

## Ethnomedicinal Knowledge Among the Local Community of Atwari Upazilla of Panchagarh District, Bangladesh

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**Abstract:** Atwari upazilla is situated in the furthest north region of Bangladesh. Its outlying location and remoteness made it unique in the traditional use of medicinal plants by the local people. Since, there is no previous report indicating conduct of ethnobotanical study in this area. The present study thus attempted to document knowledge on uses and management practices of medicinal plants by the local people in study area. The medicinal use information has been documented by interviewing randomly selected traditional healers, various elderly men and women following different ethnobotanical methods/techniques during October 2014-June 2015. Recorded plants species have been collected, identified and preserved at the Chittagong University Herbarium (CTGUH). A total of 97 vascular plant species belonging to 86 genera of 53 families have been documented which are used to treat 47 diseases/illness. In context to the number of species, the most frequent used family is Fabaceae. According to life form, herb (49.48%) is used most frequently and the most utilized plant parts are leaves (34.58%). A total of 25 local healers have been interviewed. Of them 88% were above 31 years. Most of the information has been documented from the male informants (96). This study showed that local people still depends on plants around them for the treatment of various ailments and diseases. From the present study, it can be concluded that further scientific studies conducted with the plants can lead to discovery of novel phytochemicals and drugs.

**Keywords:** Atwari, Panchagarh, ethnobotany, medicinal plants, drug discovery.

### INTRUDUCTION

Ethnobotany is considered as a branch of ethnobiology, the study of past and present interrelationships between human cultures and the plants, animals, and other organisms in their environment. It includes plants used as food, medicine, crafts, crops, weeds, wild or cultivated, and the present and past ways of manipulation, use and/or exploitation by people. Medicinal plants play a significant role in primary healthcare of rural people (Roy *et al.*, 2008; Mohiuddin *et al.*, 2012). They are considered one of the crucial components as far as the contribution of biodiversity to society is concerned. Indigenous knowledge of herbal medicine for the cure of several types of diseases exists among different rural communities of

Bangladesh (Rahman *et al.*, 2007). Bangladesh, a country of very fertile land, has a rich flora of medicinal plants. A total of 4939 angiospermic plant species are scattered throughout the forests, jungles, hills, plains, crop fields, road-sides, gardens, marshy lands and watery places of Bangladesh, out of which 750 species are used in traditional medicine (Pasha and Uddin, 2013; Uddin, 2010). The World Health Organization (WHO) listed 21,000 medicinal plants that were used in different parts of the world. According to WHO report 80% of the world's population still depend on traditional medicine for their primary health care (Islam, 2006). Bangladesh is a country of so many diversities in culture, tradition and lifestyle. Each locality is enriched with their own solitary ways of life and culture. Although

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the northern part of the country is not as bestowed naturally as rest of the country, but there still present lot of different natural treasures and their methods of application in the day-to-day life of the inhabitants of the locality. Atwari is an Upazila of Panchagarh district in the division of Rangpur, Bangladesh, with an area of 209.92 sq. km is bounded by West Bengal on the north, Panchagarh sadar upazila on the north-east, Boda upazila on the east, Thakurgaon sadar and Baliadangi upazilas on the south, and Indian border on the west. Due to its remoteness the vegetation and the socio-cultural, ethnobiological culture and practices are quite different from the rest of the country. Distant location is also a curse to this place because this place is still mostly devoid of modern cultures and trends. The most diversified and reach vegetation of the country is situated in the south-west and southeastern part, yet Atwari has some precious natural gifts and unique ethno biological practices. The new generations are getting more and more interest to the modern allopathic practices instead of following their ancestors. This trend is seriously threatening the age-old traditions and cultures of the local people. That necessitated the proper documentation, elaborated research and conservation of the age-old ethnobotanical practices, because all of these might result in discovery of important and noble phytochemicals and drugs as well.

A number of ethno-medicinal studies in Bangladesh have been carried by Rahman *et al.*, (2007), Yusuf *et al.*, (2006, 2007), Roy *et al.*, (2008), Faruque and Uddin, (2011), Mohiuddin *et al.*, (2012), Uddin *et al.*, (2006, 2011, 2012), and Sajib and Uddin (2013). However, no specific work has been done on the medicinal plants of rural community of Atwari Upazila. The present study intends to document the information on the plants used for medicinal purposes at Atwari.

## **METHOD OF STUDY**

A multidisciplinary approached fieldwork combines botanical inventories, collection of plant specimens, structured, semi structured, and informal interviews and classic anthropological participant observation techniques (Vogl *et al* 2004;

Bernard 2002). Six repeated field trips have been conducted during October 2014 to June 2015 and 38 interviews have been made among 25 informants. The information collected followed by recommended techniques, *viz*: direct observation, field interview, plant interview and group interview (Alexiades 1996, Martin 2004, Thomas *et al* 2007). Several types of questions (direct, indirect, open or closed) have been used during the fieldwork. In addition, an audio recording was done by using voice recorder.

## **ENUMERATION OF TAXA**

Plants have been collected, dried and preserved at the Chittagong University Herbarium (CTGUH) with voucher number. Plants are identified with author citation by reviewing taxonomist and recent book (Pasha and Uddin, 2013). Recorded plant species have been tabulated along with their local name, family, parts used, illness treated and using information and frequency of distribution (Table 1).

## **RESULTS**

Total 25 informants have been selected for the present study. The informants consisted of 96% male and only 4% female. According to the age, most informants were near 31-45years (40%) old and other interviewees were 46-60 years (28%) old, followed by more than 60 years (20%) old, respectively (Table 2).

