

ORIGINAL ARTICLES

Medicinal plants used by the Kavirajes of Daulatdia Ghat, Kushtia district, Bangladesh

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ABSTRACT

Folk medicinal practitioners (Kavirajes) form the first tier of primary health care providers to most of the rural population of Bangladesh. Kavirajes use simple formulations of whole plant or plant parts from medicinal plants for treatment of various ailments. The medicinal plants used by the Kavirajes differ considerably in various areas of Bangladesh. The objective of the present study was to conduct a survey on medicinal plant usage by the Kavirajes of Daulatdia Ghat area in Kushtia district, Bangladesh. Interviews were conducted with the help of a semi-structured questionnaire and the guided field-walk method. Plant specimens as pointed out by the Kavirajes were collected and identified at the Bangladesh National Herbarium at Dhaka. It was observed that the Kavirajes of Daulatdia Ghat area used 49 plants distributed into 38 families for treatment of different ailments. The Fabaceae family contributed 4 plants followed by the Agavaceae family with 3 plants. Leaves and whole plants constituted the major parts used (24.6% each), followed by roots (22.8%) and fruits (7.0%). The Kavirajes treated a number of ailments or disorders. Gastrointestinal disorders were treated with 13 plants; skin disorders were treated with 9 plants; respiratory disorders were treated with 8 plants. Other disorders treated included leucorrhea (5 plants), sexual disorders (7 plants), diabetes (4 plants), rheumatism (5 plants), gall bladder stones (3 plants), fever (3 plants), urinary tract problems (3 plants), and pain (5 plants). The Kavirajes also treated debility, hepatic disorders, infections, poisoning, menstrual problems, heart diseases, typhoid, cuts and wounds, edema, measles, helminthiasis, piles, malaria, obesity, insanity, and ear and eye infections. Taken together, the medicinal plants used by the Kavirajes considerable potential for further scientific studies, which can lead to newer and more efficient drugs.

Key words: Folk medicine, medicinal plants, Daulatdia Ghat, Bangladesh

Introduction

The use of medicinal plants for treatment of various ailments goes back a long time ago. It has been estimated that human beings probably started using medicinal plants for treatment from around 3,000 BC (Sofowora, A., 1982.). It has further been observed that a number of modern pharmaceuticals have been derived from plants used by indigenous people (Balick, J.M. and P.A. Cox, 1996.). Important modern drugs that have been derived from observations of traditional curing methods of indigenous people include aspirin, atropine, ephedrine, digoxin, morphine, quinine, reserpine and tubocurarine (Gilani, A.H. and A.U. Rahman, 2005.).

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Bangladesh has a rich history of traditional medicinal practices. Among the various systems of traditional medicine co-existing within the country are the homeopathic, Ayurvedic, Unani, and the folk medicinal system. The latter system is practiced by folk medicinal practitioners, otherwise known as Kavirajes or Vaidyas. The Kavirajes utilization of medicinal plants, although derived to a certain extent from the Ayurvedic system, is different in its simplicity of use. The Kavirajes mostly use simple juices, decoctions or paste of whole medicinal plants or plant parts in their formulations, which are either orally or topically administered. The knowledge of an individual Kaviraj is usually kept within the family and passed on to selected members of the next generation. As a result the repertoire of medicinal plants of an individual Kaviraj can vary considerably between Kavirajes of adjoining areas.

The population of Bangladesh is predominantly rural and lack access to modern medical facilities because of absence of such facilities and lack of good transportation system to get to such facilities, which are mostly available in the capital city of Dhaka. Moreover, the cost of modern medicine is for the most part prohibitive for the poorer sections of the rural population. As a result, they rely mostly on the Kavirajes for treatment of their various ailments. There are over 86,000 villages in Bangladesh and most villages have one or two practicing Kavirajes. This is in sharp contrast to allopathic practitioners, who are practically absent from villages and in difficult to get to areas.

