



Ethnopharmacological survey on traditional medicinal plants at Kalaroa Upazila, Satkhira District, Khulna Division, Bangladesh

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ABSTRACT

Aim: The traditional source of medicinal plants is an important way for daily curative uses in the rural area throughout Bangladesh. An ethnomedicinal survey was conducted in a randomized manner among traditional medicinal practitioners to find out about the medicinal plants of Kalaroa, Bangladesh. **Materials and Methods:** The information was collected through conducting interviews, discussion, and field observations with herbal healers and knowledgeable elders of the study areas from November 01, 2015, to December 31, 2015, who pointed out various medicinal plants and described their uses, using semi-structured questionnaires. **Results:** A total of 29 plants distributed into 21 families had found to be used by the 3 Kavirajes interviewed for the treatment of various ailments. 42 different individual sicknesses were claimed to be cured by plants mentioned by the Kavirajes. The *Malvaceae* family contributed the highest number of plants with four plants, followed by the *Amaranthaceae* family with three plants, and the *Leguminosae* and *Euphorbiaceae* families with two plants each. Leaves were the major plant parts used solely or mixed with other parts forming 33% of total users. This was followed by roots 22%, whole plant 12%, stem and bark, fruit and seeds, and flowers 10% each, and pods, rhizomes, and sap 2% each. Seven plants for skin diseases. Four plants for erectile dysfunction. Cough, diabetes, diarrhea, dysentery, and ulcer were treated by five plants each. Asthma, diuretic, and leukorrhea were treated by three plants each. Hypertension was treated by two plants. **Conclusion:** It is expected that the other plants observed to be used for the treatment of various diseases by the Kavirajes can be subjected to further bioactivity and phytochemical studies, which can lead to the discovery of newer drugs.

KEY WORDS: Herbal medicine, Kavirajes, Kalaroa Satkhira, medicinal plants, traditional medicine

INTRODUCTION

The use of wild plants is an essential part by the tribe. They are used to meet varied necessities of strong traditional and cultural systems and preparation, which has established and accumulated over generations. The scientific study of substances used by different ethnic or cultural groups therapeutically, especially folk medications, is called ethnopharmacology [1]. Every ethnic community has its own system of traditional medicine, and they utilize natural resource around their habitats for various medicinal purposes [2]. Bangladesh is an unindustrialized country with little cities. The minority of the residents survive in villages. A considerable segment of the population has income beneath the poverty line of US \$1 per day; subsequently, an enormous segment of the population suffers from starvation [3] and do not use modern health-care services because of insufficient transportation, lack of allopathic doctors and nonexistence of hospitals or clinics, nonaffordability to buy modern medications, and age-old dependency on folk

medicinal practitioners, who are locally known as Kavirajes. The Kavirajes depend largely on medicinal plants for the healing of various illnesses [4].

A large section of the rural populations living far away from the urban area still relies on traditional herbal medicine for their primary healthcare needs because medicinal plants are easily available and cost effective [2].

Over the past two decades, several medicinal and ethnobotanical studies in Bangladesh have been carried out. Some workers have documented the indigenous ethnopharmacology in different parts of Bangladesh [5], but documentation of such study in our research area, Kalaroa Upazila, Satkhira District, Khulna Division, and Bangladesh was not done before; therefore, it is necessary to conserve the ethnomedicinal knowledge of Satkhira district. A widespread sort of wild plant species is used by the native residents in Kalaroa including many wild green vegetable leaves, roots, and fruits as food.

The objective of this study was to conduct a randomized survey among the traditional medicinal practitioners, Kavirajes to find out the medicinal plants of Kalaroa. We have observed considerable variation in the use of medicinal plants by individual Kavirajes. This is the first attempt to elucidate the ethnomedicinal uses of plants in Kalaroa Thana (police station).

Consequently, this study was designed with the aim to document the reliable information on indigenous ethnomedicinal knowledge of traditional healers and to provide baseline information for further chemical and pharmacological investigation for the advancement and improvement in animal drugs system.