Throughout the survey, a total number of 97 species under 86 genera in 53 families have been recorded include different life forms, *viz*: herb (48), tree (30), shrub (12) and climber (7). In context to the number of species the most frequently used family were Fabaceae (8), followed by Caesalpiniaceae (5), Liliaceae (4), Euphorbiaceae (4), Asteraceae (4) and Amaranthaceae (4). (Table 3).

Various plant parts have been found to be widely used for the treatment of 47 (table:4) types of diseases/illness. The most widely used plant parts were leaves (34.58%) followed by fruits (18.69%), roots (12.15%), seeds (9.35%) and whole plant (6.54%). (figure 1). The maximum utilized plant part were leaves by them it is indicate that they are conservative in plant uses because it does

Table 1  
Documented medicinal plants used by the local people in study area

No	Scientific name (Voucher number)	Local name	Family	Habit	Disease/ Illness treated	Parts used	Using information	Frequency of occurrence
1	<i>Abroma augusta</i> (L.) L.f. (ARI1024)	Ulatkambal	Sterculiaceae	Shrub	Urinary irritations	Bark	Bark extract is taken a cup of full once a day for three days to treat urinary irritations.	Common
2	<i>Abrus precatorius</i> L. (ARI1027)	Ratti	Fabaceae	Tree	Diarrhoea and Dysentery.	Seed	Seed powder is taken one tea spoon full once a day for three days for the treatment of diarrhoea and dysentery.	Common
3	<i>Acalypha indica</i> L. (ARI1012)	Muktajhuri	Euphorbiaceae	Herb	Asthma	Leaves	Leaf extract is taken to treat asthma once a day until cure.	Common
4	<i>Achyranthes aspera</i> L. (ARI1041)	Apang	Amaranthaceae	Herb	Toothache	Stem	Root is taken in toothache.	Common
5	<i>Acorus Calamus</i> L. (ARI1029)	Bach	Araceae	Herb	Cuts and wounds	Root	Paste of root is applied to treat cuts and wounds	Common
<b>Least Concern</b>								
6	<i>Adiantum capillus- veneris</i> L. (ARI1019)	Vat pata	Adiantaceae	Herb	Stomach pain	Leaves	Decoction of leaves is taken one teaspoon full once day for three days to cure stomach pain.	Common
<b>Least Concern</b>								
7	<i>Adiantum philippense</i> L. (ARI1014)	Goyalelata	Adiantaceae	Herb	Skin disease	Leaves	Leaf paste is applied to treat skin diseases once a day for three days	Common
8	<i>Ageratum conyzoides</i> (L.) L. (ARI1025)	Fulkuri	Asteraceae	Herb	Skin disease	Leaves	Smashed leaves is applied to treat skin diseases once a day for seven days.	Common
9	<i>Albizia procera</i> (Roxb.) Benth. (ARI1013)	Sil koro	Mimosaceae	Tree	Ulcer	Leaves	Leaf extract is taken to treat ulcer once a day for every day.	Common
10	<i>Allium cepa</i> L. (ARI1036)	Piaj	Liliaceae	Herb	Asthma, Gout & Rheumatism	Bulb	Bulb paste is taken to treat asthma, rheumatism	Common
11	<i>Allium sativum</i> L. (ARI1009)	Rasun	Liliaceae	Herb	Fever, Bronchitis, Cold & Cough	Bulb	Bulb paste is taken to treat fever, cough and bronchitis	Common
12	<i>Alocasia macrorrhizos</i> (L.) G. Don (ARI1002)	Mankachu	Araceae	Herb	Inflammations, Rheumatism and Jaundice	Whole plant	Plant extract taken to treat inflammations, rheumatism and jaundice.	Common
13	<i>Aloe vera</i> (L.) Burm.f. (ARI1005)	Ghritakumari	Aloaceae	Herb	Burn and Sprains, Jaundice, Asthma.	Leaves	Juice of the leaves is applied externally for burn and sprains and also taken to treat jaundice, asthma.	Rare
14	<i>Alstonia scholaris</i> (L.) R. Br. (ARI1016)	Chatim	Apocynaceae	Tree	Ulcer	Sap	Milky juice is taken to treat ulcer once a day until cure.	Occasional
<b>least concern</b>								