Knowledge of medicinal plant usage by the Kavirajes of Bangladesh can be a good source for further scientific studies in the quest for better drugs from the medicinal plants used and with lesser side-effects. However, to get a comprehensive picture of the medicinal plants used by the Kavirajes, one has to practically conduct surveys from village to village and obtain information from individual Kavirajes. We have been conducting such ethnomedicinal studies for the last two years among the Kavirajes of various areas of Bangladesh and among the tribal medical practitioners of a number of tribes of the country (Hossan, M.S.;2010; Rahmatullah, M.,2010; Nawaz, A.H.M.M.,2009; Hanif, A., 2009;Hossan, Md. Shahadat,2009;Rahmatullah, M.,2009;Rahmatullah, M.,2009;Rahmatullah, M.,2009;Rahmatullah, M.,2009;Rahmatullah, M.,2009). The objective of the present study was to conduct a survey among the Kavirajes of Daulatdia Ghat in Kushtia district, which lies in the western part of Bangladesh.

Materials and Methods

Daulatdia Ghat area falls within Kushtia district. The primary occupations of the people are agriculture and agriculture laborer. The district is mainly known for its tobacco crop. Daulatdia Ghat is a ferry area and can be considered as totally rural. However, the place is also known for having a large prostitute area. The prostitutes cater mainly to the bus and truck drivers plying through the area. The present survey was conducted among two Kavirajes, whose patients include both prostitutes and the rural population of the area.

Interviews were conducted of both Kavirajes with the help of a semi-structured questionnaire and the guided field-walk method as described by Martin (Martin, G.J., 1995.) and Maundu (Maundu, P., 1995.) . In this method, the Kavirajes took the interviewers on guided field walks in the daytime through areas from where they usually collected their medicinal plants, pointed out the plants and described their uses. Detailed information was taken as to formulations and dosages, which were later cross-checked with the Kavirajes in later evening sessions. Plant specimens as pointed out by the Kavirajes were collected, dried in the field, and brought back to Bangladesh National Herbarium at Dhaka for complete identification.

Results and Discussion

It was observed in the present study that a total of 49 plants were used by the Kavirajes of Daulatdia Ghat area for treatment of diverse ailments. The plants were distributed into 38 families as shown in Table 1. The Fabaceae family contributed four plants followed by the Agavaceae family with three plants. A noteworthy feature of the Kavirajes of Daulatdia Ghat was the use of Agavaceae family plants, which have not been found to be used to any great extent by the Kavirajes of other areas surveyed (Hossan, M.S.;2010; Rahmatullah, M.,2010; Nawaz, A.H.M.M.,2009; Hanif, A., 2009;Hossan, Md. Shahadat,2009;Rahmatullah, M.,2009;Rahmatullah, M.,2009;Rahmatullah, M.,2009;Rahmatullah, M.,2009;Rahmatullah, M.,2009).

Whole plant and leaves constituted the major plant parts used (24.6% each of total uses). They were followed by roots (22.8%). Fruits constituted 7.0% of total uses. Another notable feature of the present study findings was the total absence of use of stems by the Kavirajes of Daulatdia Ghat area. The results are shown in Table 2.

In most of the cases a single plant part was used by the Kavirajes for treatment of a single or sometimes, multiple ailments. The roots of *Agave americana* were used a carminative (example of a plant part used for treatment of a single ailment). On the other hand, the barks of *Justicia adhatoda* were used for treatment of

Table 1: Medicinal plants used by the Kavirajes of Daulatdia Ghat, Kushtia district, Bangladesh.

