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A SURVEY OF MEDICINAL PLANTS USED BY KAVIRAJES OF CHALNA AREA, KHULNA DISTRICT, BANGLADESH

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Abstract

Kavirajes or traditional medicinal practitioners form the primary healthcare providers of the predominantly rural population of Bangladesh. Kavirajes use a variety of medicinal plants for treatment of different ailments. The formulations prepared from medicinal plants vary considerably between Kavirajes of different regions of the country. The objective of this study was to conduct an ethnomedicinal survey amongst the Kavirajes of Chalna area, Khulna district, Bangladesh. That area is known to contain a diversity of medicinal plants. Information on 50 plant species was obtained. These medicinal plants belonged to 49 genera and 33 families. Twenty five plants were used to treat skin diseases and twenty three plants for treatment of intestinal tract disorders, which included constipation, indigestion, stomachache, diarrhea, and dysentery. Fourteen plants were also used by the Kavirajes to treat cancer or tumor. Nine plants were used as insecticide, eight for rheumatoid arthritis, and seven for wounds. Five plants were used to treat jaundice. Five plants were also utilized to treat animal and snake bites, which included tiger bites. Six plants were used to treat diabetes, and two each for the treatment of leprosy, and sexually transmitted diseases like gonorrhoea. Five plants were used to treat impotency, while one plant was used as an abortifacient. Three plants were used to treat helminthiasis, which we found to be quite common amongst the population, while four plants were used to treat heart disorders. Taken together, these plant species offer considerable potential for discovery of novel compounds of pharmacological interest.

Key words: Traditional medicine, Chalna, Khulna district, Bangladesh, medicinal plants.

Introduction

Medicinal plants have a long history of use by human beings for cure of various ailments (Hill, 1989; Sofowara, 1982; Lal and Yadav, 1983). Since the advent of modern allopathic medicine, the use of traditional medicine (inclusive of the use of medicinal plants for cure) declined to a considerable extent. However, in recent years, traditional medicine has made a comeback for a variety of reasons including side-effects and toxicity of modern synthetic drugs, evolution of multi-drug resistance microorganisms, and the inability of modern medicine to find effective cures for a number of diseases. More than 70% of the developing world's population now depends on traditional medicinal system, otherwise known as complementary or alternative systems of medicine (Azaizeh *et al.*, 2008). It is a fact that plants used by indigenous peoples in their traditional medicinal systems are forming the sources of many important new pharmaceuticals (Balick and Cox, 1996). To cite a few instances of the influence of traditional medicines on the development of modern drugs and treatments, it has been reported that Native American traditional medicine provides a unique approach to the treatment of cardiovascular disease, which can complement

modern medicine treatments (Nauman, 2007). Pharmacologically active chemicals present in plants (plants that have long been used in Traditional Chinese Medicine) e.g. artesunate, homoharringtonine, and cantharidin, are now proving their potential for use in cancer therapy (Efferth *et al.*, 2007). Other important drugs introduced from plants include the anti-cancer drugs vinblastine and taxol, as well as the anti-malarial drug artemisinin (Queiroz *et al.*, 2009). Search for novel antibiotics, especially against multi-drug resistance microorganisms are on going in plants (Coates and Yu, 2007). A South African-based herbal remedy (roots of *Pelargonium sidoides*) traditionally used for treatment of respiratory tract infections, is showing promise for the treatment of bronchitis (Kolodziej, 2008). All these factors have contributed to a steady increase worldwide of traditional medicinal plants for primary health care in recent years (Samy and Gopalakrishnakone, 2008).

