Traditional Use of Medicinal Plants in Bangladesh to Treat Urinary Tract Infections and Sexually Transmitted Diseases

Md. Shahadat Hossan, Abu Hanif, Bipasha Agarwala, Md. Shahnawaz Sarwar, Masud Karim, M. Taufiq-Ur-Rahman, Rownak Jahan, Mohammed Rahmatullah

Research

Abstract

The rural population of Bangladesh has traditionally depended on folk medicinal healers for treatment of their ailments. These healers use medicinal plants as their primary source of medicinal formulations. Rural patients are more dependent on traditional or folk medicinal healers for treatment of urinary tract infections (UTIs) and sexually transmitted diseases (STDs) for a number of reasons including lack of access to modern medical facilities, clinging to traditional approaches, and finally hesitancy to relate this form of illnesses in front of unknown doctors. Since the traditional healer usually resides in the same village or in an adjoining area, the patient is more comfortable in seeking them for treatment. We conducted an ethnomedicinal survey among the traditional healers of various ethnic groups and in several regions of the country to obtain information on medicinal plants used to treat UTIs and STDs. Interviews were conducted in the local dialect or language about plant parts used, ailments treated, formulations, and dosages. Thirty-one species were reported by traditional healers as being used for UTIs, including leucorrhea, frequent or infrequent urination, cloudy urination and burning sensations during urination. Ten species were reported to be used against STDs like syphilis and gonorrhea.

Introduction

Urinary tract infections and sexually transmitted diseases (STDs) like syphilis and gonorrhea are prevalent throughout the world. In a study conducted with truck stand workers in Dhaka, Bangladesh the prevalence rates of syphilis and gonorrhea among men was observed to be 4.1 and 7.7%, respectively (Alam *et al*. 2007). Among hotel-based sex workers, a total of 8.5% had syphilis and 86.8% proved positive for at least one reproductive tract infection (RTI) or sexually transmitted infection (STI) (Nessa *et al*. 2004). In slum communities of Dhaka, serologic evidence of syphilis infection was found in 6.0% of respondents, while prevalence rates of gonorrhea were 1.7% (Sabin *et al*. 2003). Though statistics are not available for STDs in the rural areas of Bangladesh and among ethnic or tribal minority groups of the country, the prevalence of traditional medicinal practitioners dispensing medications for such diseases suggests that many in the rural population are also infected by STDs.

Major contributing factors for high levels of urinary tract infections (UTIs) in predominantly rural Bangladesh are poor sanitary conditions and lack of proper hygiene. One of the most common UTIs is leucorrhea among women, characterized by a whitish discharge from female genitalia. In one recent study, the most frequently discovered microorganisms found to cause leucorrhea included *Gardnerella vaginalis*, *Candida albicans*, *Chlamydia trachomatis* and *Trichomonas vaginalis* (Abauleth *et al*. 2006).

Most people in Bangladesh and especially in the tribal communities rely on traditional medicinal healers for treatment of their ailments. This is true for diseases like

Correspondence

Md. Shahadat Hossan, Abu Hanif, Bipasha Agarwala, Md. Shahnawaz Sarwar, Masud Karim, Rownak Jahan, Mohammed Rahmatullah, Department of Biotechnology & Genetic Engineering, University of Development Alternative, Dhanmondi, Dhaka-1205, BANGLADESH
rahamatm@hotmail.com
M. Taufiq-Ur-Rahman, Department of Pharmacology, University of Cambridge, Tennis Court Road, CB2 1PD, Cambridge, UNITED KINGDOM

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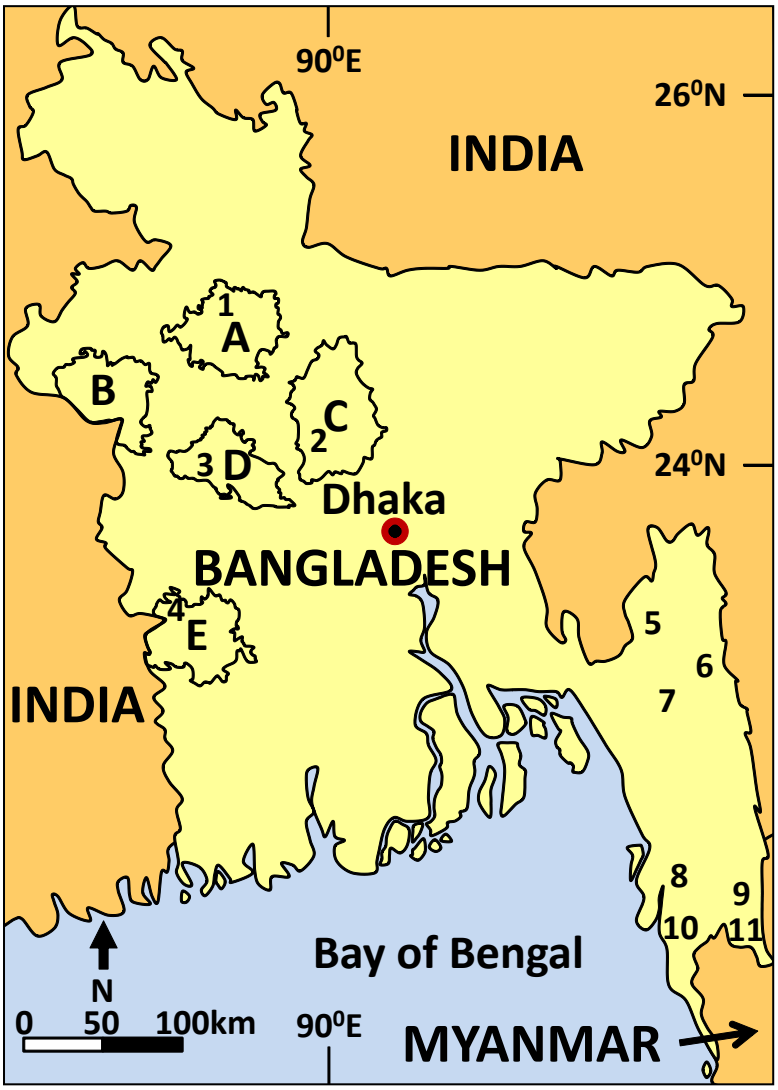