Serial Number	Scientific Name	Family Name	Local Name	Part utilized	Ailment/Symptoms treated
1	<i>Justicia adhatoda</i> L.	Acanthaceae	Bashok	Bark	Leucorrhoea, chronic respiratory disorders and coughs. 1g bark powder is taken with 1 spoonful of honey every afternoon for 1 month for chronic respiratory disorders and coughs. 1g powdered bark is taken every night for 15 days for leucorrhoea.
2	<i>Agave americana</i> L.	Agavaceae	Arkeriea	Root	Carminative. Roots are mixed with juice from <i>Cynodon dactylon</i> and taken as carminative. Note that can also result in getting rid of large worms from the intestine.
3	<i>Cordyline fruticosa</i> (L.) A. Chev.	Agavaceae	Droesina	Root	Constipation, mucus. Roots are taken with three rhizomes of turmeric for constipation.
4	<i>Yucca gloriosa</i> L.	Agavaceae	Yucca	Root	Remove gall bladder stones. Crushed roots are taken every morning and night. Note that the treatment may cause constipation.
5	<i>Aloe vera</i> (L.) Burm.f.	Aloaceae	Ghritokumari	Soft pulp within leaves	To increase strength, increase semen, enlarged spleen, bloating, hepatic diseases, pain, boils. Decoction of soft pulp within the leaves is taken with mishri (crystallized sugar) for boils.
6	<i>Curculigo orchioides</i> Gaertn.	Amaryllidaceae	Taal-muli	Root	Blood coming out through anus. Root juice is taken. Side effects include increased liver pain and constipation.
7	<i>Mangifera indica</i> L.	Anacardiaceae	Aam gach	Leaf	Diabetes. Young leaves are sun-dried, and powdered. 5g of the powder is mixed with 2g powdered, dried seeds of <i>Syzygium jambos</i> (local name: kalo jam) and taken every morning and afternoon for 45 days.
8	<i>Polyalthia longifolia</i> (Sonn.) Thwaites (PL)	Annonaceae	Debdaru	Bark	Dysentery, itch. Decoction is made from powdered bark and taken with honey for dysentery. Powdered bark is mixed with mustard oil and applied to affected areas to cure itch.
9	<i>Hemidesmus indicus</i> R.Br.	Apocynaceae	Anontomul	Root	Low semen, dysentery, boils. 1g root is crushed and taken with 1 spoonful of honey every morning after breakfast for 15 days to increase semen. 1g root is crushed and taken with honey for dysentery for 7 days. 2g root is crushed and applied over boils.
10	<i>Aristolochia indica</i> L.	Aristolochiaceae	Ishwarmul	Leaf, root	Biliary pain, infections, antidote to poisoning. Leaf and root juice is combined and taken.
11	<i>Vernonia patula</i> (Dryand.) Merr.	Asteraceae	Jowhan-piir	Whole plant	To stop menstruation. 3g amount of powdered whole plant is mixed with warm cow/goat's milk and taken twice daily every morning and night.
12	<i>Bombax ceiba</i> L.	Bombacaceae	Shimul gach	Root	Impotency. 1 spoonful of powdered root, 1 spoonful of powdered <i>Piper cubeba</i> , 1 spoonful of powdered <i>Curculigo orchioides</i> , 1 spoonful of powdered <i>Withania somnifera</i> , 1 spoonful of honey and 1 poa (local measure approximates 250g) cow/goat's milk is taken every night for a month.
13	<i>Cereus grandiflorus</i> (L.) P.Mill.	Cactaceae	Kaat-raaz	Inner portion of plant after bark is removed	Acidity. Decoction made from pulp is taken with sugar or molasses.

Table 1: Continue

14	<i>Mesua ferrea</i> L.	Clusiaceae	Nageshwar	Flower	Inability to bear children in women. 10g powdered flower is mixed with 10g white-flowered <i>Sida cordifolia</i> , and 10g <i>Abrus precatorius</i> and powdered. 1 spoonful of this powder is mixed with 1 spoonful of ghee (clarified butter), one spoonful of honey and 100g cow/goat's milk and taken every morning for 1 month.
15	<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn.	Combretaceae	Arjun gach	Bark	Heart diseases. Crushed bark is taken every morning and evening with warm rice, two spoonful of ghee (clarified butter) for a month. Note that lime juice cannot be taken during this time. Alternately, two spoonful of crushed bark is taken with warm milk for a month.
16	<i>Terminalia chebula</i> Retz.	Combretaceae	Horitoki gach	Whole plant	Constipation, less urination. 10g whole plant powder when taken with water during night time before sleep relieves constipation. 1 spoonful of whole plant powder is mixed with 1 spoonful helencha (<i>Enydra fluctuans</i>) juice and 1 spoonful sugar and taken 2-3 times daily as remedy for less urination.
17	<i>Ipomoea aquatica</i> Forssk.	Convolvulaceae	Kolmi shak	Whole plant	Gall bladder stones. Juice from crushed whole plant is mixed with powdered <i>Polyalthia longifolia</i> and taken. The mixture should not be taken too often.
18	<i>Ipomoea mauritiana</i> Jacq.	Convolvulaceae	Vui-kumra	Root	Increase lactation. The bottom parts of roots are crushed and the juice collected and taken. Dried roots are also taken with honey. Ingestion of raw roots causes vomiting.
19	<i>Kalanchoe pinnata</i> (Lam.) Pers.	Crassulaceae	Pathorkuchi	Whole plant	Gall bladder stones, pain from piles. ½ cup leaf juice is taken to dissolve gall bladder stones. Crushed leaves are applied to anus for piles.
20	<i>Coccinia grandis</i> (L.) J. Voigt	Cucurbitaceae	Telakucha	Leaf, fruit	Typhoid disease, eczema, leukoderma, lesions of the tongue. Powdered fruit is taken with sugar for typhoid disease. Leaf juice mixed with sugar is both taken and applied for eczema and leukoderma. Unripe fruits are chewed and so mixed with saliva and then applied to lesions of the tongue.
21	<i>Diospyros peregrina</i> (Gaertn.) Gürke.	Ebenaceae	Gab gach	Whole plant	Leucorrhea, thorn-induced infections, gangrene, cough, mucus, biliary diseases, blood purifier. Ripe fruits are boiled to make a decoction and taken with sugar for leucorrhea. Unripe fruits are boiled to make a decoction, mixed with ghee and then re-boiled and applied to infected areas (thorn-induced infections). Unripe fruits are boiled to make a decoction and applied to areas affected with gangrene. Unripe fruits or barks are boiled to make a decoction and taken with a little honey for coughs and mucus.
22	<i>Cassia fistula</i> L.	Fabaceae	Bandor lathi	Root	Anal disorders (prolapse). Roots of the plant are mixed with roots of <i>Mesua ferrea</i> , crushed and taken.
23	<i>Cassia occidentalis</i> L.	Fabaceae	Kulka-sunda	Leaf, bark	Boils, skin diseases, cough, mucus, blood purifier. Paste of crushed leaves and barks is applied to boils and skin disease-affected area. 1 tola (local measure approximates 12.5g) of powdered leaf and bark is put in ½ kg water, boiled and taken for cough and mucus. For purification of blood, 1 tola leaf juice is taken with mishri