Ethnomedicinal surveys or surveys of medicinal plants used by traditional medicinal practitioners can form a rich source of data for knowledge about medicinal plants and the ailments for which they are used. These data can provide the background and save the potential researcher from fruitless research in modern scientific inquiries about the disease-curing properties of any particular plant. Bangladesh has a rich tradition of traditional medicinal practices. The traditional medicinal practitioners, who are also experts in the use of medicinal plants, form the primary healthcare providers to both rural and urban populations. Since the traditional medicinal practitioners differ considerably in their use of medicinal plants from region to region, it is worthwhile to survey various regions of Bangladesh to get a comprehensive picture of the medicinal plants used to treat different ailments. The present study was conducted in Chalna area of Dacope upazila (sub-district), which falls within Khulna district, Bangladesh and is in close proximity to the Sunderbans forest region. Agriculture, and livestock farming and fishing form the occupation of more than 70% of the population, which is predominantly rural. Modern health clinics or hospitals are absent and the population relies on traditional medicinal practitioners (known locally as Kavirajes) as their primary healthcare providers.

Materials and methods

The study area

Chalna and adjacent area, i.e. the area of survey is located within roughly 89°28'-89°32' E and 22°34'-22°38' N. The main crops are paddy, potato, onion, and garlic. A number of fruits are also cultivated, these being *Cocos nucifera*, *Psidium guajava*, *Zizyphus mauritiana*, and *Manilkara zapota*.

Data collection and sampling techniques

Semi-structured interviews based on note-taking while interviewing the informants (also known as guided field walk) as described by Martin (1995) and Maundu (1995) were employed in collecting the ethnomedicinal data. Plant specimens, as pointed out by the informants (Kavirajes) were collected, pressed and dried on site. All collected specimens were later brought to the Bangladesh National Herbarium for complete identification. Voucher specimens were also deposited over there.

Results

Plants and their distribution into families

The result of the present study showed that 50 species of plants were used by the Kavirajes of Chalna area in Khulna district, Bangladesh. These medicinal plants belonged to 49 genera and 33 families (Table 1). The Fabaceae family provided the largest number of species (6), followed by Acanthaceae, Euphorbiaceae, Lamiaceae, and Poaceae families (3 species each), and Amaranthaceae, Araceae, Asteraceae and Malvaceae families (2 species each). Other families were represented by one plant each. Out of the 50 plant species obtained in the present survey, several species were cultivated and used either for direct consumption or sold commercially. These species included *Spondias dulcis*, *Alocasia macrorrhizos*, *Carica papaya*, *Brassica oleracea*, *Hibiscus esculentus*, *Psidium guajava*, *Piper chaba*, *Olea europaea*, and *Zea mays*. Several other species were not systematically cultivated but grown around the homesteads or along rural roads for their medicinal values, shade giving effect, ornamentals or for feeding leaves to cattle. These plants included *Ervatamia divaricata*, *Clitoria ternatea*, *Saraca indica*, *Ficus hispida*, and *Cedrus deodara*.

Table 1: Listing of medicinal plants obtained from the traditional medicinal practitioners of Chalna area, Khulna district, Bangladesh.