Figure 1. Bangladesh. districts where ethnomedicinal suveys were conducted: A. Bogra, B. Rajshahi, C. Tangail, D. Pabna and E. Jessore. Villages with cultural groups where surveys were conducted: 1. Villages of Bohrat, Brindanbonpara, Fullbari, Kaghyul, Langrabazar, Mahastanbazar, and Vhanbaniganj, 2. Bogra with Garo tribe & local traditional healer, 3. Bilkada village, 4. Bajua danga village, 5. Village of Khagrachari with Chakma & Tripura tribes, 6. Ramgarh village with Chakma tribe, 7. Rangamati village with Chakma tribe, 8. Chittagong village with Tripura tribe, 9. Bandarban village with Chakma, Murong and Tripura tribes, 10. Ramu village with Rakhain tribe, 11. Nikhangchaari village with Chak, Chakma, Marma & Tonchonga tribes.

UTIs and STDs because of the social stigma associated with them. People, particularly women, either do not discuss their ailments or only discuss them preferentially with traditional healers, who are common in every village and city. Since these healers most often belong to their own community, people seek their treatment instead of visiting modern allopathic doctors. Two other causes of seeking out traditional healers are age-old customs and the cost of modern medicines. Moreover, the rural people of Bangladesh lack access to modern medicinal facilities. The traditional healers use medicinal plants for treatment and are considered experts in their knowledge of plants and their preparation in disease-treating formulations. This knowledge is on the verge of disappearing because of loss of forest regions and consequent endangerment of medicinal plants. The practice of traditional healers keeping their knowledge confined to their immediate family may also contribute to this disappearance. Recent years have witnessed a gradual migration of traditional medicinal healers to other jobs, which has been more pronounced in their sons and daughters, who after receiving formal education are more inclined to give up traditional medicinal practices and migrate to jobs in the bigger cities. As a consequence, the age-old medicinal knowledge is fast disappearing. This is unfortunate because the medicinal plants utilized by the healers are under-studied and can be a potential source of new and effective drugs.

The objective of the present study was to learn more about medicinal plants that have been utilized for hundreds of years and so have demonstrated their potential efficacies, even though such efficacies may not have been thus far validated through modern scientific methods. We therefore undertook an ethnomedicinal survey of traditional medicinal healers (known generally as **kavirajes** or **vaidyas** by the mainstream community) in several districts and tribal groups to sample information on medicinal plants used to treat UTIs and STDs. A further objective of the research was to compare the use of these plants in traditional medicine with scientific reports on the efficacy of these plants.

Materials and Methods

Mode of information collection

Information was learned from healers using semi-structured interviews with a questionnaire. The basic method followed was a guided field interview (Martin 1995, Maundu 1995). Traditional healers were taken during daytime on field trips to areas where they usually collected plants, while at the same time survey interview questions were

asked and information noted. The information collected included formulations, ailments for which the formulations were used, and dosages dispensed. Information was also collected about any particular season for collecting plants, plant parts used and whether combination of plants were used to treat any particular ailment or if any single plant was used to treat multiple ailments. For the latter, additional questions were asked about if any specific plant part(s) are used for the ailment(s) concerned. The information was noted while in the field and later cross-checked with the healers in evening or night-time meetings. Evening or night-time meetings were usually conducted as group interviews in the presence of the healer, tribal or village elders and any other interested local persons (usually 10-15 people altogether). Informed consent was obtained from every healer prior to the interview. For the tribal healers, interviews were conducted with the help of an interpreter. In the cases of village healers, interviews were conducted in Bangla language, which is spoken throughout Bangladesh (apart from the tribes).

Plant specimens were photographed and voucher samples collected, pressed and dried in the field. Local names of the plants were obtained from the informant and double-checked with randomly selected other members of the community (on average three persons). Plant specimens were identified and then deposited at the Bangladesh National Herbarium, Dhaka (DACB).

Location and selection of Kavirajes or Vaidyas

Information was collected from either tribal or village **kavirajes**. As a result of lack of modern medicinal facilities (clinics, hospitals), **kavirajes** form the primary health care providers to tribal or village populations of Bangladesh. As such, they are the important sources of ethnomedicinal knowledge. Ethnomedicinal information was collected from the Chak, Chakma, Garo, Marma, Murong, Rakhain, Tonchonga and Tripura tribes. The locations of the various tribes are shown in Figure 1. Apart from the tribes, ethnomedicinal information was also obtained from **kavirajes** of villages in Bogra, Jessore, and Pabna districts. The names of the villages are given in Table 1 and the sites shown in Figure 1.

Bangladesh is a small country with 86,000 villages. It is believed that a typical village population consists of approximately 1600 persons. In general every village has 2-3 traditional medicinal practitioners, i.e., one **kaviraj** per 500-800 persons. However, our survey indicated that there is one **kaviraj** per approximately 200-300 persons

Table 1. Some medicinal plants used against urinary tract infections (UTI) in Bangladesh.