(crystallized sugar) in the morning.

Table 1: Continue

24	<i>Clitoria ternatea</i> L.	Fabaceae	Neel aparajita	Root	Stomachache (udar disease). 2g roots of the plant is mixed with 1 spoonful ghee (clarified butter), 1 spoonful honey, 1 spoonful sugar, made into a paste and kept in a cup. After meals every day, ½ spoonful of the paste is to be taken for 15 days.
25	<i>Mucuna pruriens</i> (L.) DC.	Fabaceae	Alkushie	Seed	Increase sperm count, stimulate energy, wounds to vaginal area in women. Powdered seeds are taken with honey. May cause constipation.
26	<i>Swertia chirata</i> (Roxb. ex Fleming) H. Karst.	Gentianaceae	Chirota	Whole plant	Sonnipath fever (Kaviraj term usually denoting typhoid), blood purifier, acne, itches. Decoction of powdered plant is taken with a little sugar as remedy for sonnipath fever. Decoction of powdered plant is taken with water to purify blood. Powdered plant is mixed with mishri (crystallized sugar) and the decoction taken for acnes and itches.
27	<i>Leucas aspera</i> (Willd.) Link	Lamiaceae	Door-kolosh	Leaf	Excess salivating. Fried leaves are taken with rice as chutney.
28	<i>Ocimum tenuiflorum</i> L.	Lamiaceae	Tulshi gach	Leaf	Contraceptive, enhances immunity. Following completion of menstruation, decoction of boiled leaves is taken for 3 days to avoid pregnancy. In the Bengali month of Kartik (October 15 – November 14), every morning 2-3 leaves are chewed and taken on an empty stomach to protect the body system against diseases for a whole year. This only happens during the month of Kartik.
29	<i>Allium sativum</i> L.	Liliaceae	Roshun	Bulb	Diabetes. 1 poa (local measure approximates 250g) bulb is chewed every morning and night daily for 45 days.
30	<i>Crinum asiaticum</i> L.	Liliaceae	Go-roshun	Whole plant	Edema, pain, rheumatism. Decoction made from crushed whole plant is mixed with mustard oil and applied to affected areas.
31	<i>Sida cordifolia</i> L.	Malvaceae	Brela	Whole plant	Skin diseases. Powdered plant is mixed with camphor powder and applied to affected areas.
32	<i>Azadirachta indica</i> A. Juss.	Meliaceae	Neem gach	Leaf, bark	Regularize menstruation, diabetes. 80g bark is sliced into small pieces, mixed with 40g molasses and boiled in water till the volume is reduced to half. The water while still warm is taken for 5 days to regularize menstruation. 15-20 leaves and 5-6 black peppers are chewed every morning for 45 days as remedy for diabetes.
33	<i>Tinospora cordifolia</i> (Willd.) Hook.f. & Thoms.	Menispermaceae	Guloncho lota	Whole plant	Measles, burning sensations, cough, mucus, fever, helminthiasis, constipation, leucorrhea, to increase thirst, i.e. induce drinking, rheumatism, piles, respiratory problems, heart diseases, less urination, carminative, malaria, enlarged spleen, skin infections, godh disease (Kaviraj term usually denoting swelling of legs and hands).
34	<i>Ficus hispida</i> L.f.	Moraceae	Kack dumur	Whole plant	Internal bleeding. 25g juice from unripe fruits is taken with sugar once daily for 7 days.

