , 5-6 g rock salt and 24 g sugar candy are mixed and boiled in ½ liter water. It is done in a clay pot. When it form 1 cup it is then cooled and filtered. The warm solution is taken once a daily for 7 days.
38	<i>Syzygium cumini</i> L. Skeels	Myrtaceae	Jaam	Young leaf, Seeds	Blood dysentery. Young leaves of <i>Syzygium cumini</i> are macerated to obtain juice. It is then filtered and heated slightly. 2-3 teaspoons warm juice are taken twice daily for 2-3 days. If possible, it is taken with goat milk. Diabetes. 1-2g powder of <i>Syzygium cumini</i> seeds is soaked in 1 cup water for one night. It is taken in the morning for 15 days. Note that this procedure is not applicable for patients with high blood pressure.
39	<i>Tagetes patula</i> L.	Asteraceae	Gada, Genda	Leaf	External bleeding. Paste of <i>Tagetes patula</i> leaves is applied to cuts and wounds. Note that the paste is to be used as soon as possible after preparation.
40	<i>Tamarindus indica</i> L.	Fabaceae	Tetul	Leaf, Fruit	Hemorrhoids. 3-4g young leaves of <i>Tamarindus indica</i> are boiled in 1.5-2 cup water to make 1 cup. It is taken orally mixed with trace amount of sugar candy. This procedure is repeated every morning for 7 days. Note that leaves are taken from young plants that yet not have flowers. Alternately 1 cup juice prepared from old fruit of <i>Tamarindus indica</i> can be taken in the morning.
41	<i>Terminalia arjuna</i> (Roxb. ex DC.) Weight & Arn.	Combretaceae	Arjun	Bark	Bone fracture. Bark of <i>Terminalia arjuna</i> and garlic (<i>Allium sativum</i>) are macerated to form a paste. The paste is applied thickly over the fractured area. Besides this, 2-3 g bark of <i>Terminalia arjuna</i> is powdered. The powder is mixed with ¼ cup of milk and ½ teaspoon clarified butter (ghee). It is taken orally till cure.

					Palpitation. 5-6 g bark of <i>Terminalia arjuna</i> is powdered. The powder is boiled in 1 cup milk of cow and ½ liter water to make 1 cup. The mixture is filtered and taken daily in the afternoon for 1 month.
42	<i>Trichosanthes dioica</i> Roxb.	Cucurbitaceae	Potol	Fruit, Leaves	Fungal infection in nail (Kaviraj term: Angulhara). Fruit of <i>Trichosanthes dioica</i> is fomented over a coal fire. 1 end of the fruit is cut off and seeds are removed. The infected finger is kept into it for a while. The process is repeated 2-3 times daily till cure. Acidity (with constipation). 4-5 g leaves of <i>Trichosanthes dioica</i> are boiled with ½ cup water. 1 seed pulp of <i>Terminalia chebula</i> and 2-1 g <i>Coriandrum sativum</i> are added into the boiled mixture. The mixture is filtered and taken daily in the morning in an empty stomach. The procedure is done for 5-7 days.
43	<i>Vitis quadrangularis</i> L.	Vitaceae	Harvanga	Whole plant	Bone fracture. <i>Vitis quadrangularis</i> plant is macerated to form paste. The paste is applied thickly over the fractured area and bandaged with leaves of <i>Musa sapientum</i> or <i>Alocasia indica</i> . If there is too much fracture, the area is ribbed with mixed paste of <i>Vitis quadrangularis</i> cord, <i>Paederia foetida</i> leaf, <i>Vitex negundo</i> leaf and <i>Datura metel</i> leaf in a ratio of 2: 2: 2: 1. This procedure is repeated with 24 hours interval.
44	<i>Vitis vinifera</i> L.	Vitaceae	Angur	Whole plant, Fruit	Barrenness (sterility). 20-25 g plant (including root) of <i>Vitis vinifera</i> with 4 cupful water is boiled to make 1 cup. The mixture is then filtered and mixed with 8-10 g paste of currant (specially dried <i>Vitis vinifera</i> fruit). It is taken by both husband and wife. Haematemesis. 20 g shalparni plant (unidentified plant, possibly <i>Bombax heptaphyllum</i>) with 4 cupful water is boiled to make 1 cup. Paste of currant (specially dried <i>Vitis vinifera</i> fruit) is mixed with it. It is taken twice a day. The procedure is repeated each day until cure.
45	<i>Zingiber officinale</i> Roscoe	Zingiberaceae	Ada	Rhizome	Cough. 1 teaspoon juice of <i>Zingiber officinale</i> is mixed with 1 teaspoon juice of <i>Ocimum sanctum</i> leaves, 2 spoonfuls juice of <i>Nyctanthes arbor-tristis</i> leaves and 1 teaspoon honey. It is taken twice daily for 3 days. Acute dysentery. 1 g powder of dried <i>Zingiber officinale</i> is mixed with 1 cup warm water. It is taken twice a day until cure. Small pox. 1teaspoon juice of <i>Zingiber officinale</i> is mixed with 1 teaspoonful juice of <i>Ocimum sanctum</i> leaves. It is taken twice a day until cure. Urticaria (nettle-rash). 1 teaspoon juice of <i>Zingiber officinale</i> is mixed with 10 g molasses prepared from juice of <i>Saccharum officinarum</i> . It is taken daily in the morning for 1 month. Loss of appetite. <i>Zingiber officinale</i> with rock salt is taken before taking meal.