Scientific name	Vernacular name	Part(s) used	Ailment	Tribe or location of usage
Acanthaceae				
Acanthus ilicifolius L.	**Fereng-jubang**	Roots	Cloudy urination in women	Marma tribe
	View-kada	Roots	Leucorrhoea	Chakma tribe
Hygrophila spinosa T. Anders.	**Kuel-kharha**	Whole plant	Leucorrhoea	Mahastanbazar village, Bogra district
Adiantaceae				
Acrostichum aureum L.	**Mou-chai-pang**	Leaves	Cloudy urination in women	Marma tribe
Amaranthaceae				
Achyranthes aspera L. var. *nigro-olivacea* Suess.	**Sesaika**	Roots	Menstrual pain, lower abdominal pain	Chak tribe
	Chirchiri	Roots	Leucorrhoea, menstrual problems	Bajua danga village, Jessore district
Apiaceae				
Centella asiatica (L.) Urban	**Goal pata**	Whole plant	Leucorrhoea	Fullbari village, Bogra district
Apocynaceae				
Hemidesmus indicus (L.) R.Br. ex Schult.	**Anantamul**	Leaves	Urinary tract infections	Kaghyul village, Bogra district
Holarrhena pubescens Buch.-Ham. Wall. ex G. Don	**Koruj gach**	Bark	Leucorrhoea	Chakma tribe

Scientific name	Vernacular name	Part(s) used	Ailment	Tribe or location of usage
Asteraceae				
Ageratum conyzoides L.	**Waila**	Leaves, roots	Cloudy urination in women	Murong tribe
Eclipta alba (L.) Hassk.	**Kalo-keshi**	Whole plant	Leucorrhoea	Bohrat village, Bogra district
Elephantopus scaber L.	**Pau-ma-fang**	Roots	Difficulties in urination	Marma tribe
	Mul gach, Akfoilla	Roots	Leucorrhea, irregular urination	Chakma and Tonchonga tribes
Spilanthes acmella (L.) Murray	**Vhadalika**	Leaves, flowers	Leucorrhoea	Vhabaniganj village, Bogra district
Bignoniaceae				
Oroxylum indicum (L.) Kurz	**Tou-kharung**	Bark, fruit	Leucorrhoea, urinary problems	Tripura tribe
	Chilana gach	Bark, fruit	Presence of pus or semen in urine, burning sensations during urination	Chakma and Tonchonga tribes
Convolvulaceae				
Ipomoea paniculata Burm.f.	**Bhui kumra**	Whole plant	Leucorrhoea, menstrual problems	Bajua danga village, Jessore district
Costaceae				
Costus speciosus (Koen.) Sm.	**Tiatui**	Roots	Leucorrhoea, clearing of urine	Chakma and Tonchonga tribes
Cucurbitaceae				
Coccinia cordifolia (L.) Cogn.	**Telakucha**	Roots	Leucorrhoea, menstruation problems	Bajua danga village, Jessore district
Euphorbiaceae				
Emblica officinalis Gaertn.	**Amla**	Leaves, fruit	Leucorrhoea	Mahastanbazar village, Bogra district
Fabaceae				
Acacia farnesiana (L.) Willd.	**Wil-fai**	Roots	Burning sensation during urination, frequent urination, difficulties in urination, lower abdominal pain	Chak tribe
Caesalpinia nuga (L.) Aiton	**Pur-mu-o**	Plant juice, roots, fruit	Burning sensation in urinary tract	Murong tribe
	Krong-khai-bong	Leaves, roots	Burning sensations in urinary tract, urinary tract infections, pain in left abdomen followed by swelling and light red urination	Rakhain tribe
Cassia sophera L.	**Ichri**	Roots	Leucorrhoea	Chakma tribe
Clitoria ternatea L.	**Umaio**	Leaves, roots	Urinary tract infections, burning sensation in urinary tract, lack of urination, frequent urination	Tripura tribe
Mimosa pudica L.	**Pinuch-rurai**	Roots, bark, leaves	Frequent urination, burning sensations in the vaginal area, leucorrhoea	Murong tribe
	Lal lajjaboti	Roots	Bleeding of penis	Chakma tribe

Scientific name	Vernacular name	Part(s) used	Ailment	Tribe or location of usage
Moghania macrophylla (Willd.) Kuntze	**Blumai-kongda**	Roots	Urinary tract problem, frequent urination, lack of or infrequent urination	Tripura tribe
Lauraceae				
Dehaasia kurzii King ex Hook. f.	**Mojar mostapata, Modonbocchu**	Leaves, roots	Leucorrhoea	Chakma tribe
Litsea liyuyingi H. Liu	**Pipulta**	Leaves, bark	Leucorrhoea	Langrabazar village, Bogra district
Malvaceae				
Abroma augusta L.f.	**Ulot-kombol**	Leaves, stems	Menstrual disorders, diseases of uterus	Brindanbonpara village, Bogra district
	Ulot kombol	Bark of roots	Leucorrhoea, menstrual problems	Bajua danga village, Jessore district
Urena lobata L.	**Fow-fi-i**	Leaves, flowers	Urinary tract disorders	Marma tribe
	Rinia-mang	Roots, bark, flowers	Urinary problems, less urination	Murong tribe
	Bulbuli gach	Leaves	Presence of pus or semen in urine, burning sensations during urination, lower abdominal pain, lack of urination although feeling pressure of urination, urinary tract infections	Chakma tribe
Melastomataceae				
Melastoma malabathricum L.	**Tai-tong**	Leaves, roots	Urinary problems, leucorrhea	Tripura tribe
	Aksio	Roots, bark	Leucorrhoea	Murong tribe
	Na-aap-khi	Leaves, roots	Presence of sperm, blood or pus in urine	Rakhain tribe
Menispermaceae				
Stephania japonica (Thunb.) Miers	**Muicchani lata**	Vines	Leucorrhoea, presence of semen in urine, burning sensations during urination	Chakma and Tonchonga tribes
Nymphaeaceae				
Nymphaea nouchali Burm.f. var. *mutandaensis* Verdc.	**Fodom-ba**	Root clusters	Urinary problem, burning sensations in urinary tract, leucorrhoea	Tripura tribe
	Kra-pang	Upper portion of roots	Urination difficulties in men	Marma tribe
	Krapao	Root tops	Urinary problem, leucorrhoea	Murong tribe