No	Scientific name (Voucher number)	Local name	Family	Habit	Disease/ Illness treated	Parts used	Using information	Frequency of occurrence
15	<i>Amaranthus spinosus</i> L. (ARI1020)	Katanoty	Amaranthaceae	Herb	Dysentery	Root	Root juice along with sugar or molasses is given in dysentery	Common
16	<i>Amaranthus viridis</i> L. (ARI1032)	Notey	Amaranthaceae	Herb	Bronchitis	Leaves	Leave extract is taken to treat bronchitis	Common
17	<i>Ananus comosus</i> (L.) Merr. (ARI1039)	Anaras	Bromeliaceae	Herb	Intestinal disorder.	Immature Leaves, Sucker	Juice of leaf is taken one teaspoon full once a day for three days for the treatment of intestinal disorder.	Common
18	<i>Andrographis paniculata</i> (Burm.f.) Wall. ex Nees. (ARI1043)	Kalomegh	Acanthaceae	Herb	Liver cirrhosis	Whole plant	plant extract taken to treat liver cirrhosis	Common
19	<i>Annona reticulata</i> L. (ARI1048)	Ata	Annonaceae	Tree	Tumors	Leaves	Leaves extract is taken to treat tumors	Common
20	<i>Neolamarckia cadamba</i> (Roxb.) Bosser (ARI1026)	Kadam	Rubiaceae	Tree	Coolant & Analgesic	Fruit	Fruits is taken as coolant & Analgesic	occasional
21	<i>Aphananixis polystachya</i> (wall.) R. Parker (ARI1030)	Pitraj	Meliaceae	Tree	Rheumatism	Seed	Seed oil is applied to treat rheumatism	Common
<b>least concern</b>								
22	<i>Areca catechu</i> L. (ARI1042)	Shupari	Arecaceae	Tree	Urinary irritation	Fruit	Seed is taken to treat urinary irritation	Abundant
23	<i>Argemone mexicana</i> L. (ARI1008)	Shialkanta	Papaveraceae	Herb	Cancer	Latex	Latex is taken to treat cancer twice a day for 30 days.	Common
24	<i>Artocarpus lacucha</i> Buch-Ham. (ARI1003)	Dewa	Moraceae	Tree	Skin disease	Bark	An infusion of the bark is applied for skin disease	Common
25	<i>Asparagus racemosus</i> Willd. (ARI1031)	Satamuli	Liliaceae	Herb	Gastritis	Root	Pasted of root is taken one spoon full once a day for three days for the treatment of gastritis	Common
26	<i>Averrhoa carambola</i> L. (ARI1029)	Kamranga	Oxalidaceae	Tree	Tonic, jaundice.	Fruit	Fruit is used to treat jaundice, taken two or three times until cure; it is also used as tonic.	Abundant
27	<i>Azadirachta indica</i> A. Juss. (ARI1001)	Nim	Meliaceae	Tree	Skin disease	Leaves, Bark.	Powder of leaf\ bark is taken one teaspoon full twice a day for three days against skin problems.	Abundant
28	<i>Basella rubra</i> L. (ARI1033)	Puishak	Basellaceae	climber	Constipation,	Leaves,	The juice of the leaves is taken in constipation,	Common

*contd. table 1*

No	Scientific name (Voucher number)	Local name	Family	Habit	Disease/ Illness treated	Parts used	Using information	Frequency of occurrence
29	<i>Bombax ceiba</i> L. (ARI1006)	Shimul	Bombacaceae	Tree	Dysentery	Root	Extract of young root is taken one teaspoon full twice a day for three days.	Common
30	<i>Cajanus cajan</i> (L.) Millsp. (ARI1028)	Arhar	Fabaceae	Shrub	Jaundice	Seed	Paste of leaves mixed with bark of mango, berry and root of catechu nut is applied on the body once a day for two days.	Common
31	<i>Calotropis gigantea</i> (L.) Ait.f. (ARI1040)	Akanda	Asclepiadaceae	Shrub	Gout and Rheumatism	Leaves	Leaf is applied to the affected area twice a day for three days for the treatment of gout and rheumatism.	Common
32	<i>Carica papaya</i> L. (ARI1054)	Pepe	Caricaceae	Tree	Gastritis	Fruit	Green papaya is taken with beet salt to cure gastritis once a day for three days.	Abundant
33	<i>Cassia fistula</i> L. (ARI1062)	Sonalu	Caesalpinaceae	Herb	Ulcer, Ringworms	Leaves	Leave juice is taken to treat ulcer, young leaves is used to cure ringworms.	Abundant
34	<i>Senna obtusifolia</i> (L.) H.S. Irwin & Barneby (ARI1068)	Chakunda	Caesalpinaceae	Herb	Asthma, Bronchitis	Leaves	Leave juice is taken to treat asthma & bronchitis	Abundant
35	<i>Senna occidentalis</i> Roxb. (ARI1051)	Kalkasunde	Caesalpinaceae	Herb	Hiccup	Leaves	Leave juice is taken to treat hiccup.	Abundant
36	<i>Senna sophora</i> (L.) Roxb. (ARI1069)	Chhoto kalkasunde	Caesalpinaceae	Herb	Asthma, Bronchitis, Hiccup, Ringworm	Leaves	Leaf juice is taken in ringworm, asthma, bronchitis and hiccup.	Abundant
37	<i>Catharanthus roseus</i> (L.) G. Don (ARI1055)	Nayantara	Apocynaceae	Herb	Menorrhagia	Leaves	Infusion of the leaves is given in menorrhagia.	Common
38	<i>Celosia cristata</i> L (ARI1052)	Moragphul	Amaranthaceae	Herb	Dysentery, Diarrhoea and Body pain.	Seed	Seeds oil applied to relief from body pain; it is also used in dysentery and diarrhea.	Abundant
39	<i>Centella asiatica</i> (L.) Urban (ARI1058)	Thankuni	Apiaceae	Herb	Dysentery	Whole plant	Extract of leaves is mixed with 2-5 black pepper is taken one teaspoon full once a day for three days for the treatment of dysentery.	Abundant
40	<b>Least Concern</b> <i>Cicer arietinum</i> L. (ARI1071)	Chana	Fabaceae	Herb	Energetic and Diabetes	Seed	Green seed is energetic, taken 25gm once a day ; it also taken in diabetes.	Common
41	<i>Cinnamomum verum</i> C.Presl (ARI1070)	Daruchini	Lauraceae	Tree	Bronchitis, Piles and Diarrhoea	Bark, Leaves	Bark is taken to treat bronchitis and piles. Leaves extract is taken once a day until cure from diarrhea.	Common
42	<i>Cissus quadrangularis</i> L. (ARI1066)	Harjora	Vitaceae	Climber	Broken limbs	Whole plant	Plant paste is applied to join broken limbs.	Rare
43	<i>Citrullus lanatus</i> (Thumb.) Matsumura & Nakai (ARI1053)	Tormuj	Cucurbitaceae	Climber	Coolant	Fruit	Ripe fruits is taken as coolant.	Common