In many cases, Kavirajes combined several species against a particular ailment, e.g., treatment of ulcer involved six plant species, viz. *Polygonum hydropiper*, *Myristica fragrans*, *Terminalia chebula*, *Piper nigrum*, *Carum carvi* and *Cynodon dactylon*. The same plant parts from each plant were not always used. The leaves of *Polygonum hydropiper* and *Cynodon dactylon* were used along with the nut of *Myristica fragrans*, fruit of *Terminalia chebula*, *Piper nigrum* and *Carum carvi*. For treatment of catarrh with cough, a total of five plants were used, viz. *Solanum sisymbriifolium* (leaves and cord), *Piper nigrum* (fruit), *Cinnamomum tamala* (leaf), *Piper longum* (fruit) and *Cinnamomum zeylanicum* (bark). Rock salt and sugar candy were also added to the mixture, presumably to make the formulation more palatable. For treatment of dysentery two plants were used, viz. *Aegle marmelos* (fruit) and molasses obtained from the stem juice of *Saccharum officinarum*. The major plant used here is probably *Aegle marmelos*, while the molasses may have been added to ensure palatability through imparting a sweet taste. At Bheramara of Kushtia district, Bangladesh molasses were used in combination with *Andrographis paniculata* for treating anthelmintic, dysentery, rectal diseases, cough, cold, mucus, fever etc. [22]. Honey may replace molasses [6]. Treatments with combinations of plants are also notable in Narail and Jessore [8], Lalmonirhat [12], Tangail [19, 23] and Kushtia [22] districts, Bangladesh.

Instead of a combination, single plant component was used by the Kavirajes for treatment of many diseases. Root juice of *Asparagus racemosus*, mixed with milk and water, was used for treatment of haematemesis. Powder of *Abrus precatorius* seed pulp entered into banana (fruit of *Musa sapientum*) was used for controlling pregnancy. The use of banana did not appear to have any clinical significance; banana was merely used as a vehicle or carrier. Boiled rice [8] and puffed rice (locally known as muri) [12] were used in some instances.

Also notable was that the formulation of some treatment consisted of a two stage treatment. For instance, treatment of bone fracture paste of *Terminalia arjuna* bark and garlic (*Allium sativum*) was applied thickly over the fractured area. Besides this, powder of *Terminalia arjuna* was taken orally along with milk and clarified butter (ghee). In Narail and Jessore districts, the root of *Achyranthes aspera* was chewed in combination with leaf of *Piper betle* and fruit of *Areca catechu* on an empty stomach; this was followed by consumption of fried *Cayratia trifolia* leaves with boiled rice [8].

The rhizome of *Zingiber officinale* had a variety of applications. In combination with the leaves of *Ocimum sanctum* and *Nyctanthes arbor-tristis*, it was used for treatment of cough. In combination with *Saccharum officinarum* the rhizome was used for treatment of prolapse of urticaria (nettle-rash). In combination with *Ocimum sanctum* leaves *Zingiber officinale* was used for the treatment of small pox. It is also reported to be used for the treatment of liver malfunction, coughs and mucus in Jessore district, Bangladesh [6] and for indigestion and diarrhoea in Paschim Medinipur district, West Bengal [21]. The leaf, root, seed of *Ocimum sanctum* were also used with other plants for treatment of diverse ailments by the Kavirajes, including spermatorrhea, cough, ring-worm, gonorrhoea, insect bite. For spermatorrhea seeds of *Ocimum sanctum* was used in combination with other plant parts. For coughs, juice of *Ocimum sanctum* leaves and honey was

consumed. Medicinal practitioners of Khakiachora and Khasia Palli in Sylhet district also used *Ocimum sanctum* for treating two ailments, blood with stool and pain in bones [3].