Scientific name	Vernacular name	Part(s) used	Ailment	Tribe or location of usage
Rhamnaceae				
Zizyphus oenoplia (L.) Mill.	**Boroi**	Roots	Burning sensations in urinary tract, less urination, frequent urination	Tripura tribe
Rutaceae				
Glycosmis pentaphylla (Retz.) DC.	**Ash-sheora**	Whole plant	Leucorrhoea	Kaghyul village, Bogra district

in each tribe (highest number of **kavirajes** was among the Rakhain tribe with one **kaviraj** per 70 persons and the lowest among the Tripura tribe with one **kaviraj** per approximately 700 persons). With the exception of the Garos, the rest of the tribes are settled in three districts in the southeast region of Bangladesh. The Garos are settled in the north-central part of Bangladesh. With the exception of the Chakmas (where four communities were visited), one community each was visited for all the other tribes. The number of **kavirajes** in any particular tribal community or village is given in Table 2. For each of these tribal communities or villages, each practicing **kaviraj** was interviewed independently. It should be pointed out that all **kavirajes** of any particular tribe or village did not name the same plant for treatment of the same ailment. The number of plants and the number of ailments treated varied between **kavirajes** indicating that there is some specialization among them in use of plants and in the treatment of diverse ailments.

Table 2. Number of **kavirajes** (traditional medicinal healers) interviewed from different tribes and villages in Bangladesh.

Location/Community		Approximate Population[1]	Number of Kavirajes
Tribe	**Village/District**		
Chak		2000	10
Chakma		800	6
Garo		1250	5
Marma		1500	7
Murong		750	2
Rakhain		350	5
Tonchonga		500	2
Tripura		2000	3
	Bajua danga/Jessore	-	2
	Bilkada/Pabna	-	3
	Bohrat/Bogra	-	3
	Brindabanpara/Bogra	-	2
	Fulbari/Bogra	-	3
	Kaghyul/Bogra	-	2
	Langrabazar/Bogra	-	2
	Mahastanbazar/Bogra	-	2
	Vabaniganj/Bogra	-	2

1. The approximate population of the tribal communities was obtained from the tribal elders.

Results

Plants and their distribution into families

A total of 31 plants in 19 families were reported by the traditional healers of various districts and tribes of Bangladesh as used in remedies for UTIs (Table 1). UTIs remedies included leucorrhea, frequent or infrequent urination, cloudy urination and burning sensations during urination. Fabaceae was the largest family with six species.

A total of 10 plants in 8 families were reported by traditional healers as used in remedies for STDs like syphilis and gonorrhea (Table 3). The Garo tribe and the adjacent local non-tribal people of Madhupur, Tangail district formed the major population using a variety of plants against gonorrhea suggesting that the disease is quite prevalent among them. Two species each of Amaranthaceae and Malvaceae were used to treat gonorrhea, while four other species used to treat gonorrhea were each from different families. The two plants used as a remedy for syphilis came from the Moraceae and Plumbaginaceae families.

Plant parts used and ailments

Altogether 48 traditional healers reported use of whole plant or plant parts to treat UTIs. The most common ailment treated was leucorrhea. The most frequently reported part used was roots. Roots were used by 29 traditional healers followed by 13 healers, who used leaves of plants. In a few cases, more than one plant part was used. For instance, both leaves and flowers of *Spilanthes acmella* (L.) Murray were used to treat leucorrhea. The leaves and roots of *Ageratum conyzoides* L., *Clitoria ternatea* L. and *Dehaasia kurzii* King ex Hook. f. were used together respectively, to treat cloudy urination in women, leucorrhea, and burning sensations

in urinary tract. The leaves and fruits of *Emblica officinalis* Gaertn. were used to treat leucorrhea, whereas juice from the whole plant as well as roots and fruits of *Caesalpinia nuga* (L.) Aiton were used as remedy for burning sensations in the urinary tract. Occasionally, various parts of the same plant were used to treat UTIs. For instance, while the Marma tribe used the leaves and flowers of *Urena lobata* L. as remedy for urinary tract disorders, the Murong tribe used the roots, barks and flowers of the same plant to treat urinary problems and decreased urination. The Chakma tribe used the leaves of the same plant to treat pus in the urine, burning sensations during urination, lower abdominal pain (a frequent occurrence during UTIs), and other urinary tract infections. The leaves and stems of *Abroma augusta* L.f. were used by the traditional healers of Bogra district, but the bark of roots were used by the traditional healers of Jessore district. *Nymphaea nouchali* Burm.f. var. *mutandaensis* Verdc. proved to be an exception to this; the roots of this plant were used by traditional healers of the Tripura, Marma and Murong tribes to treat UTIs.

For treatment of STDs, leaves formed the major part used followed by roots. In three instances (*Centella asiatica* (L.) Urban, *Scoparia dulcis* L., and *Sida rhombifolia* L.), the whole plant was used to treat venereal diseases. The whole plant of each of these three was used specifically to treat gonorrhea.

Discussion

In an ethnobotanical study conducted among the Andean people of Canta, Lima, Peru, De-la-Cruz *et al*. (2007) observed that out of 31 families of plants used by traditional healers, Asteraceae provided the largest number of

Table 3. Some medicinal plants used against sexually transmitted diseases (syphilis, gonorrhea) by particular tribes and in specific villages in Bangladesh.