MATERIALS AND METHODS

Study Area

The study was conducted in the villages of Kalaroa is an Upazila (subdistrict) of Satkhira District in the Division of Khulna, Bangladesh. Kalaroa Upazila area 232.64 km², located in between 22°48' and 22°57' north latitudes and in among 88°54' and 89°09' east longitudes. It is surrounded by Sharsha, Jhikargachha, and Manirampur upazilas on the north; Satkhira sadar and Tala upazilas on the south; Keshabpur, Manirampur, Tala upazilas, and the Kopothakho river on the east; West Bengal state of India on the west [6].

The average level of arsenic in shallow tube-well water is 137 µg. Sanitation 25.97% (rural 51.43% and urban 61.70%) of dwelling households of the upazila use sanitary latrines and 39.06% (rural 41.23% and urban 21.99%) of dwelling households use nonsanitary latrines; 34.97% of households do not have latrine facilities. The health center's Upazila health complex 1, the family planning center 12, clinic 1, private clinics/facilities 27, and community clinics 21. Natural disasters are also a common problem in this area [7,8].

The rural population of the village was found to visit Kavirajes for the treatment of both common ailments as well as complicated ailments, which are difficult to treat with modern medicines [Figure 1].

Ethnomedicinal Data Collection

To document the utilization of medicinal plants, a survey was carried out in Narayanpur and Bamonkhali Village of Kalaroa Upazila of Satkhira district of Bangladesh from November 01, 2015, to December 31, 2015.

Before the household survey, casual field visits were arranged with 48 people including local old persons, religious leaders, and other key informants to review and document the availability of medicinal plants in the locality. Meetings were held in the interviewee's home using the native language (Bengali).

After the interviews, the survey was conducted among 30 households, consisting of 155 people altogether, to get the

information about the local use of various plants. Those houses were selected where at least two people take treatments from herbal practitioners.

They were asked about the local name of the plant, which parts they used, where they collected it from, how they prepared it, which diseases they used it, and in which form they take the medication from. Collected information provided by the local informants were cross-checked by three local herbal practitioners locally referred to as Kaviraj namely Md.Mizan Moral, Md. Omar Sardar, Md. Golampor who have sound knowledge on medicinal plants and are highly rated in the society. The survey objectives were explained to informants to get information about traditional medicinal plants. Interviews were conducted based on a semi-structured questionnaire form with answers. For this survey, following information was gathered from them: (a) The local name, (b) plants part's used, (c) the method of preparation, (d) medicinal uses, (e) mode of application, and (f) dose and dosage forms.

All plant specimen was collected from local forest, follow land, roadside. Plant specimens as pointed out by the Kavirajes were collected and dried.

After completion of survey dried plants was brought to ex-Curator and Principal Scientific Officer of the Bangladesh National Herbarium at Dhaka for complete identification and also, got the information of the scientific names, family names, habit, habitat, nature, relative abundance, and preservation of the species. The voucher specimens of the plants were deposited in Bangladesh National Herbarium, Dhaka (DACB).

Data Analysis

All the species were listed by their scientific name, family, local name, the general name, plants parts used, mode of preparation, habit, habitat, nature, the general name, and solvent used. Statistical analysis of obtained data was performed using Excel software.

RESULTS

In this study, a total of 29 plants distributed into 21 families were observed to be used by the 3 Kavirajes for treatment of various ailments such as cough, pain, cholera, dysentery, fever, flux, erectile dysfunction, leukorrhea, skin disease, ophthalmia, opacity of cornea, pox, tuberculosis, hypertension, inflammation, diarrhea, dysmenorrhea, paralysis, gonorrhoea, ulcer, and asthma. The *Malvaceae* family contributed the highest number of plants with four plants, followed by the *Amaranthaceae* three plants and the *Leguminosae* and *Euphorbiaceae* family with two plants, respectively. Other important families included the *Bromeliaceae*, *Apiaceae*, *Cucurbitaceae*, *Piperaceae*, *Athyriaceae*, *Aristolochiaceae*, *Papaveraceae*, *Poaceae*, *Oxalidaceae*, *Meliaceae*, *Araceae*, *Menispermaceae*, *Asteraceae*, *Arecaceae*, *Plantaginaceae*, and *Verbenaceae*. Some of the plants used by traditional medicinal practitioners are shown in Figure 2. The results are summarized in Table 1.