Table 1: Continue

35	<i>Geodorum densiflorum</i> (Lam.) Schltr.	Orchidaceae	Mishri-dana	Tuber	Increase sperm density. Tubers are cleaned, powdered and taken with honey.
36	<i>Oxalis lobata</i> Sims	Oxalidaceae	Amrul shak	Whole plant	Appetite stimulant, rheumatism. The plant is cooked as a vegetable (with a salty taste) and taken daily for 3-4 days to stimulate appetite. The plant is cooked as a vegetable and taken for 15 days for rheumatism.
37	<i>Pandanus odoratissimus</i> L.f.	Pandanaceae	Keya	Leaf	Obesity. Juice from crushed leaves is boiled and taken.
38	<i>Piper longum</i> L.	Piperaceae	Pipul	Root, fruit	Carminative, cough, mucus. Roots are chewed as remedy for cough and mucus. Powdered fruits are carminative.
39	<i>Cynodon dactylon</i> (L.) Pers.	Poaceae	Durba ghash	Whole plant	Skin diseases, less urination. Juice from 6 tolas (local measure, 1 tola approximates 12.5g) of whole plant is mixed with 1 poa (local measure approximates 250g) sesame oil, heated and applied to affected areas as treatment for skin diseases. Roots of the plant are boiled in 1 kg water in an earthen vessel and taken with honey as remedy for less urination.
40	<i>Paederia foetida</i> L.	Rubiaceae	Gondho-vadule	Whole plant	Cough, mucus, loss of appetite, rheumatism, pain, dysentery. Leaf juice is taken with honey for coughs and mucus. Decoction of crushed leaves is cooked and taken for loss of appetite. Leaf, stem and flower is boiled with oil and applied to affected area for rheumatism. Leaf juice is taken for 7 days for dysentery.
41	<i>Aegle marmelos</i> (L.) Corr.	Rutaceae	Bael gach	Leaf, fruit	To remove odor from sweat, incoherency or insanity, reduces acidity, ear diseases, eye diseases. Leaf juice is applied to the body to remove bad odor from sweating. Leaves are crushed and applied to head as remedy for incoherency or insanity. Unripe fruit is burnt in cow dung fire and then taken with sugar cane molasses (local name: akher gur) as remedy for acidity. Juice from crushed young leaves is applied to ears for ear diseases. Fruit juice is applied around the eyes for eye diseases.
42	<i>Citrus aurantiifolia</i> (Christm.) Swingle	Rutaceae	Kagji lebu	Fruit	Leucorrhoea. Fruits are mixed with roots of <i>Punica granatum</i> and then taken. Note that this may result in frequent sneezing.
43	<i>Datura metel</i> L.	Solanaceae	Dhutra	Leaf, root, seed	Swelling and pain, excessive breathing, to enlarge pupil in eye, swelling of gums and base of ears, breast pain. Application or drinking of leaf juice relieves pain and swelling. Powdered whole plant is smoked to cure excessive or abnormal breathing. Powdered plant is applied around the eyes to enlarge pupils. Leaf juice is mixed with a little opium and applied to affected area to reduce swelling of gums or base of ears. Leaf juice is mixed with lime and turmeric and applied to the breasts to reduce breast pain.
44	<i>Withania somnifera</i> (L.) Dunal	Solanaceae	Ashwogondha	Root	Piles, debility. Juice from crushed roots is mixed with equal amounts of cow/goat's milk and taken with honey.