contd. table 1

No	Scientific name (Voucher number)	Local name	Family	Habit	Disease/ Illness treated	Parts used	Using information	Frequency of occurrence
44	<i>Citrus aurantifolia</i> (Christm.) Swingle (ARI1056)	Lebu	Rutaceae	Shrub	Sinusitis, Vomiting and Energetic.	Leaves, Fruit	Smashed leaves are effective on vomiting and sinusitis. Fruit extract with sugar is energetic, taken twice a day for three days.	Abundant
45	<i>Citrus maxima</i> (Burm.f.) Merr. (ARI1063)	Jambura	Rutaceae	Tree	Asthma	Fruit	Fruits is taken to treat asthma.	Common
46	<i>Cleome gynandra</i> L. (ARI1076)	Sada hurhure	Capparaceae	Herb	Tumors	Root	Root is taken to treat tumors.	Abundant
47	<i>Clerodendrum indicum</i> (L.) Kuntze (ARI1072)	Bamunhatti	Verbenaceae	Shrub	Asthma	Root	Root paste is taken to treat asthma.	Common
48	<i>Clerodendrum viscosum</i> Vent. (ARI1074)	Bhat	Verbenaceae	Shrub	Fever, Cough and Cold	Immature Leaves	Leaves extract with 21 black pepper is taken one teaspoon full once a day for 21 days to cure Fever, cough and cold.	Abundant
49	<i>Coccinia grandis</i> (L.) Voigt (ARI1064)	Telakucha	Cucurbitaceae	Climber	Diabetes	Whole plant	Juice of plant is taken to diabetes.	Common
50	<i>Cocos nucifera</i> L (ARI1042)	Narikel, dab	Areaceae	Tree	Intestinal disorder, Fever and Urinary irritations	Fruit	Drinking of green coconut heals intestinal disorder, taken twice a day for three days. Fruit is useful in fever and urinary irritations.	Abundant
51	<i>Colocasia esculenta</i> (L.) Schott (ARI1061)	Kachu	Araceae	Herb	Tumors	Leaves	Leaves juice is taken to treat tumors.	Abundant
<b>Least Concern</b>								
52	<i>Commelina benghalensis</i> L. (ARI1081)	Dholpata	Commelinaceae	Herb	Cuts and wounds	Stem	Stem sap is applied to stop cuts and wounds.	Common
<b>Least Concern</b>								
53	<i>Crotalaria juncea</i> L. (ARI1078)	Shonpat	Fabaceae	Herb	Hair tonic, Skin diseases	Seed	seed is applied to treat skin disease and hair tonic.	Abundant
54	<i>Crotalaria verrucosa</i> L. (ARI1021)	Jhanjhani	Fabaceae	Herb	Dyspepsia	Leaves	leaves is taken to treat dyspepsia.	Common
55	<i>Cucumis sativus</i> L. (ARI1077)	Shasha	Cucurbitaceae	Climber	Energetic, Obesity	Fruit	Green fruit is energetic, taken 250 gm twice a day every day; it is also used to reduce fat from the body.	Common
56	<i>Curcuma longa</i> L. (ARI1084)	Halud	Zingiberaceae	Herb	Blood purifier, Diabetes	Rhizome	Paste of the rhizome along with <i>Azadirachta indica</i> leaf is taken one glass every day in the morning in empty stomach to control diabetes; it is also blood purifies blood.	Abundant

contd. table 1

No	Scientific name (Voucher number)	Local name	Family	Habit	Disease/ Illness treated	Parts used	Using information	Frequency of occurrence
57	<i>Cyperus rotundus</i> L. (ARI1087)	Mutha, Kalna	Cyperaceae	Herb	Dysentery	Root	Extract of root mixed with 2-5 black pepper taken one teaspoon full thrice a day for seven days to cure dysentery.	Common
<b>Least Concern</b>								
58	<i>Dalbergia sissoo</i> DC. (ARI1084)	Sisu	Fabaceae	Tree	Stomach pain	Leaves	Extract of young leaves is taken to treat stomach pain.	Common
59	<i>Dillenia indica</i> L. (ARI1053)	Chalta	Dilleniaceae	Tree	Allergy	Fruit	Fruits is used in allergy, taken once a day for two days.	Common
60	<i>Diospyros malabarica</i> (Desr.) Kostel. (ARI1091)	Gab	Ebenaceae	Tree	Skin disease	Bark and Leaves	Bark and leaves are applied to treat skin disease.	Common
61	<i>Drimys indica</i> (Roxb.) Jessop (ARI1098)	Ban piyaj	Liliaceae	Herb	Asthma	Bulb	Extract of bulb is taken one teaspoon full twice a day until cure from asthma.	Common
62	<i>Eclipta prostrata</i> (L.) L. (ARI1093)	Kesuti	Asteraceae	Herb	Jaundice	Leaves	Fresh leave juice is taken to treat jaundice.	Abundant
<b>Data Deficient</b>								
63	<i>Eichhornia crassipes</i> (Mart.) Solms (ARI1076)	Kachuripana	Ponted eriaceae	Herb	Goiter	Whole plant	Plant extract taken to treat goiter for three months.	Abundant
64	<i>Elaeocarpus floribundus</i> Blume (ARI1099)	Jalpai	Elaeocarpaceae	Tree	Rheumatism	Leaves	Leaves is taken to treat Rheumatism.	common
65	<i>Elephantopus scaber</i> L. (ARI1095)	Gojialata	Asteraceae	Herb	Piles	Leaves	Leaves are taken to treat piles.	Common
66	<i>Erythrina variegata</i> L. Var. variegata (ARI1078)	Mader	Fabaceae	Tree	Dysentery	Root	100g root paste is taken once a day for four days to treat dysentery.	Common
<b>Least Concern</b>								
67	<i>Euphorbia thymifolia</i> L. (ARI1094)	Dudhiya	Euphorbiaceae	Herb	Diarrhoea	Leaves	Paste of leaf is taken one tea spoon full once a day for three days to treat diarrhoea.	Abundant
68	<i>Limonia acidissima</i> L. (ARI1067)	Kadbel	Rutaceae	Tree	Stomach pain	Fruit	Fruits is taken twice a day for three days to cure from stomach pain.	Common
69	<i>Ficus semicordata</i> Buch. -Ham. ex J.E.Sm. (ARI1042)	Dumur	Moraceae	Tree	Sensuality	Fruit	2-3 fruits is taken thrice a day for seven days for the treatment of sensuality.	Common
70	<i>Heliotropium indicum</i> L. (ARI1086)	Hatisur	Boraginaceae	Herb	Dysentery	Root	Root extract is taken one teaspoon full once a day for three days in the morning on empty stomach to cure dysentery.	Abundant