Scientific name	Vernacular name	Part(s) used	Ailment	Tribe or location of usage
Amaranthaceae				
Achyranthes aspera L. var. *nigro-olivacea* Suess.	**Apang**	Roots	Gonorrhea	Garo tribe and local traditional healers, Madhupur, Tangail district
Amaranthus spinosus L.	**Khuira kanta**	Roots	Gonorrhea	Garo tribe and local traditional healers, Madhupur, Tangail district
Apiaceae				
Centella asiatica (L.) Urb.	**Dhol manik**	Whole plant	Gonorrhea	Garo tribe and local traditional healers, Madhupur, Tangail district
Costaceae				
Costus speciosus (Koen.) Sm.	**Keu danga**	Leaves, roots	Gonorrhea	Garo tribe and local traditional healers, Madhupur, Tangail district
Lauraceae				
Litsea glutinosa (Lour.) C.B. Rob.	**Khara zura**	Leaves	Gonorrhea	Garo tribe and local traditional healers, Madhupur, Tangail district
Malvaceae				
Grewia asiatica L.	**Chandani shewra**	Leaves	Gonorrhea	Garo tribe and local traditional healers, Madhupur, Tangail district
Sida rhombifolia L.	**Bairali**	Whole plant	Gonorrhea	Garo tribe and local traditional healers, Madhupur, Tangail district
Moraceae				
Streblus asper Lour.	**Aurga**	Leaves, stems	Syphilis	Chakma tribe
Plumbaginaceae				
Plumbago indica L.	**Agni chita**	Leaves, stems	Syphilis	Bilkada village, Pabna district
Scrophulariaceae				
Scoparia dulcis L.	**Chinigura**	Whole plant	Gonorrhea	Fullbari village, Bogra district

medicinal species. This was the second largest family in our study. In another survey conducted around 'Dheeraa' town, Arsi Zone, Ethiopia, it was observed that the Fabaceae family had the highest number of species being used (Wondimu *et al*. 2007). In our study, we also observed that the Fabaceae family provided the highest number of species, suggesting that it is an important family for UTIs and STDs as well as medicinal plants in general.

Comparison of traditions within Bangladesh

There are many different ways to compare traditions within a region. One way is to compare the uses of cultural groups (tribes) based upon their ancestoral (liguistic) and geographical histories. The tribal groups examined in this study speak Indo-European (Chakma and Tonchonga) and Sino-Tibetan (Chak, Marma, Murong, Rakhain, and Tripura) languages (Lewis 2009). They are mostly settled in S.E. Bangladesh in the Chittagong area that adjoins Myanmar. Chak, Murong and Rakhain speakers are also settled in Myanmar. Patterns of common linguistic-cultural descent and historical proximity may explain examples observed in the present survey of utilizing the same plant by various tribal groups to treat the same or similar ailments. For instance, the Chakma and the Marma tribe use *Acanthus ilicifolius* L. to treat leucorrhea and cloudy urination in women, respectively. *Oroxylum indicum* (L.) Kurz is utilized by Tripura, Chakma and Tonchonga tribes to treat UTIs, while *Elephantopus scaber* L. is used by the Marma, Chakma and Tonchonga tribes for the same purpose. *Urena lobata* is used to treat UTIs by the Marma, Murong and the Chakma tribes, while *Melastoma malabathricum* L. is used to treat UTIs by the Tripura, Murong and Rakhain tribes. It is hypothesized that a common ancestry plus the fact of living in the same or nearby regions with greater interactions between the tribes has led to this similarity in choice of medicinal plants to treat similar ailments. In support of this hypothesis, it is also to be noted that with the exception of one single plant (*Achyranthes aspera* L. var. *nigro-olivacea* Suess.), which is utilized by **kavirajes** of the Chak tribe as well as by the **kavirajes** of Jessore district (which is far removed from the tribal abodes of Chittagong and adjoining areas, see Figure 1), there is no other instance observed in the present survey of the same plant being used to treat UTIs by tribal and non-tribal **kavirajes**. With the exception of *Abroma augusta* L.f., the **kavirajes** of non-tribal areas like Bogra and Jessore districts also differ in their choice of medicinal plants to treat UTIs. It is possible that the selection of medicinal plants used to treat UTIs by tribal as well as non-tribal **kavirajes** depends on plant availability. Our survey regarding UTIs was conducted among the tribal **kavirajes** living in Chittagong area and non-tribal **kavirajes** of Bogra and Jessore districts (Chittagong, Bogra and Jessore are quite distant from one another). The vegetation and medicinal plant availability is also quite different in these three different areas.

Comparison with global medicinal traditions

Since both UTIs and STDs are common throughout the world, it was of interest to survey the scientific literature for validation of the uses reported by the informants in this research. It is hypothesized that plants possessing antimicrobial activity or diuretic effects may act towards direct remediation of ailments or relieving the diseased person of any secondary effects. For example, the diuretic effects of *Hygrophila spinosa* T. Anders. (Kumari & Iyer 1967) likely actively contribute when the plant is used as a remedy for leucorrhea, where modern doctors also advocate drinking enough water to produce excessive urination. Diuretic activity has also been reported for whole plant of *Eclipta alba* (L.) Hassk. (Rangineni *et al*. 2007) and for the flowers of *Spilanthes acmella* (L.) Murray (Ratnasooriya *et al*. 2004). It is interesting that these are precisely the parts used by the traditional healers as remedy for leucorrhea. Similarly, the roots of *C. ternatea*, used by local traditional healers for urinary tract infections reportedly demonstrated diuretic activity in dogs (Piala *et al*. 1962). The stem bark of *Holarrhena pubescens* Buch.-Ham. Wall. ex G. Don (used to treat leucorrhea by the traditional healers) reportedly contains antibacterial steroid alkaloids (Chakraborty & Brantner 1999). The antibacterial property of *A. conyzoides*, used by traditional healers as remedy for cloudy urination in women has also been reported (Durodola 1977).