Whole plants as well as plant parts like leaf, stem, root, bark, fruit, flower and seed were used for treatment. The usual mode of treatment was extracting juice from crushed whole plant or plant parts, followed by administration of the juice orally till cure. Other forms of administration are rubbing, bandaging, gargling and holding plant parts [3, 8, 12, 21]. The Kavirajes do not usually provide any information on the amount of juice to be administered from any particular plant or plant part on grounds that it would hurt their interests if this information is known by others. In the present survey, it was observed that the Kavirajes mainly relied on leaves of plants in their treatment. Leaves constituted 35.60% of total uses, followed by fruits at 22.20%, roots at 13.30%, seeds at 13.30% and stems at 11.10%. Whole plant constituted 8.90% of total uses. Flower of *Hibiscus rosa-sinensis* was only used for hemorrhoids and chronic dysentery.

Gastrointestinal disorders were the major complaint treated by the Kavirajes and a total of 18 plants were used for that purpose. Previous surveys showed that in Narayanganj [24] and Pabna [25] districts, the main ailment that was treated by practitioners was various gastrointestinal disorders. The symptoms various gastrointestinal disorders treated by the Kavirajes of Jhenaidah district include dysentery, blood dysentery, constipation, diarrhea, loss of appetite, acidity, piles (hemorrhoids leading to passing of blood in stool). Treatment of different type of pains like menstrual pain, muscle pain, rheumatism, bone fracture, abdominal pain was also notable. A total of 10 plants were used for treatment of pain. Eight plants were used for treatment of cough, cold and influenza and two plants for hematemeses, two plants were used for treatment of diabetes. Other diseases treated include typhoid, jaundice, cuts and wounds, paralysis, sexual disorders, infections, insect bite, fever, tuberculosis, hysteria, ophthalmia, isomnia and urticaria (nettle-rash).

In the present survey, it was observed that rural patients are more dependent on traditional healers for treatment of urinary tract infections (UTIs) and sexually transmitted diseases (STDs). It is because for a number of reasons including lack of access to modern medical facilities. Plants like *Ipomoea reptans*, *Ocimum sanctum* were used for the treatment of gonorrhoea; *Caesalpinia bonducella*, *Mucuna pruriens*, *Ocimum sanctum* for spermatorrhea; *Lannea coromandelica* for regaining sexual power of males. Some other ailments that were treated are leucorrhoea, menstrual disorders, and difficulties in urination, presence of pus or semen in urine, burning sensations during urination, low sperm count [3, 26].

A comparison of the common plants used by the Kavirajes of Jhenaidah district in the present study with that of plants used by Kavirajes of earlier studies highlights the considerable similarities and differences between the natures of use of medicinal plants in different areas of Bangladesh. To cite a few instances, both in Jhenaidah and Jessore [6] district *Nyctanthes arbor-tristis* and *Piper longum* were used for treating cough.

Though Jhenaidah district is not far from Narail and Jessore districts and all three districts have almost identical vegetation cover, *Mangifera indica* was used by the Kavirajes of Jhenaidah district to treat diabetes and dysentery; the same plant was used by the Kavirajes of Narail and Jessore districts

for treatment of fistula¹⁸¹. *Zingiber officinale* was used by the Kavirajes in the present study for treatment of cough, acute dysentery, small pox, urticaria (nettle-rash) and loss of appetite, while it was used by the Kavirajes of Narail and Jessore districts for treatment of bone fracture and rheumatism. It is to be noted that the same plant part (rhizome) of *Zingiber officinale* was used in all treatments, whether be at Jhenaidah, Narail or Jessore districts.

Kaviraj did not have any medical degrees but just obtained his knowledge from previous generations and current practice. The use of oil or ghee in topical applications showed a basic knowledge of topical treatment in the Kaviraj. Oil or ghee helps to spread the applied material more evenly on the skin, acts as an emollient and facilitates absorption of bio-active compounds through the skin. These facts alone suggest that herbal medicinal treatment cannot be simply dismissed as quackery. Through accumulated knowledge over centuries, a Kaviraj can have a meticulous knowledge of not only plants but the best way for administration of the plant for treatment of diseases.

7. References

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