contd. table 1

No	Scientific name (Voucher number)	Local name	Family	Habit	Disease/ Illness treated	Parts used	Using information	Frequency of occurrence
71	<i>Justicia adhatoda</i> L. (ARI1085)	Basak	Acanthaceae	Shrub	Cough	Leaves	Leaf extract with zinger & black pepper is taken one tea spoon full twice a day until cure to treat cough.	Common
72	<i>Kalanchoe pinnata</i> (Lam.) Pers. (ARI1046)	Patharkuchi	Crassulaceae	Herb	Urinary irritations	Mature Leaves	Mature leaves extract is taken thrice a day for three days to treat urinary irritations.	Common
73	<i>Lablab purpureus</i> (L.) Sweet Subsp: <i>purpureus</i> (ARI1006)	Shim	Fabaceae	Herb	Skin disease	Leaves, seed	Paste of leaf mixed with salt and applied to the affected area once a day for three days to cure skin diseases.	Abundant
74	<i>Leucas aspera</i> (Roth) Spreng. (ARI1016)	Dulfi	Lamiaceae	Herb	Skin disease	Leaves	The juice of leaves is applied in psoriasis and other skin eruption.	Abundant
75	<i>Melastoma malabathricum</i> L. (ARI1073)	Datrenga, Lutki	Melastomataceae	Shrub	Jaundice	Fruit	Fruit is taken twice a day for five days to treat jaundice	Abundant
76	<i>Mimosa pudica</i> L. (ARI1049)	Lojjaboti	Mimosaceae	Shrub	Toothache	Root	Root extract is taken one tea spoon full once a day for three days to treat toothache	Abundant
<b>Least Concern</b>								
77	<i>Moringa oleifera</i> Lam. (ARI1023)	Sajina	Moringaceae	Tree	Cold and cough	Bark	Bark extract is taken 50 gm twice a day for two days to treat cold and cough.	Common
78	<i>Musa paradisiaca</i> L. (ARI1047)	Aittakola	Musaceae	Herb	Dysentery, Diabetes.	Fruit	The unripe fruit is taken to control diabetes, also used to treat chronic dysentery.	Abundant
79	<i>Nigella sativa</i> L. (ARI1057)	Kalojira	Ranunculaceae	Herb	Jaundice, Cough and Piles.	Seed	Powder of seed is taken one teaspoon full once a day for three days for the treatment of jaundice also used to cure cough and piles.	Common
80	<i>Ocimum suave</i> Willd. (ARI1085)	Tulsi	Lamiaceae	Shrub	Fever, Cough.	Immature Leaves	Leaf extract is taken to cure from fever and cough, taken one teaspoon full once a day for three days.	Common
81	<i>Polygonum lapathifolium</i> L. var. <i>lapathifolium</i> (ARI1082)	Bishkatali shada	Polygonaceae	Shrub	To control insect of rice field	Whole plant	Plant extract is applied in the rice field as an insecticide.	Abundant
82	<i>Phoenix sylvestris</i> (L.) Roxb. (ARI1101)	Khajur	Areaceae	Tree	Stomach pain	Sap	Sap is taken to treat stomach pain, taken one glass once a day until cure.	Common
83	<i>Phyllanthus emblica</i> L. (ARI1120)	Amloki	Euphorbiaceae	Tree	Blood pressure, Liver cirrhosis, Sensuality; used as a hair tonic.	Fruit, Root	Root extract is taken one teaspoon full once a day for seven days to treat sensuality. Fruit is used in blood pressure & liver diseases. Fruit oil is also used in hair tonic.	Common