Serial Number	Scientific Name	Family Name	Local Name	Utilized Part	Ailment/Uses
1	<i>Barleria lupulina</i> Lindl.	Acanthaceae	Laal-tarokh	Whole plant	Tonic, dermatitis, sexual disorder, cough, fever.
2	<i>Justicia aurea</i> Schtdl.	Acanthaceae	Kalo-bashok	Leaf, stem	Tonic, malaria, asthma.
3	<i>Hygrophila auriculata</i> (Schumach.) Heine	Acanthaceae	Kulekhara	Whole plant	Jaundice, rheumatoid arthritis, itch, edema, laxative, leprosy, analgesic.
4	<i>Sansevieria trifasciata</i> Prain	Agavaceae	Bagha-chokro	Whole plant	Tonic, snake bite, alopecia, malaria.
5	<i>Alternanthera paronychioides</i> Hort. ex Regel	Amaranthaceae	Jaal-chanchi	Whole plant	Carminative, dermatitis, poultice.
6	<i>Amaranthus spinosus</i> L.	Amaranthaceae	Kanta-khudurey	Whole plant	Gonorrhea, colic, piles, dermatitis.
7	<i>Spondias dulcis</i> Sol. ex Parkinson	Anacardiaceae	Amra	Leaf, flower	Appetizer, toothache, ecboic, itch.
8	<i>Centella asiatica</i> (L.) Urb.	Apiaceae	Thankhai	Whole plant	Dog bite, asthma, carminative, itch, leucorrhea, malaria, tumor, wound.
9	<i>Ervatamia divaricata</i> (L.) Burkill	Apocynaceae	Togor	Leaf, flower	Tonic, tumor, insecticide.
10	<i>Alocasia macrorrhizos</i> (L.) G. Don.	Araceae	Maan-kochu	Whole plant	Tiger bite, rheumatoid arthritis, itch.
11	<i>Syngonium podophyllum</i> Schott	Araceae	Dhobol-kochu	Whole plant	Tonic, dermatitis.
12	<i>Gnaphalium luteo-album</i> L.	Asteraceae	Phool-kuri	Whole plant	Tonic, tumor, gout, dermatitis.
13	<i>Tridax procumbens</i> L.	Asteraceae	Phool-jori	Whole plant	Bronchitis, anti-hemorrhagic, wound, carminative, insecticide.
14	<i>Carica papaya</i> L.	Caricaceae	Papay	Whole plant	Rheumatoid arthritis, constipation, jaundice, diabetes, dermatitis, hurt.
15	<i>Tradescantia spathacea</i> (sw.) Stearn	Euphorbiaceae	Daun-kepah	Whole plant	Tonic, insecticide.
16	<i>Brassica oleracea</i> L.	Cruciferae	Badha-kopi	Leaf, fruit	Tonic, carminative, cancer, eczema, astringent, gynecological disorders.
17	<i>Trichosanthes kirilowii</i> Maxim.	Cucurbitaceae	Lota-mohakaal	Whole plant	Cancer, jaundice, mumps, diabetes, constipation, astringent.
18	<i>Cuscuta reflexa</i> Roxb.	Cuscutaceae	Swarnolata	Whole plant	Impotency, stomachache, sore throat.
19	<i>Cyperus amuricus</i> Maxim.	Cyperaceae	Tara-grass	Whole plant	Piles, tumor, wound.
20	<i>Baliospermum polyandrum</i> Wight	Euphorbiaceae	Bath-raaz	Whole plant	Dermatitis, tumor, insecticide.
21	<i>Euphorbia royleana</i> Boiss.	Euphorbiaceae	Caat-raaz	Whole plant	Eye disease, impotency, alopecia.
22	<i>Excoecaria agallocha</i> L.	Euphorbiaceae	Geowa	Leaf, bark	Tumor, myopathic spasm, leprosy, abortifacient, dermatitis.