Table 1: Continue

45	<i>Abroma augusta</i> L.f.	Sterculiaceae	Ulot kombol	Whole plant	Passing of semen with urine. Powdered plant is mixed with powdered <i>Ipomoea mauritiana</i> , crushed with sugar and milk and taken. Note that with this preparation urine can come out in several flows.
46	<i>Centella asiatica</i> (L.) Urb.	Umbelliferae	Thankuni	Leaf	Blood purifier, fever, diabetes. Leaves are boiled in water and the decoction taken with honey to purify blood. Leaf juice is mixed with leaf juice of <i>Nyctanthes arbor tristis</i> and a little sugar to cure fever. Crushed leaves are taken with powdered mishri (crystallized sugar) as remedy for diabetes.
47	<i>Nyctanthes arbor tristis</i> L.	Verbenaceae	Sheuli gach	Leaf	Rheumatism, pitto jor (Kaviraj term for fever due to metabolic disorders). 15-20 leaves are boiled in 2 cups water and taken every morning and night for rheumatism. 10g of leaf juice is taken every day for fever due to metabolic disorders.
48	<i>Cayratia trifolia</i> (L.) Domin.	Vitaceae	Goale lota	Leaf	To stop bleeding, scorpion bite, snake bite, leucorrhoea. Leaves are crushed in hand and the juice applied to wounds to stop bleeding [1 tola to 4 anna (local measures, 1 tola approximates 12.5g, 4 annas approximate 250g) amount of juice is applied]. Leaf juice is applied 5-6 times to scorpion bitten area to lessen pain. Leaf juice is applied immediately to snake bitten area as an antidote. ½ tola leaf juice and ¼ tola marigold (<i>Tagetes erecta</i>) leaf juice is taken with honey for leucorrhoea.
49	<i>Curcuma longa</i> L.	Zingiberaceae	Holud	Rhizome	To lighten up skin (improve skin texture), sprain. Raw rhizome is mixed with oil, applied to body followed by bathing to improve texture of skin. 4 parts rhizome, 1 part salt and 1 part lime are mixed thoroughly, warmed and applied to sprains for 2-3 days. Local names for diseases used by the Kavirajes are indicated in bold lettering. Some of the local measures are given in the original Bengali names with an approximation of the weights in grams. Mishri is crystallized sugar, which is prepared as follows. A super-saturated sugar solution is first made by adding sugar to boiling water till no more sugar can be dissolved. The solution is poured into a vessel and let cool after hanging a string in the middle of the vessel. During the cooling process, sugar crystals are deposited throughout the length of the string. The crystals are collected and air-dried in the shade. Ghee is clarified butter and is prepared by boiling butter till it melts and assumes a yellow color followed by straining of the melted butter.

chronic respiratory disorders, coughs, and leucorrhoea. An example of use of multiple plant parts to treat ailments was that of *Aristolochia indica*, whose leaves and roots were used in combination for treatment of biliary pain, infections, and as an antidote to poisoning.

There were several instances where a combination of plants was used for treatment. The roots of *Bombax ceiba* were used along with *Piper cubeba*, *Curculigo orchoides*, and *Withania somnifera* for treatment of impotency. Similarly, a combination of *Terminalia chebula* and *Enydra fluctuans* was used for treatment of constipation and less urination. The roots of *Cassia fistula* and *Mesua ferrea* were taken in combination for anal disorders (prolapse).

Table 2: Percent use of various plant parts by the Kavirajes of Daulatdia Ghat area.

Plant part	Percent use
Whole plant	24.6
Leaf	24.6
Root	22.8
Stem	0.0
Bark	8.8
Flower	1.8
Seed	3.5
Fruit	7.0
Inner portion of plant after removal of bark	1.8
Bulb	1.8
Tuber/Rhizome	3.5

Some of the names of diseases in Table 1 refer to local terms as used by the Kavirajes. For instance **udar** disease, although it most often indicates stomach ache can be a more serious problem, one of the symptoms of which is stomach ache. The term **sonnipath** fever refers to a particular type of fever, which commonly occurs during typhoid but may occur with other types of disease. In this type of fever, the temperature rises to a certain level, diminishes, and then rises to a level higher than the previous level. It then again diminishes, but stays higher than the previous diminished stage. The cycle is continued. **Godh** disease can both include abnormal swelling of legs and hands during edema or elephantiasis. **Pitto jor** can happen due to metabolic disorders, but usually is meant by the Kavirajes as fever arising out of biliary problems.