contd. table 1



No	Scientific name (Voucher number)	Local name	Family	Habit	Disease/ Illness treated	Parts used	Using information	Frequency of occurrence
84	<i>Piper longum</i> L. (ARI1131)	Pipul	Piperaceae	Herb	Cough	Fruit	Fruit with boiling water or tea is taken twice a day for three days to cure cough.	Occasional
85	<i>Piper nigrum</i> L. (ARI1112)	Golmarich	Piperaceae	Climber	Cough and Cold	Fruit	Extract of the fruit taken to treat cough and cold, taken 3 or 4 fruit once a day for three days.	Common
86	<i>Ricinus communis</i> L. (ARI1106)	Bherenda	Euphorbiaceae	Herb	Body pain.	Seed	Seed oil is applied to the body twice a day for seven days to relief from body pain,	Common
87	<i>Saccharum officinarum</i> L. (ARI1108)	Akh	Poaceae	Herb	Jaundice	Stem	Sap is drank one glass twice/thrice a day for fifteen days for the treatment of jaundice.	Abundant
88	<i>Sesamum indicum</i> L. (ARI1113)	Dulfi, til	Pedaliaceae	Herb	Stomach pain, Body pain	Seed, Leaves	Powder of young leaves and rice is taken once a day for three days in stomach pain. Seed oil is used to treat body pain.	Common
89	<i>Stephania japonica</i> (Thumb.) Miers (ARI1124)	Maknadi	Menispermaceae	Climber	Fever, Diarrhoea, Urinary irritations and Dyspepsia	Leaves, Root	Extract of leaves is taken once a day until cure to treat fever; it is also used in diarrhoea, urinary irritations and dyspepsia	Common
90	<i>Syzygium fruticosum</i> (Roxb.) DC. (ARI1103)	Sabri	Myrtaceae	Tree	Blood dysentery	Leaves	Juice of the tender leaves with rice water is taken one glass once a day until cure from dysentery	Common
91	<i>Tabernaemontana divericata</i> (L.) R.Br.ex Roemer & Schult. (ARI1128)	Togar	Apocynaceae	Shrub	Swelling of eye	Flower	Extract of flower is mixed with a pinch of salt is taken half teaspoon full once a day for three days in swelling of eye.	Common
92	<i>Tagetes erecta</i> L. (ARI1222)	Genda	Asteraceae	Herb	Cut and wounds.	Young Leaves	Paste of young leaf applied to the affected area during cut and wounds.	Abundant
93	<i>Tamarindus indica</i> L. (ARI1123)	Tetul	Caesalpinaceae	Tree	Fever	Fruit	Fruit is taken twice a day until cure to treat fever	Common
94	<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn. (ARI1118)	Arjun	Combretaceae	Tree	Blood pressure	Bark	Bark extract or dried bark with water is taken once a day on empty stomach for three months to cure blood pressure.	Common
95	<i>Terminalia bellirica</i> (Gaertn.) Roxb. (ARI1129)	Bahera	Combretaceae	Tree	Bronchitis, Asthma, Dyspepsia and Scorpion-sting	Fruit	Dry fruit soaked in water is taken one glass once a day (in the morning) for 7-15 days for the treatment of bronchitis, asthma, dyspepsia and scorpion-sting	Common
96	<i>Terminalia chebula</i> (Gaertn.) Retz. (ARI1132)	Haritaki	Combretaceae	Tree	Asthma, Blood pressure, Painful menstruation and Indigestion	Fruit	Dry fruit soaked in water is taken in asthma, blood pressure, painful menstruation and indigestion, taken one glass once a day (in the morning) until cure.	Common
97	<i>Zingiber officinale</i> Roscoe (ARI1104)	Ada	Zingiberaceae	Herb	Coolant, Cough	Rhizome	Rhizome with tea is taken to cure cough and for keeping the body cool.	Abundant

**Table 2**  
**List of Families**

Family	Number	Family	Number	Family	Number	Family	Number
Apocynaceae	3	Bromeliaceae	1	Fabaceae	8	Papaveraceae	1
Acanthaceae	2	Caesalpiniaceae	5	Lamiaceae	2	Pedaliaceae	1
Adiantaceae	2	Capparaceae	1	Lauraceae	1	Piperaceae	2
Aloeaceae	1	Caricaceae	1	Liliaceae	4	Poaceae	1
Amaranthaceae	4	Combretaceae	3	Melastomataceae	1	Polygonaceae	1
Annonaceae	1	Commelinaceae	1	Meliaceae	2	Pontederiaceae	1
Apiaceae	1	Crassulaceae	1	Menispermaceae	1	Ranunculaceae	1
Araceae	3	Cucurbitaceae	3	Mimosaceae	2	Rubiaceae	1
Areaceae	3	Cyperaceae	1	Moraceae	2	Rutaceae	3
Asclepiadaceae	1	Dilleniaceae	1	Moringaceae	1	Sterculiaceae	1
Asteraceae	4	Ebenaceae	1	Musaceae	1	Verbenaceae	2
Basellaceae	1	Elaeocarpaceae	1	Myrtaceae	1	Vitaceae	1
Bombacaceae	1	Euphorbiaceae	4	Oxalidaceae	1	Zingiberaceae	2
Boraginaceae	1						

**Table 3**  
**Demography of informants**

Factor	Categories	No. of person	% of informants
Gender	Male	24	96%
	Female	1	4%
Age	15-30	3	12%
	31-45	10	40%
	46-60	7	28%
	More than 60	5	20%
Profession	Hakim	6	24%
	Farmer	7	28%
	Businessman	7	28%
	Others	5	20%

not need to uproot/destroy the whole plants. Extensive use of leaves in ethnobotanical practice has also been recorded in some other ethnobotanical survey reports (Mahishi *et al* 2005, Abo *et al* 2008, Gonzalez *et al* 2010, Telefo *et al* 2011). Maximum numbers of plants were used for diarrhea and dysentery (13) followed by Asthma (10), Cold and cough (9), Jaundice (8), etc. (Table 4).