Figure 1: Location of the study area (Kolaroa, Bangladesh) [9]



Figure 2: Several plants used by traditional medicinal practitioners – (1) *Abroma augusta*, (2) *Acalypha indica*, (3) *Achyranthes aspera*, (4) *Adhatoda vasica*, (5) *Aerva lanata*, (6) *Argemone mexicana*, (7) *Aristolochia indica*, (8) *Clerodendrum viscosum*, (9) *Diplazium sylvaticum*

DISCUSSION

It was observed that whole plants, as well as, plant parts such as leaves, stems, roots, bark, fruit, flowers, seeds, and wood were used in their treatment of various ailments. Leaves were the major plant parts used solely or mixed with other parts forming 33% of total users. This was followed by roots (22%), whole plants (12%), stems and bark, fruit and seeds and flowers (10%), and the lowest parts used were pods, rhizomes, and sap (2%) [Figure 3]. Mode of applications was either oral or topical depending on the ailment. In most cases, obtained juice from macerated plant part was administered.

Our survey identified around 42 different individual sicknesses which were claimed to be cured by plants mentioned by the Kavirajes. Maximum numbers of plants (7 plants) were used to treat skin diseases, namely, *Aristolochia indica*, *Argemone mexicana*, *Euphorbia hirta*, *Achyranthes aspera*, *Acalypha indica*, *Eupatorium*

odoratum, and *Clerodendrum viscosum*. Four plants, namely, *Abroma augusta*, *A. aspera*, *C. viscosum*, and *Sida cordifolia*, were used to treat erectile dysfunction. Cough, diabetes, diarrhea, dysentery, and ulcer were other important diseases which were also treated by five plants each. Asthma, diuretic, and leukorrhea were treated by three plants each. Hypertension was treated by *Sida rhombifolia* and *Scoparia dulcis* plant [Table 2].

According to the Health Bulletin 2016, top diseases were fever, asthma, hypotension, and hypertension, diarrhea and gastroenteritis of presumed infectious origin, peptic ulcer, heart failure, secondary hypertension, etc. Hence, from the above data, diseases such as diarrhea, fevers, hypertension, and ulcers are treated by herbal practitioners [Table 2] [8].

Some plants were used to treat multiple diseases, while others were used as a remedy for a single disease. For instance, juice from the leaves of *Centella asiatica* was used to treat cholera,

Table 1: List of plants along with their local uses and other relevant information described by the Kavirajes

Scientific name	Local name	Family	Habit	Habitat	Nature	Used plant part	Local use	Preparation	Mode of application
<i>Justicia gendarussa</i> Burm.f.	Kalkasindhi	Acanthaceae	Shrub	Light, medium and heavy soils	Cultivated	Leaf, bark	The leaf of this plant is used for treating pain and sprained leg. It is also used to treat cough, cold, throat infections and asthma.	Juice	Oral
<i>Justicia adhatoda</i> L.	Bakasha, Vasok	Acanthaceae	Shrub	Low moisture areas and dry soils	Cultivated wild	Leaf	The leaf extract is used for treating cough. The leaf juice is also used to treat dyspepsia.	Extract, juice	Oral
<i>Aerva lanata</i> (L.) Juss.	Daiye khaiye	Amaranthaceae	Herb	Open forests on mountain slopes, on waste and disturbed ground, deserted cultivation and coastal scrub	Wild	Leaf, root, flower	A combination of root and red sugar is useful for treating leukorrhea. It is also used as antidiarrheal medicine. The root is used in a snake-bite treatment.	Soup, spinach, vegetable	Oral
<i>Achyranthes aspera</i> L.	Chirchira	Amaranthaceae	Herb	Disturbed areas, roadsides, gardens, crops, grasslands, savanna and forest margins	Wild, cultivated	All parts	In my study area, it is effective for treating erectile dysfunction. It is also used in paralysis. The root is used in skin disease. Juice of the leaves is used in dysentery.	Juice, paste	Oral, topical
<i>Cyathula prostrata</i> (L.) Blume	Bou-thukuni	Amaranthaceae	Herb	Evergreen vine thickets, vine forest, closed forest and monsoonal, loamy and sandy soils	Wild	Whole plant	Dysentery, pain and inflammatory, root with betel vine is used in the treatment of infertility of women.	Powder, decoction, infusion	Oral, topical
<i>Centella asiatica</i> (L.) Urb.	Thankuni	Apiaceae	Shrub	Tropical swampy areas, drier soils	Cultivated wild	Leaf	The leaf juice is used for treating cholera, dysentery, and asthma. The leaf is also used in diabetes, indigestion.	Juice	Oral
<i>Rhaphidophora pertusa</i> (Roxb.) Schott	Katakacu	Araceae	Climber	Evergreen forests	Wild	Leaf	Anti-inflammatory and analgesic.	Juice	Oral
<i>Phoenix sylvestris</i> (L.) Roxb.	Khejura	Areaceae	Tree	Plains to the coast in low-lying wastelands, scrub forest, disturbed or are prone to periodic or seasonal inundation with water, causing water-logging	Wild, cultivated	Sap of the plant, central tender part, fruit, gum	It is used in a cough, fever, and gonorrhoea. Root is used in a toothache and in nervous debility. Gum is useful in diarrhoea.	Juice, powder	Oral
<i>Aristolochia indica</i> L.	Isharmul	Aristolochiaceae	Climber	Forests and open lowland thickets, scrambling over bushes and trees	Wild	Rhizome, leaf, root	It is useful in skin disease. A combination of root and chili is used as antivenom medicine. The juice of leaves is used in vomiting.	Decoction, juice	Oral