In a number of cases, the decoction or juice of the plant was observed to be orally administered with a sweetener like honey, sugar, sugar (crystallized) or molasses. The bark of *Justicia adhatoda* was administered along with honey for chronic respiratory disorders and coughs. In this instance, honey was not only used to hide the taste of the bark, but also used for its individual soothing effects during respiratory distress including coughs. The soft pulp within the leaves of *Aloe vera* were administered along with crystallized sugar (local name: mishri) to patients with boils. What is of interest in this instance is that the formulation was advised to be taken orally and not used topically even though the ailment in question is boils. The decoction of the pulp from *Cereus grandiflorus* was advised by the Kavirajes to be taken either with sugar or molasses for treatment of acidity. The Kavirajes believe that mishri, by itself, has medicinal properties and can act in synergism with plant-based formulations. Occasionally, a formulation would be administered with cows or goats milk (as in the case of *Bombax ceiba*) or with clarified butter locally known as ghee (as in the case with *Terminalia arjuna*).

In several instances, administration was also observed to be topical. For instance, the roots of *Hemidesmus indicus* were crushed and applied to boils. Sometimes the plant-based formulation may be mixed with mustard oil (as in the case with *Crinum asiaticum* used for treatment of edema, pain, and rheumatism) or with camphor powder (as in the case with *Sida cordifolia* used for treatment of skin diseases).

Surprisingly, the Kavirajes were not observed to use any plants for sexually transmitted diseases like gonorrhoea or syphilis even though a number of their clients are prostitutes. This could be because the Government has an intensive program for monitoring such diseases in prostitute areas and frequent check-ups are made of prostitutes by both Governmental and non-Governmental agencies for occurrence of such diseases including AIDS. On the other hand, the Kavirajes used five plants for treatment of leucorrhoea (whitish discharge in the urine of females, which can be normal or due to sexually transmitted diseases). The Kavirajes, however, used two plants – *Curcuma longa* (to improve skin texture) and *Ocimum tenuiflorum* (as a contraceptive), which can benefit the general population but more particularly the prostitutes.

A number of the plants used by the Kavirajes have been scientifically studied and those studies have validated their folk medicinal uses. The plant *Justicia adhatoda* contains alkaloids with positive effects on inflammatory diseases (Chakraborty, A.,2001).; extract of the plant also has been shown to have antitussive effect (Dhuley, J.N., 1999.) and a bronchodilator alkaloid (vasicinone) has been isolated from the plant (Amin, A.H.1959). The Kavirajes use the bark of the plants for chronic respiratory disorders and coughs. There are a considerable number of reports for the efficacy of *Terminalia arjuna* in heart disorders (Singh, G.,2008;Dwivedi, S., 2007.; Gauthaman, K.,2005; Karthikeyan, K.,2003;Dwivedi, S. and D. Gupta, 2002.;Bharani, A.,2002; Gauthaman, K.,2001; Dwivedi, S.1997) which is why the bark of the plant is used

for by the Kavirajes of Daulatdia Ghat. The beneficial effects of *Allium sativum* have been similarly described for diabetic models in a number of reports (Dwivedi, S.2009;Chandra, A.,2008; Islam, M.S.2008; Raju, T.N.,2008; Jalal, R.,2007; Ahmad, M.S. and N. Ahmed, 2006.; Hattori, A.,2005;Okada, Y.,2005; Liu, C.T.,2005; Jelodar, G.A.,2005; Josling, P., 2001.; Roman-Ramos, R.,1995; Sheela, C.G. and K.T. Augusti, 1992.; Swanston-Flatt, S.K.,1990; Nyner, M.A., A.A.1989). Notably, the bulbs of the plant are used by the Kavirajes for diabetes. Since the objective of this paper is not a pharmacological evaluation of all the medicinal plants used by the Kavirajes of Daulatdia Ghat, only a few instances are cited where modern scientific findings are in agreement with traditional use of the plants.

Relevant scientific studies are yet to be conducted on most of the plants used by the Kavirajes of Daulatdia Ghat. Cumulatively speaking, these medicinal plants possess considerable potential towards discovery of newer and more efficacious drugs. A further fact needs to be brought at this point. The plants are rapidly becoming endangered in the wild. It is hoped that further studies on these plants can focus public attention to a point where the general people by themselves take an active part in the conservation of these plants and save them from possible extinction.

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