Emblica officinalis, used by traditional healers as a remedy for leucorrhea is used in Ladakh against kidney and urinary disorders (Ballabh *et al*. 2008). The plant has also proven its efficacy in scientific studies against age-related renal dysfunction (Yokozawa *et al*. 2007). The plant reportedly also has antibacterial and antifungal properties (Ahmad *et al*. 1998, Dutta *et al*. 1998, Ghosh *et al*. 2008). The roots of *U. lobata* used by traditional healers of the Murong tribe for urinary problems and the plant *Hemidesmus indicus* (L.) R.Br. ex Schult. has also been shown to have antibacterial activity (Aqil & Ahmad 2007, Mazumder *et al*. 2001).

A number of plants used by traditional healers of Bangladesh as remedy for STDs like syphilis and gonorrhea are used for similar purposes by traditional healers in various regions of the world (see Table 4). A decoction of the root of *A. aspera* var. *nigro-olivacea* is taken in Tanzania as remedy for venereal diseases. A decoction of roots of *Amaranthus spinosus* L. and whole plant of *C. asiatica* is used in the Philippines for treatment of gonorrhea. *Centella asiatica* is also used in South African folk medicine to treat gonorrhea. The roots of *S. rhombifolia* are used in the Ayurvedic treatment of India to treat gonorrhea, while the roots of *Streblus asper* Lour. are used in Indian traditional medicine to treat syphilis. A tincture of the root of *Plumbago indica* L. is also used to treat secondary syphilis in India. Indigenous tribes in Nicaragua use a hot water infusion of *S. dulcis* leaves as remedy for venereal diseases. The plant *Grewia asiatica* L. is also used in the

Table 4. Traditional uses of medicinal plants in other countries of the world that are used in Bangladesh to treat urinary tract infections (UTIs) and sexulally transmitted diseases (STDs). Common uses of the same medicinal plant in Bangladesh and other countries of the world have been underlined. Uses from other countries are sourced from UK CROPNET (2003) while other ailments besides UTIs and STDs for which the medicinal plants are used in the traditional medicinal system of Bangladesh have been obtained through the surveys of this research.

Plant	Traditional uses in Bangladesh (includes other ailments besides UTI and STD)	Uses in traditional medicinal systems of other countries of the world
A. Plants used against urinary tract infections		
Abroma augusta L.f.	Menstrual disorders, diseases of uterus, leucorrhoea, menstrual problems. Other uses:Stomachache, diabetes, dermatitis, whitish discharge in urine (men).	Dysmenorrhea (India), scabies (Indonesia).
Acacia farnesiana (L.) Willd.	Burning sensation during urination, frequent urination, difficulties in urination, lower abdominal pain.	Headache, dysentery, dyspepsia, inflammation (Mexico), aphrodisiac, stimulant, insecticide (Brazil), arthritis (China), snake bite, rabies, sore, sterility, epilepsy, insanity (India), stomach cancer (Venezuela), nausea, opthalmia (Java), tuberculosis (China, Mexico).
Acanthus ilicifolius L.	Cloudy urination in women, leucorrhoea.	Inflammation, hepatitis (China), kidney stones (Thailand), hepatitis, liver enlargement, spleen enlargement, gastralgia, asthma, leucorrhea (the Philippines), rheumatism, neuralgia (India, Malaysia), anodyne, flatulence (Java).
Acrostichum aureum L.	Cloudy urination in women.	Boil (Borneo), wound (Malaysia).
Achyranthes aspera L. var. *nigro-olivacea* Suess.	Menstrual pain, lower abdominal pain, leucorrhoea, menstrual problems. Other uses: Toothache, opacity of the eye, cough, night blindness, menstruation control, analgesic, fever, anti-hemorrhagic, dysentery, cough, snake bite, fever, astringent.	Astringent (Haiti), snake, tiger and insect bites, syphilis, toothache, rheumatism (India), cataract (the Philippines), diuretic (India, Haiti, the Philippines, Samoa), fever (Dominican Republic), cough (Moluccas), opthalmia (Java), venereal diseases (Tanzania).
Ageratum conyzoides L.	Cloudy urination in women. Other uses: Insect repellent, epilepsy, wounds, stomachache, syphilis, diabetes, astringent, indigestion, abortifacient, virility, itch, sex stimulant, insecticide.	Abortifacient, diabetes, puerperal fever, flu (Trinidad), boil, dysentery (Malaysia), contraceptive (Malacca), pneumonia (Liberia), infection (Tonga), emetic (cameroon, Sierra Leone), rheumatism, tumor (Venezuela), sleeping sickness (Zaire), syphilis (Tanzania), wound (The Philippines, India, Java, Tonga)
Caesalpinia nuga (L.) Aiton	Burning sensation in urinary tract, urinary tract infections, pain in left abdomen followed by swelling and light red urination.	Uteriotonic (India).
Cassia sophera L.	Leucorrhoea. Other uses: Eye disease, cancer, malaria, cough, pain, insect bite, snake bite.	Herpes, sore (China), tumor (India).
Centella asiatica (L.) Urb.	Leucorrhoea. Other uses: Tonic, sedative, fever, cold, anxiolytic, dog bite, asthma, carminative, itch, malaria, tumor, wound., diarrhea (child), liver disease, itch, constipation, anemia, dysentery, insanity, carminative, sexual disorder, wound.	Headache, gonorrhea, wound (The Philippines), astringent (Turkey), boil, venereal diseases (Samoa), cataract, cholera, tonic, insanity, tumor (India), cancer (Mauritius), convulsion (Tonga), leprosy (India, Malagasy, Samoa, Turkey).