(Contd...)

Table 1: (Continued)

Scientific name	Local name	Family	Habit	Habitat	Nature	Used plant part	Local use	Preparation	Mode of application
<i>Chromolaena odorata</i> (L.) King and H.E. Robins.	Germany lata	Asteraceae	Shrub, herb	Bush land, forest margins, roadsides, disturbed sites, waste areas, neglected pastures, crops and plantations	Wild	Leaf	Combination of leaf extract and salt is used as antiulcerant medicine It is used in cold, fever, and useful in skin disease	Extract	Topical oral
<i>Diplazium sylvaticum</i> (Bory) Sw.	Kaldhera	Athyriaceae	Herb	Evergreen forests, along stream banks	Wild, cultivated	Root	Antidiarrheal, severe pain, pox	Decoction, juice	Oral, topical
<i>Ananas sativus</i> Schult. and Schult.f.	Anaros	Bromeliaceae	Herb	Light, permeable soils	Cultivated	Root, fruit, leaf	Combination of leaf and honey is used for treating cough Juice of the ripe fruit is diuretic The unripe fruit is abortifacient, digestive, good for influenza	Juice, unripe fruit	Oral
<i>Coccinia grandis</i> (L.) Voigt	Telakucha	Cucurbitaceae	Herb	Dry deciduous forests and wastelands	Wild, cultivated	Root, fruit, and leaf	The combination of root and mustard oil is used for treating dysentery Leaf extract is a good laxative It is also used in diabetes	Extract	Oral topical
<i>Euphorbia hirta</i> L.	Sada dudhagach	Euphorbiaceae	Herb	Grasslands, roadsides, and pathways	Cultivated	All parts	The root is used in diarrhea, dysentery It is also used as an analgesic and anti-inflammatory medicine and in skin diseases	Decoction, juice	Oral, topical
<i>Acalypha indica</i> L.	Mukta jhuri	Euphorbiaceae	Herb	Wastelands, in moist and shaded places, riverbanks. Plains from the coast	Wild, cultivated	Whole plant	The leaf juice is used as antiulcer medicine It is also used in skin disease The plant is used in severe cough associated with bleeding	Vegetables, infusion, powder, paste	Oral, topical
<i>Acacia nilotica</i> (L.) Delile	Baabalaa	Leguminosae	Shrub or a small to medium tree	Dry environments and can also endure floods	Wild, cultivated	Root, stem, bark, leaf, gum, seed, pod	The leaf juice is useful in dysentery The bark is used in colds and pneumonia The bark is also used in dysentery and diarrhea	Juice, infusion	Oral
<i>Sesbania cannabina</i> (Retz.) Poir.	Lal chainche	Leguminosae	Herb shrub	Heavy soils on watercourses and low-lying areas	Wild, cultivated	Root, bark, leaf	Dysmenorrhea, epilepsy	Pills	Oral
<i>Abroma augusta</i> (L.) L.f.	Ulat Kambal	Malvaceae	Shrub or small tree	The well-drained soil mix	Wild, cultivated	Leaf, root	The combination of root and honey shows its effectiveness against erectile dysfunction It is also used for treating leukorrhoea It is used in amenorrhoea and dysmenorrhoea	Decoction, paste, decoction	Oral, topical

(Contd...)