The present study has been revealed that at least 10 methods of application of medicine or usage in general. The maximum number of application are orally administrated or internal application. Medicines that are administrated internally includes

**Table 4**  
**Recorded disease/ illness treated**

Disease	Number	Disease	Number	Disease	Number	Disease	Number
Diarrhoea & Dysentery	13	Tumors	3	Liver cirrhosis	2	Scorpion-sting	1
Asthma	10	Coolant	3	Intestinal Disorder	2	Cancer	1
Cold & Cough	9	Body pain	3	Ring worms	2	Sinusitis	1
Jaundice	8	Piles	3	Hiccup	2	Burn and Sprains	1
Skin disease	8	Dyspepsia	3	Gastritis	2	Indigestion	1
Bronchitis	6	Blood pressure	3	Swelling of eye	1	Inflammations	1
Fever	6	Energetic	3	Analgesic	1	Tonic	1
Urinary irritation	5	Toothache	3	Menorrhagia	1	Constipation	1
Stomach pain	5	Cuts & Wounds	3	Allergy	1	Broken limbs	1
Gout & Rheumatism	5	Hair tonic	2	Goiter	1	Obesity	1
Diabetes	4	Sensuality	2	Insecticide	1	Vomiting	1
Ulcer	3	Blood purifier	2	Menstruation problem	1		

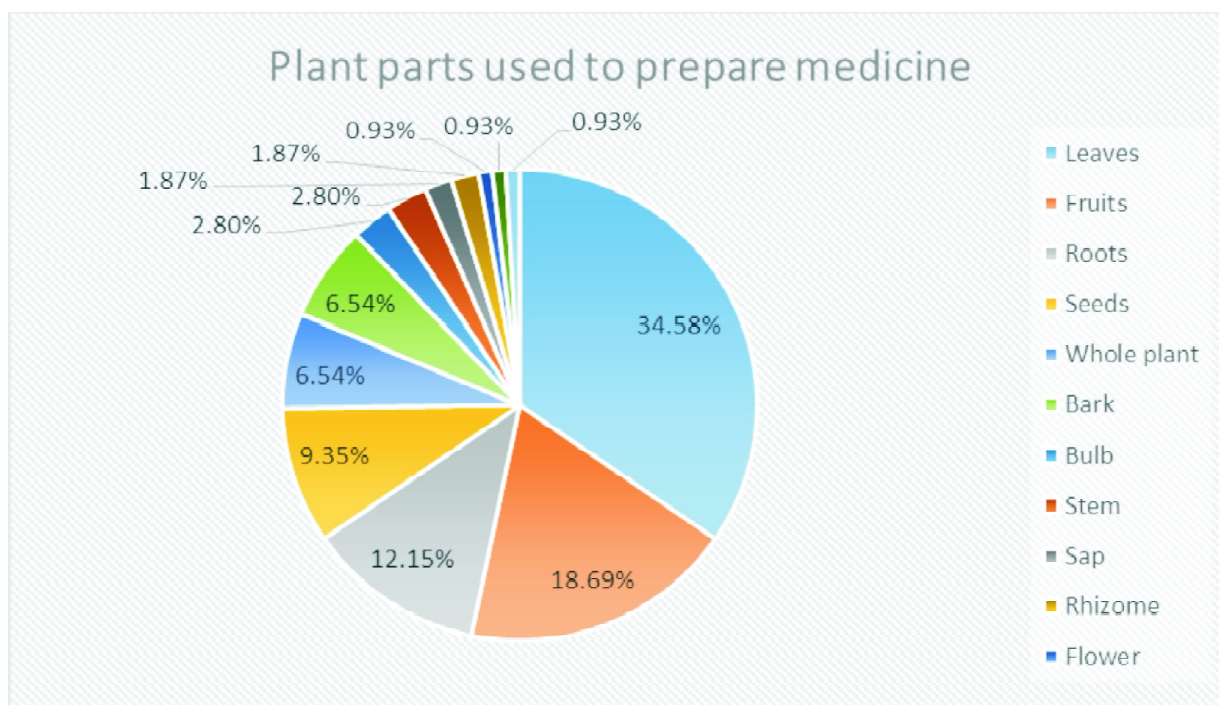


Figure 1: Plant parts used to prepare ethnomedicine

for cough, diarrhoea, asthma, jaundice, fever etc. Local application of plant as medicine is also referred by them in many cases. Herbal bath, plaster, rubbing, massaging and tying the plant parts in the body also been found. The local application and the other outer application may be considered as external application. So the major two categories are i) external application, and ii) internal application. Seven plants were found to be used as both external and internal. Fig. 2.

The most frequently cited modes of preparation were extracting and pasting (45.45%), chewing that includes direct ingestion, intake etc (19.19%), juice preparation (14.14%), boiling and baking (7.07%), Powder and dried form (6.06%) and smashing that includes massaging, rubbing (3.03%). Materials prepared as juice, decoction, and paste and in other forms are often mixed with a variety of spices, vegetable oils, pharmacological agents etc.