Plant	Traditional uses in Bangladesh (includes other ailments besides UTI and STD)	Uses in traditional medicinal systems of other countries of the world
Clitoria ternatea L.	Urinary tract infections, burning sensation in urinary tract, lack of urination, frequent urination. Other uses: Edema, antidote, pain, tumor, diuretic, snake bite, indigestion.	Abscess, cough (Java), arthritis (The Philippines), scorpion bite (Sudan), laxative (Samoa), snake bite, diuretic (Iraq), tumor (India).
Coccinia cordifolia (L.) Cogn.	Leucorrhoea, menstruation problems. Other uses: Edema, eye diseases, carminative, hypertension, headache, typhoid, antiinflammatory, sunstroke, hypertension, diabetes, cough relief, fever.	Convulsion, scrofula, diabetes (India).
Costus speciosus (Koen.) Sm.	Leucorrhoea, clearing of urine. Other uses: Small pox, anthelmintic, leprosy, baldness, syphilis, malaria, bronchitis, gout, to control another person, debility, contraceptive, dysentery, eczema, paralysis.	Alopecia, opthalmia, dysentery, syphilis (Java), oral cancer (Europe), cough, fever, leprosy, purgative, small pox (Malaysia).
Dehaasia kurzii King ex Hook. f.	Leucorrhoea.	
Eclipta alba (L.) Hassk.	Leucorrhoea. Other uses: Tonic, fever, cold, emetic, purgative, antiseptic, viral diseases, anemia, sperm mortality, alopecia, dermatitis, stomach ache, hair dye.	Alopecia, hemorrhage, indigestion, lumbago, vertigo (China), gastritis, giddiness (Malayasia), marasmus, pertussis (Trinidad), ringworm, toothache (Java).
Elephantopus scaber L.	Difficulties in urination, leucorrhea, irregular urination.	Abscess, enteritis, pharyngitis, fever, swelling, suppurative (China), dysentery (China, Venezuela), tumor (Cuba), aphrodisiac (India), nausea (Malaysia), diuretic (China, Malaysia).
Emblica officinalis Gaertn.	Leucorrhoea. Other uses: Appetizer, gonorrhea, itch, diabetes, jaundice, heart disease, eye disease, cooling, diuretic, stomachache, toothache, stop hair loss, indigestion, debility.	Laxative, eye wash, peptic ulcer, jaundice (India), kidney and urinary disorders (Ladakh).
Glycosmis pentaphylla (Retz.) DC.	Leucorrhoea. Other uses: Rheumatoid arthritis, migraine, gastritis, jaundice, stimulant, toothache, toothbrush.	Anemia, cough, fever, jaundice, rheumatism, vermifuge (India).
Hemidesmus indicus (L.) R.Br. ex Schult.	Urinary tract infections. Other uses: Antidote to poison, snake bite, cold, mental disorder, dermatitis, tonic, anti-bacterial, diuretic, nerve weakness, dysentery, appetite stimulant, cough, skin disorders, genital disorders.	Demulcent, diaphoretic, diuretic, antiinflammatory, rheumatism, syphilis, tonic, tumor, urogenital disorders (India).
Holarrhena pubescens Buch.-Ham. Wall. ex G. Don	Leucorrhoea. Other uses: Anti-hemorrhagic, purgative, tuberculosis, anthelmintic, indigestion, tumor, itch, cough, spleen enlargement, fever, hypertension, dysentery.	Malaria, chronic constipation (India).
Hygrophila spinosa T. Anders.	Leucorrhoea. Other uses: Jaundice, rheumatoid arthritis, itch, edema, laxative, leprosy, analgesic, kidney and gall bladder stones.	Demulcent, aphrodisiac, diuretic, urinary tonic, hepatoprotective, nervine tonic, cardiac disorders, male genital dysfunctions (India), diuretic (France, Sudan), hepatitis, rheumatism (Sudan), demulcent (Italy, Sudan).

Plant	Traditional uses in Bangladesh (includes other ailments besides UTI and STD)	Uses in traditional medicinal systems of other countries of the world
Ipomoea paniculata Burm.f.	Leucorrhoea, menstrual problems. Other uses:Stimulant, increases bile secretion, liver cirrhosis, lunacy, sexual diseases, whitish discharge in urine (men).	Diuretic, expectorant, fever, menstrual problems, tuberculosis (India).
Litsea liyuyingi H. Liu	Leucorrhoea. Other uses: Tonic, stimulant.	
Melastoma malabathricum L.	Urinary problems, leucorrhea, presence of sperm, blood or pus in urine. Other uses: Indigestion, rabies, diarrhea.	Diarrhea, flatulence, infection, small pox, toothache (Malaysia), leucorrhea (Java).
Mimosa pudica L.	Frequent urination, burning sensations in the vaginal area, leucorrhoea, bleeding of penis. Other uses: Diarrhea, hypertension, antidote to poison, hemorrhoids, skin wounds, toothache, stomachache, ecbolic.	Headache, alopecia (Panama), diarrhea, dysentery (Haiti), insomnia (Panama, Trinidad), antidote to poison (Venezuela), sedative (Guatemala, Java).
Moghania macrophylla (Willd.) Kuntze	Urinary tract problem, frequent urination, lack of or infrequent urination. Other uses: Gastric problems.	Blindness, cholera, dysentery, fistula, small pox (India), analgesic (China), throat ache (Nepal).
Nymphaea nouchali Burm.f. var. *mutandaensis* Verdc.	Urinary problem, burning sensations in urinary tract, leucorrhoea, urination difficulties in men. Other uses: Indigestion, heart diseases, anti-hemorrhagic, stomachache, heart disease, cancer.	Coughs, colds (South Africa), diabetes (India).
Oroxylum indicum (L.) Kurz	Leucorrhoea, urinary problems, presence of pus or semen in urine, burning sensations during urination. Other uses: Tonsillitis, cholera, spleen enlargement, indigestion, snake bite, rheumatoid arthritis, edema, gynecological disorders, colic, jaundice.	Stomachache, swelling (Malaysia), anthrax, antiseptic, astringent, snake bite, cholera, dysentery, dyspepsia, dysuria, rheumatism, sore, tumor, urticaria (India), diuretic, tonsillitis (China), enterosis (Java), spleen enlargement (Sumatra).
Spilanthes acmella (L.) Murray	Leucorrhoea. Other uses: Toothache, anti-inflammatory, astringent, stop bleeding from gums, dysentery, antibacterial, anemia.	Panacea (Sumatra), stimulant, toothache (Sudan), stomatosis (Java), wound (India).
Stephania japonica (Thunb.) Miers	Leucorrhoea, presence of semen in urine, burning sensations during urination. Other uses: Edema, headache, diabetes, magic power, infectious disorder, bone fracture, debility.	Cancer (Japan), itch (The Philippines).
Urena lobata L.	Urinary tract disorders, urinary problems, less urination, presence of pus or semen in urine, burning sensations during urination, lower abdominal pain, lack of urination although feeling pressure of urination, urinary tract infections. Other uses: Skin diseases.	Stomachache, hangover (Trinidad), boil, gastritis, gingivitis (Haiti), burn (Tonga), fever (Sumatra, Guam), filariasis (Samoa), gonorrhea (Malaysia), wound (Sumatra).
Zizyphus oenoplia (L.) Mill.	Burning sensations in urinary tract, less urination, frequent urination.	Cuts and fresh wounds on the skin (Sri Lanka).