Table 1: (Continued)

Scientific name	Local name	Family	Habit	Habitat	Nature	Used plant part	Local use	Preparation	Mode of application
<i>Sida rhombifolia</i> L.	Sbetabarila	Malvaceae	Shrub or woody herbaceous plant	Wastelands, wastelands, fallow fields also in degraded forest areas	Wild	Whole plant	It is used as antihypertensive medicine It also used as analgesic medicine and contains diuretic action	Juice, pounded	Oral, topical
<i>Hibiscus scandens</i> Roxb.	Kaanphul	Malvaceae	Climber	Forests outskirts and village shrubberie	Wild, cultivated	Root	Leukorrhea	Juice	Oral
<i>Sida cordifolia</i> L.	Hagara	Malvaceae	Herb, undershrub	Roadsides, sandy seacoasts, and wastelands	Wild	Root, bark, leaf, flowers, seed	The combination of leaf extract and salt is used in erectile dysfunction It is also used in the treatment of piles	Extract, paste	Oral, topical
<i>Azadirachta indica</i> A. Juss.	Neem	Meliaceae	Tree	Plains Forests	Cultivated	Leaf, seed, tree	It is used as antiulcer and antidiarrheal medicine Leaves are used to treat skin diseases like eczema Leaves are also used as antidiabetic medicine	Juice decoction paste	Oral, topical
<i>Stephania japonica</i> (Thunb.) Miers	Nimako	Menispermaceae	Climbing shrub	Evergreen and moist deciduous forests	Wild	Whole plant	It is used as a blood coagulant Roots and leaves used for fever and diarrhea Leaves are used in urethritis	Extract, juice	Oral
<i>Oxalis articulata</i> Savigny	Aamarul	Oxalidaceae	Herb	Well-drained soils	Wild	Leaf	The leaf juice is useful in dysentery	Juice	Oral
<i>Argemone mexicana</i> L.	Siyal kata	Papaveraceae	Herb	Fallow lands	Roadsides, riverbanks floodplains, cultivated	Leaf, root, seed.	The leaf juice is used to cure ophthalmia and opacity of the cornea Skin disease is treated by cooking the leaves of this plant Seeds are used for sedative action	Juice	Oral
<i>Piper peepuloides</i> Roxb.	Pepula	Piperaceae	Herb or climbing shrubs	Subtropical forests	Wild, cultivated	Leaf	In the study area, it is used for treating fever, cough, and flux It is used in gonorrhoea, leukorrhoea, menstrual problems The root is a good diuretic	Juice decoction	Oral, topical
<i>Scoparia dulcis</i> L.	Gurapana	Plantaginaceae	Herb/ undershrub	Waste places	Wild, cultivated	All parts	Diabetes, antihypertensive, anemia	Juice, extract, infusion	Oral

(Contd...)

Table 1: (Continued)

Scientific name	Local name	Family	Habit	Habitat	Nature	Used plant part	Local use	Preparation	Mode of application
<i>Cynodon dactylon</i> (L.) Pers.	Durbaghass	Poaceae	Herb	Gardens, landscapes, turf areas, orchards, roadsides, vineyards, and industrial areas	Wild, cultivated	Root, stem, leaf	A combination of plant leaf and bay leaf is used for treating pox The leaf extract is also useful in tuberculosis It is also used as antidiabetic, antiulcer, analgesic medicine	Extract	Oral, topical
<i>Clerodendrum viscosum</i> Vent.	Bunobhati	Verbenaceae	Shrub or undershrub, small tree	Moist evergreen forests, river banks, degraded forest areas and also in the plains.	Ornamental, wild	Leaf, root	Leaves and roots are used in asthma and skin diseases Root juice is warmed and rubbed on the penis to treat erectile dysfunction The leaves are used in malaria	Juice, decoction	Oral

Table 2: The list of number of plants for treating an individual disease

Disease	Number of plants
Cough	5
Asthma	3
Diuretic	3
Diabetes	5
Dysentery	5
Leukorrhoea	3
Erectile dysfunction	4
Skin disease	7
Diarrhea	5
Hypertension	2
Ulcer	5

For treating some diseases, plant parts are used in combination with other plants or substances. For example, the combination of root of *A. augusta* and honey shows effectiveness against erectile dysfunction; combination of root of *Aerva lanata* and red sugar is useful for treating leukorrhoea; combination of leaf extract of *E. odoratum* and salt is used as antiulcer medicine; combination of plant leaf and bay leaf is used for treating pox.