Based on field observation and local information, it has observed that out of total 97-recorded plant species, 62 species were common, 30 species were abundant, three species were occasional and only two species were rare viz: *Cissus quadrangularis* L. and *Aloe vera* (L.)Burm.f. On the

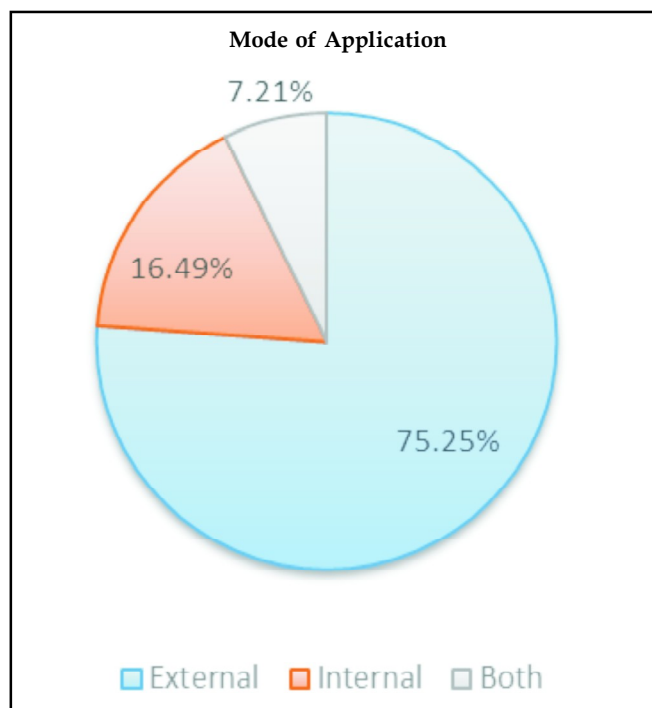


Figure 2: Mode of Application

other hand the conservation status of the recorded plants species has been checked by IUCN Red List of Threatened Species (Version 2015.1. [www.iucnredlist.org](http://www.iucnredlist.org)). Only one plant was recorded

as 'data deficient' (*Alstonia scholaris*) and 10 plant species were recorded as 'least concern'. The other

species has not yet been assessed for the IUCN Red List (figure 3).

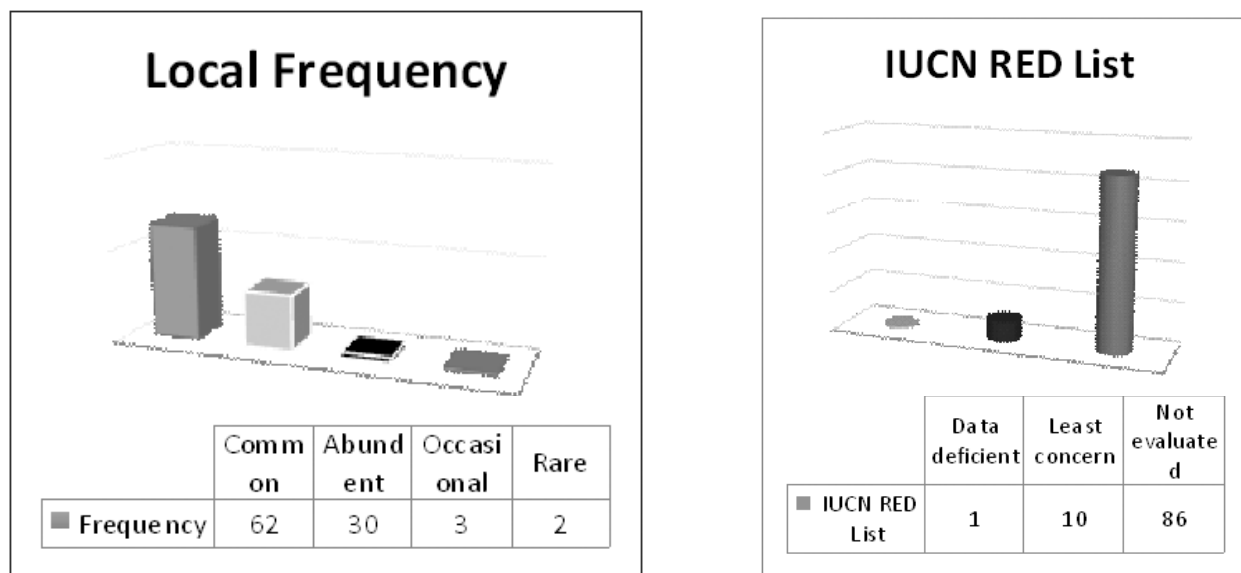


Figure 3: Comparative representation of data of local and IUCN red list data

## DISCUSSION

The main focus of this study was to document the plant use information for herbal formularies as the source of treatment for various diseases by the rural communities. These people are still dependent on plants products and have believed in their various remedial properties for a very long time. From one generation to another, this knowledge has been passed on through word of mouth and improved through selection and rejection processes. A total of 47 species have been found to be used for treatment purpose. Aerial parts mostly used in herbal formularies indicating the easy collection and rich conservation management. Frequently treated disease/illness are diarrhea, dysentery, asthma, cough, jaundice etc. which are very common to that area as well as in Bangladesh. The herbal formularies include extract, paste, juice, powder and the frequent intake procedure is intake indicate the proper use of active constituents. From the observation and analysis only two medicinal species have been found to be rare to that area. This is the reflection of their good conservation management of medicinal plants. There is no written document of such folk knowledge. In modern times, it is alarming that the knowledge of ethnobotany is

disappearing rapidly. It is urgently needed to document these information before disappear forever from this region. Moreover, if the plants of this locality can be thoroughly examined and investigated for further research and study, the probability of finding new class of phytochemical and drug in certain. Atwari upazila situated beside the Indian state of Shiliguri. There are some common plants in both side which are used for the treatment of same/different types of diseases and sometimes this using information were shared between them. The present study tried to document the ethnomedicinal from the Bangladesh part later on, will try to document the ethnomedicinal from the Indian part and no men's land and try to find out the correlation, similarities and dissimilarities of vegetation and ethnomedicinal uses between two regions. Moreover, this would become an example for the rest of the country's remote places and ultimately the future of the ethnobotany and ethnopharmacology will be flourishing than ever before.

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