23	<i>Cassia fistula</i> L.	Fabaceae	Sonalo	Whole plant	Constipation, cancer, analgesic, piles, dermatitis, helminthiasis.
24	<i>Cassia occidentalis</i> L.	Fabaceae	Kulka-sundi	Leaf, seed	To induce fertility, diabetes, jaundice, dermatitis, heart disease, typhoid.
25	<i>Clitoria ternatea</i> L.	Fabaceae	Aparajita	Flower, seed	Snake bite, indigestion, tumor.
26	<i>Desmodium motorium</i> (Houtt.) Merr.	Fabaceae	Turi-chombol	Whole plant	Tonic, anti-hemorrhagic, dermatitis.
27	<i>Saraca indica</i> L.	Fabaceae	Ashok	Leaf, bark	Tonic, nerve stimulant, dermatitis, menstrual irregularities.
28	<i>Sesbania grandiflora</i> (L.) Pers.	Fabaceae	Bock-phool	Whole plant	Eye diseases, leucorrhea, dermatitis, tonsillitis, small pox, carminative.
29	<i>Anisomeles malabarica</i> (L.) R.Br. ex Sims	Labiatae alternate Lamiaceae	Raaz-moni	Whole plant	Indigestion, snake bite, rheumatoid arthritis, asthma.
30	<i>Clerodendrum inerme</i> (L.) Gaertn.	Lamiaceae alternate Verbenaceae	Vana-jhai	Leaf, flower	Night blindness, pneumonia, colic, rheumatoid arthritis.
31	<i>Plectranthus barbatus</i> Andrews	Lamiaceae	Pathor-hara	Whole plant	Heart disease, leucorrhea, colic.
32	<i>Cuphea hyssopifolia</i> Kunth	Lythraceae	Kablap	Leaf and flower	Tonic, fever, cough, insecticide.
33	<i>Hibiscus esculentus</i> L.	Malvaceae	Dherosh	Fruit, seed	Tonic, gonorrhoea.
34	<i>Wissadula periplocifolia</i> (L.) C. Presl ex Thwaites	Malvaceae	Naag-moni	Leaf, root	Tonic, snake bite, indigestion.
35	<i>Ficus hispida</i> L.	Moraceae	Kack-dumur	Leaf, seed	Diabetes, dermatitis, emetic.
36	<i>Psidium guajava</i> L.	Myrtaceae	Piyara	Leaf, fruit	Heart disease, malaria, appetizer, diabetes, jaundice, colic, virility.
37	<i>Bougainvillea spectabilis</i> Willd.	Nyctaginaceae	Bagan-bilash	Leaf, flower	Astringent, insecticide, cough.
38	<i>Olea europaea</i> L.	Oleaceae	Jolpai	Fruit, seed	Appetizer, hypertension, tumor.
39	<i>Cedrus deodara</i> (Roxb. ex D. Don) G. Don f.	Pinaceae	Devdaru	Leaf, bark	Sexual disorder, indigestion, piles, dermatitis.
40	<i>Piper chaba</i> Hunter	Piperaceae	Choi	Whole plant	Tonic, piles, insecticide.
41	<i>Hygroryza aristata</i> (Retz.) Nees	Poaceae	Beguni-pata	Whole plant	Tonic, scabies, astringent, cough.
42	<i>Phragmites australis</i> (Cav.) Trin. ex Steud.	Poaceae	Nol-khagra	Whole plant	Typhoid, rheumatoid arthritis, anti-hemorrhagic, impotency, diabetes, gout.
43	<i>Zea mays</i> L.	Poaceae	Bottha	Leaf, fruit	Kidney/gall bladder stones, heart disease, tumor, stimulate energy.
44	<i>Persicaria hydropiper</i> (L.) Spach	Polygonaceae	Bish-pata	Leaf, seed	Sedative, insecticide, cancer, colic.
45	<i>Ceriops tagal</i> (Perr.) C.B. Robinson	Rhizophoraceae	Goran	Leaf, bark	Malaria, dermatitis, astringent.
46	<i>Richardia scabra</i> L.	Rubiaceae	Riim-raaz	Whole plant	Tonic, asthma, emetic, dermatitis.

47	<i>Murraya paniculata</i> (L.) Jack	Rutaceae	<i>Komla-jasmine</i>	Leaf, flower	Helminthiasis, liver disease, rheumatoid arthritis, menstrual control, sedative.
48	<i>Veronica officinalis</i> L.	Scrophulariaceae	Chapta-pata	Whole plant	Cancer, carminative, expectorant, dermatitis, tuberculosis, helminthiasis.
49	<i>Typha minima</i> Funk ex Hoppe	<i>Typhaceae</i>	Gola-kashia	Whole plant	Tonic, dermatitis, wound.
50	<i>Boehmeria macrophylla</i> D. Don	<i>Urticaceae</i>	Jangli-chotta	Whole plant	Tonic, dermatitis, insecticide, boil.

Table 2: Parts of medicinal plants used to treat various ailments.