Many scientific studies confirm the use of medicinal plants by the Kavirajes. Other plants used by the Kavirajes have not been studied at all or relevant pharmacological studies are yet to be conducted. The literature review of plants is summarized in Table 3.

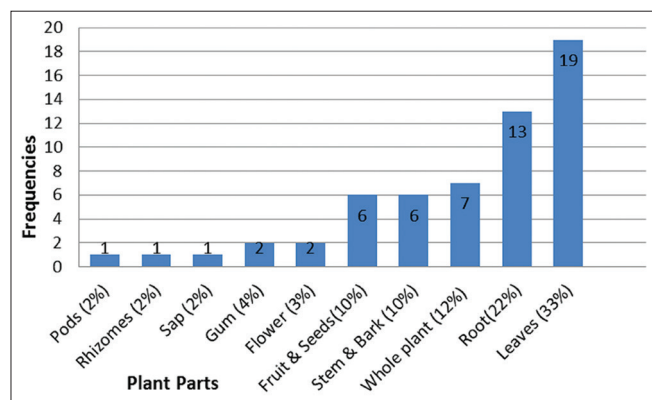


Figure 3: Percentage of plant parts used for indigenous medicines

dysentery, asthma, diabetes, and indigestion; the leaves and roots of *C. viscosum* were used to treat malaria, asthma, skin diseases, and juice was warmed and rubbed on the penis to treat erectile dysfunction, whereas pain and sprained leg, cough, cold, throat infections, and asthma were treated by the juice of the leaf, bark of *Justicia gendarussa*.

Local uses of different medicinal plants were evaluated according to the scientific literature study. *C. asiatica* locally used for the treatment of diabetes. From the literature, we noticed the similar type of medicinal use of this plant. The plant has been shown that chloroform fraction of ethanol extract contains terpenoids, coumarins, and saponins which shown antihypertglycemic activity [16]. *C. asiatica* extract and its active compound rutin may also provide a safe, natural, and cost-effective treatment for hyperlipidemia and hyperglycemia [47].

Local use of *Adhatoda vasica* was cough, dyspepsia. From literature, we found that a pectic arabinogalactan isolated from *A. vasica* by aqueous extraction and precipitation with ethanol inhibited the number of coughs induced by citric acid in guinea pigs and slightly decreased the values of specific airway resistance by peroral administration of this arabinogalactan (50 mg kg⁻¹ body weight) [48].

Azadirachta indica (neem) locally use to treat skin diseases, acne, and fever. Neem is a common medicinal plant in Bangladesh. From the literature, we found that *A. indica* was used to determine the minimum inhibitory concentration (MIC) and