Plant	Traditional uses in Bangladesh (includes other ailments besides UTI and STD)	Uses in traditional medicinal systems of other countries of the world
B. Plants used against sexually transmitted diseases		
Achyranthes aspera L. var. *nigro-olivacea* Suess.	Gonorrhea. Other uses: See above under Section A.	Syphilis (India), venereal diseases (Tanzania). Also see above under Section A.
Amaranthus spinosus L.	Gonorrhea. Other uses: Laxative, expectorant, increase cow and goat milk, colic, piles, dermatitis, leucorrhoea, diarrhea, cattle disease, tonic, jaundice, stomach diseases, to stop frequent urination, dysentery, eczema, fever, diuretic.	Gonorrhea (India, The Philippines), snake bite (India, The Philippines, Ghana), boil, bronchitis, dyspnea (Malaysia), fever (The Philippines), emmenagogue, inflammation (Java), nausea (India), piles (Ghana), tumor (Java, Mauritius, Cambodia).
Centella asiatica (L.) Urban	Gonorrhea. Other uses: See above under Section A.	Venereal diseases (Samoa), gonorrhea (The Philippines). Also see above under Section A.
Costus speciosus (Koen.) Sm.	Gonorrhea. Other uses: See above under Section A.	Syphilis (Java). Also see above under Section A.
Grewia asiatica L.	Gonorrhea. Other uses: Lack of appetite, typhus, acidity, giddiness, diarrhea, hypertension, stimulant, anorexia.	Gonorrhea, astringent, demulcent, rheumatism, stomachic, tumor (India).
Litsea glutinosa (Lour.) C. B. Rob.	Gonorrhea. Burning sensations during urination, constipation, increase body strength.	Boil (Singapore), emmenagogue (The Philippines).
Plumbago indica L.	Syphilis. Other uses: Blood cancer, eye diseases, leprosy, leucoderma, gastritis, headache.	Syphilis (India), abortifacient, cough (Malaysia), headache, vermifuge (Java), leprosy (Moluccas), tumor (Indonesia, India).
Scoparia dulcis L.	Gonorrhea. Other uses: Fever, headache, jaundice, diabetes, earache, gastritis, dysentery, virility, itch, cancer, febricity, cough, virility, cough, sex stimulant, nerve stimulant, dissolve gall bladder stones.	Gonorrhea (Haiti, Siera Leone), syphilis (Malaysia), antidote to poison (Trinidad), astringent (Dominican Republic, Haiti, Venezuela), diabetes (Dominican Republic, Haiti, Trinidad), cough (Haiti, Malaysia), inflammation, tumor, toothache, headache, earache (Haiti), insecticide (Paraguay), rash (Trinidad), stomachache (Malaysia).
Sida rhombifolia L.	Gonorrhea. Other uses: White discharge in urine (men).	Gonorrhea (India), abortifacient (Borneo), alopecia, burn (Samoa), aphrodisiac, chicken pox, delirium, enterosis, ophthalmia, itch, impotency, tuberculosis (Malaysia), diarrhea (Costa Rica, Samoa), rheumatism (Malaysia, Sudan), urethritis (Nicaragua).
Streblus asper Lour.	Syphilis. Other uses: Cholera, piles, wound, sperm mortality, cancer, mental disorder, heart disease, itch, stimulant, tumor, indigestion, leucoderma, liver disease, analgesic.	Syphilis, ache, cancer, cholera, colic, dysentery, fever, menorrhagia (India), parturition (Java).

Himalayan traditional medicinal system of India to treat gonorrhea. In scientific studies, the plants *Litsea glutinosa* (Lour.) C.B. Rob., *S. asper*, and *P. indica* have been shown to possess antibacterial properties that could account for their use in traditional medicine (Aqil & Ahmad 2007, Mandal *et al*. 2000, Wongkham *et al*. 2001).

Conclusions

Urinary tract infections and sexually transmitted diseases are prevalent throughout the world. Since most people, particularly in the underdeveloped countries do not go to allopathic doctors for treatment, either because they lack access to modern medical facilities or are too shy to dis-

cuss these diseases with unknown doctors, they rely primarily on traditional healers and medicinal plants for treatment of such diseases. It is therefore important to collate information from all parts of the world regarding medicinal plants that are used as treatments for these ailments. A number of plants used in Bangladesh for treatment of STDs are in use in other regions of the world for similar purposes. Thus these plants have a basis to be investigated by modern scientific methods for possible discovery of novel antimicrobial or other compounds. A direct result of the present survey was that information on a number of plant species used to treat urinary tract infections and sexually transmitted diseases have been collected that can form the basis for further scientific studies. A comparison of the survey results with published scientific reports indicate that a number of the plants have validity in their uses in traditional medicine.

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