Parts used	Number of species	Percentage
Whole plant	29	40.85
Leaf	18	25.35
Root	1	1.41
Bark	4	5.63
Stem	1	1.41
Flower	7	9.86
Seed	6	8.45
Fruit	5	7.04

Plant parts used and mode of preparation

The various plant parts used included whole plants, leaves, stems, roots, barks, flowers, fruits, and seeds. In total, 71 uses of whole plants or plant parts were reported for the 50 species collected in the present survey. Table 2 displays the results on medicinal plant parts used to treat human ailments. The Kavirajes used several different types of preparation for a particular plant or plant part. Most often, the whole plant or plant part (leaf, stem, root) was crushed thoroughly to extract juice and the juice administered orally after straining through a piece of cloth. A decoction was sometimes prepared, which typically involved boiling the plant or plant part (leaf, bark) in four volumes of water till the volume has been reduced by half. The decoction was then strained through a piece of cloth and administered orally. On other occasions, a plant or plant part was dried and made into pills and the pills administered orally. Seeds were in general not administered orally; for most purposes oil was extracted from the seed and that oil used for topical applications.

Medical applications

In general a single plant was used by the Kavirajes to treat multiple ailments, which can be as high as six in number. Plants that were used to treat four or more ailments included *Barleria lupulina*, *Hygrophila auriculata*, *Sansevieria trifasciata*, *Amaranthus spinosus*, *Spondias dulcis*, *Centella asiatica*, *Gnaphalium luteo-album*, *Tridax procumbens*, *Carica papaya*, *Brassica oleracea*, *Trichosanthes kirilowii*, *Excoecaria agallocha*, *Cassia fistula*, *Cassia occidentalis*, *Saraca indica*, *Sesbania grandiflora*, *Anisomeles malabarica*, *Clerodendrum inerme*, *Cuphea hyssopifolia*, *Psidium guajava*, *Cedrus deodara*, *Hygroryza aristata*, *Phragmites australis*, *Zea mays*, *Persicaria hydropiper*, *Richardia scabra*, *Murraya paniculata*, *Veronica officinalis*, and *Boehmeria macrophylla*.

Twenty five (25) plants were used to treat skin diseases and 23 plants for treatment of Gastro intestinal tract disorders, which included constipation, indigestion, stomachache, diarrhea, and dysentery. This suggested that skin and intestinal tract disorders were the common afflictions of the population in the area. 14 plants were used to treat respiratory tract disorders (cough, cold, mucus, bronchitis, asthma). It was interesting to note that 14 plants were also used by the Kavirajes to treat cancer or tumor, suggesting that the area might be a rich source of plants with anti-cancer activities. 9 plants were used as insecticide, 8 for rheumatoid arthritis, and 7 plants for healing wounds. 5 plants were used to treat jaundice. 5 plants were also utilized to treat animal and snake bites, which included tiger bites. The surveyed area is within the vicinity of the Sunderbans forest region and a number of people are engaged in collecting honey, fish and timber products from the forest, which makes them a target for tiger attacks. Six (6) plants were used to treat diabetes, and 2 each for the treatment of leprosy, and sexually transmitted diseases like gonorrhoea. 5 plants were used to treat impotency, while 1 plant was used as an abortifacient. 3 plants were used to treat helminthiasis, which we found to be quite common amongst the population, while 4 plants were used to treat heart disorders. The medicinal plant species that were used by the Kavirajes included true mangrove species like *Excoecaria agallocha* and *Ceriops tagal*.

Discussion

Leaves and roots generally form the most frequently used plant parts in traditional medicine (Giday *et al.*, 2003; Wondimu *et al.*, 2007). Our survey results showed a different profile of plant parts used in Chalna area. Whole plants were used the most, followed by leaves and flowers, respectively. The root of only one plant species was used.

Our survey indicated that the plant species used for medicinal purposes in Chalna area differ from other areas of Bangladesh (data not shown). However, the diseases treated by the Kavirajes of Chalna area were quite similar to diseases treated by Kavirajes in other regions of Bangladesh. One notable exception, as pointed out earlier, was the comparatively large number of plant species used to treat cancer. A number of the medicinal plant species are collected from the Sunderbans forest. Since depletion of this forest region is going on at an alarming rate, it is imperative that modern scientific studies be conducted as soon as possible on the medicinal plants of the area. Not only such scientific studies can lead to possible discoveries of novel pharmacologically active compounds, but also such discoveries can be an inducement for preservation of the forest region.

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