Table 3: Literature review for the comparison of local use of the plants

Scientific name	Local name	Local use	Medicinal use from literature	References
<i>Ananas sativus</i> Schult. and Schult.f.	Anaros	Cough, diuretic, abortifacient, digestive, good for influenza	Anthelmintic, abortifacient	[10,11]
<i>Justicia gendarussa</i> Burm.f.	Kalkasindhi	Pain and sprained leg, cough, cold, throat infections and asthma	Antiarthritic, anti-inflammatory and analgesic activities	[12,13]
<i>Centella asiatica</i> L.	Thankuni	Cholera, dysentery, asthma, diabetes, indigestion	Wound healing activity, cytotoxic and antitumor properties, antidiabetes	[14-16]
<i>Justicia adhatoda</i> L.	Bakash, Vasok	Cough, dyspepsia	Anticestodal, antitussive	[17,18]
<i>Coccinia grandis</i> (L.) Voigt	Telakucha	Laxative, diabetes, the combination of root and mustard oil is used for treating dysentery	Antioxidant and hepatoprotective	[19,20]
<i>Abroma augusta</i> (L.) L.f.	Ulat Kambal	Leukorrhea, amenorrhea, and dysmenorrhea. Combination of root and honey shows its effectiveness against erectile dysfunction	Anti-inflammatory	[21]
<i>Aristolochia indica</i> L.	Isharmul	Skin disease, vomiting, and the combination of root and chili is used as antivenom medicine	Antibacterial, antivenom	[22,23]
<i>Acacia nilotica</i> (L.) Delile	Baabalaa	Dysentery, diarrhea, colds and pneumonia	Antioxidant, anti-inflammatory, antibacterial, antidiarrheal	[24-27]
<i>Azadirachta indica</i> A.Juss.	Neem	Antidiabetic, antiulcerant and antidiarrheal, skin diseases like eczema	Hepatoprotective, antioxidant, hypoglycemic, antidiabetic	[24,28,29]
<i>Sida rhombifolia</i> L.	Sbetabarila	Antihypertensive, diuretic, analgesic	Anti-inflammatory and hepatoprotective, cytotoxicity and antibacterial, analgesic and cytotoxic	[30-32]
<i>Rhaphidophora pertusa</i> (Roxb.) Schott	Katakacu	Anti-inflammatory and analgesic medicine	Antioxidant and antibacterial; anti-inflammatory, analgesic and antilipid peroxidative	[33,34]
<i>Phoenix sylvestris</i> (L.) Roxb.	Khejura	Cough, fever, gonorrhoea, toothache and in nervous debility, diarrhea	Antibacterial, diuretic and analgesic effect, antinociceptive and neuropharmacological	[35-37]
<i>Scoparia dulcis</i> L.	Gurapana	Diabetes, antihypertensive, anemia	Antiviral, insulin-secretagogue, hypoglycemic	[38-40]
<i>Acalypha indica</i> L.	Muktajhuri	Antiulcer, skin disease, severe cough associated with bleeding	Wound healing, antibacterial	[41,42]
<i>Sida cordifolia</i> L.	Hagara	Piles, combination of leaf extract and salt is used in erectile dysfunction	Anti-inflammatory, analgesic; hypoglycemic, antimicrobial, cardiovascular effects	[43-46]

minimum fungicidal concentration, where extracts of the leaves and seeds were used in contradiction of various dermatophytes. Clinical isolates of dermatophytes were cured with extracts of leaves and seeds of the plant *A. indica* (neem) for antifungal activity by *in vitro* tube dilution technique. The achieved outcome was the MIC of neem seed extracts was 31 $\mu\text{g/mL}$ for all the dermatophytes tested.

The neem seed extract at 15 $\mu\text{g/mL}$ concentration (below MIC) was observed to be sufficient for distorting the growth pattern of the organisms tested. The variations in growing curve of the treated dermatophytes were found to be statistically significant with reference to the untreated fungi [49].

Locally, *Acacia nilotica* is used for the treatment of dysentery, diarrhea, liver disorders, inflammation, colds, and pneumonia. From the literature, we found that in mice, methanolic extract of *A. nilotica* (bark) showed significant actions against castor oil, magnesium sulfate induced diarrhea, and enteropooling activity due to castor oil treatment as well as on normal as well as barium chloride induced peristalsis of small intestine. It also showed antimicrobial activity against common pathogens

responsible for diarrhea *in vitro*. The above studies support the ethnomedicinal use of *A. nilotica* bark for the treatment of diarrhea [27].

CONCLUSION

The recent increase in the manufacturing of herbal drugs has created a large demand for medicinal plants. Hence, it plays an important role in the establishment of pharmaceutical industries and identifying new and alternative drug in a more rational and scientific manner. The Kavirajes of Bangladesh merit further consideration for detailed scientific studies as to their uses of various medicinal plants for treatment of diverse ailments.

Diseases such as hypertension or diabetes are on the rise in modern society because of a change in lifestyle and an increase in stress. The medicinal plants used by the Kavirajes in the study to alleviate diabetes or hypertension can prove useful in the discovery of novel drugs to treat such diseases. A further study can be done to identify valuable phytochemicals present in the plant and their disease-curing abilities. The plants that

are mentioned by the Kavirajes in the present survey can be a potential source for the discovery of lead compounds and novel therapeutics.

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