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Local folk use of plants in Dakshin Dinajpur district of West Bengal, India

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Abstract

Dakshin Dinajpur (2162 Sq. Km.) is a small ethnomedicinally active district, where most of the common tribals (Santal, Munda, Oraon, Rajbanshi, Lodha, Sabar etc.) still use plants as their remedies for various ailments. An ethnomedicinal study among the local tribal people of this district has been carried out during November 2009 to November 2011. Information is collected based on interviews and cross verified with other aged traditional practitioners. The present investigation documents the use of 132 plant species belonging to 65 families. The survey was conducted among different tribal and non-tribal communities of this district. Out of 132 recorded uses 56 uses are new report from this district.

Keywords: Folk medicine, Dakshin Dinajpur district, ethnobotany, Kaviraj.

Introduction

Since the early days of civilization plants have been used as medicine. Survival of tribals and backward class communities depend upon the use of these useful plants. Tribal people as well as traditional practitioner widely used the medicinal plants in their every day practice for safer, low cost, efficient and locally availability. Plants have been used as medicine from the beginning of civilization to present day. According to a report of World Health Organization (WHO), it is claimed that still 80% of the population of developing countries depend on traditional and folk medicine for primary healthcare.

Dakshin Dinajpur of West Bengal is a small agriculturally active district having 8 blocks, where most of the rural people still use the medicinal plants as their remedies for different ailment. The district Dakshin Dinajpur lies between 26° 35' 15" N to 25° 10' 55" N latitude and 89° 00' 30" E - 87° 48' 37" E longitude and covering an area of 2162 Sq. Km. (Figure-1). There are five tribal communities such as Santal, Munda, Oraon, Lodha, Sabar, which are about (16.12%) of total population. Along with these tribes, the other non-tribal population belongs to other category such as Rajbanshis (18.4%), Hindus, Mushlims and other minorities. This district has also a very old tradition of practicing Kabiraji, Ayurveda and Unani.

Figure-1
Location map of the survey area (Dakshin Dinajpur district)

The value of medicinal plants, herbs and spices as herbal remedies is getting lost due to lack of awareness, urbanization, deforestation and modernization. On the other hand, some traditional practitioners had a false apprehension that propagating the knowledge of medicinal plants by common people may reduce their efficacy and thus they kept it secret. However, the newer generations are not very keen to retain this traditional based knowledge from their predecessors. As a result important knowledge based tradition is fading away. Therefore, before this huge wealth of traditional knowledge is lost forever it must be documented properly. So far, some floristic works on this district have been done by different scientist[1-6]. De Sarker and co-authors have undertaken an elaborate systemic investigation on plants having medicinal value in this region comprising of three district viz. Uttar Dinajpur, Dakshin Dinajpur and Malda district[7]. A very little work has been done in the field of ethnobotany of West Dinajpur and Dakshin Dinajpur district[6-16]. But no such work has been done in the field of folk medicine of entire Dakshin Dinajpur district after bifurcation of West Dinajpur district.

With these above background a survey for documenting the traditional knowledge of use of plants which are in practice among the different tribal and non-tribal communities of Dakshin Dinajpur.

Methodology

The work was undertaken through field study carried out throughout the season conducted during November 2009 to November 2011. The present study is the outcome of two years of critical and intensive ethnomedicinal survey of Dakshin Dinajpur district. For conducting the study, exploration trips were regularly made in every season in such a manner that it covers all the blocks of the district. Data collection places were selected based on the high concentration of tribal and local scheduled caste populations (18.4%). 'Kaviraj' (persons having knowledge of Ayurveda), old and experienced tribal person provide important information regarding the use of different medicinal plants to cure various ailments (figure-2). The information was also cross verified with some local aged and experienced practitioners. The method of collection of plant specimens, herbarium preparation and preservation was done following standard procedure[17]. To identify all the collected specimens relevant floras and standard literature were used[18-20]. As records, the voucher specimens were kept in the Herbarium of the Department of Botany, Raiganj College (University College), Uttar Dinajpur. The enumeration of the collected specimens was arranged alphabetically by scientific name, vernacular names, family, parts used and mode of preparation and application.

Results and Discussion

The study reveals that the district Dakshin Dinajpur is very rich in ethnobotanical diversity and local people still depend on plants for their daily needs. The present study reveals the use of 132 plant species belonging to 120 genera and 65 families by different tribal and non-tribal communities of this district (table-1). As to their distribution among families the plants show that 8 species belonging to Asteraceae followed by Euphorbiaceae (6 species) and Papilionaceae (6 species). The Acanthaceae, Asclepiadaceae, Cucurbitaceae, Lamiaceae and Verbenaceae were having 5 species each. Poaceae (4 species) and Amaranthaceae, Apocyanaceae, Caesalpiniaceae, Combretaceae, Menispermaceae, Rutaceae, Solanaceae and Zingiberaceae contributed 3 plant species per family. Anacardiaceae, Convolvulaceae, Liliaceae, Malvaceae, Mimosaceae, Myrtaceae, Orchidaceae, Oxalidaceae, Piperaceae, Sterculiaceae and Vitaceae were having 2 plant species each. Other families included Acoraceae, Araceae, Aristolochiaceae, Basellaceae, Bombacaceae, Boraginaceae, Cannaceae, Capparaceae, Commelinaceae, Costaceae, Crassulaceae, Cyperaceae, Dioscoreaceae, Flacourtiaceae, Hypoxidaceae, Lauraceae, Lythraceae, Marsileaceae, Meliaceae, Nyctaginaceae, Nymphaeaceae, Oleaceae, Onagraceae, Ophioglossaceae, Palmae, Papaveraceae, Phyllanthaceae, Plumbaginaceae, Polypodiaceae, Portulacaceae, Rubiaceae, Salviniaceae, Sapotaceae, Scrophulariaceae, Smilaceae, Tiliaceae and Apiaceae were used by the tribal and non-tribal people in the region. A graphical representation of relative relation of families with respect to their numbers is shown in figure-3.

Table-1
Enumeration of the medicinal plants used by the tribal and non-tribal people of Dakshin Dinajpur district

Scientific name	Vernacular name	Family	Parts used	Medicinal uses
Abroma augustum (L.) L. f.	Ulatkambol	Sterculiaceae	Petiole	Young petiole cut into small pieces and kept in a glass of water for overnight and infusion is used at early morning in empty stomach to cure "Meho" (gonorrhoea) and physical weakness.
Abrus precatorius L. Figure-5	Kanch	Papilionaceae	Root	Fresh root decoction used for "Meho" (gonorrhoea) and jaundice.
Acacia nilotica L.	Babla	Mimosaceae	Stem bark	Stem bark decoction used to treat cough, diarrhoea, dysentery, indigestion, acidity, "Meho" (gonorrhoea) and diabetes.

Achyranthes aspera L.	Apang/ Chatchota	Amaranthaceae	Root	Stem and root (2-3 piece) decoction mixed with "Ada" (*Zingiber officinale*) is used in jaundice.
Acmella oleracea (L.) R.K.Jansen	Rasun sag	Asteraceae	Whole plant	Whole plant eaten as vegetable to treat body pain especially after child birth.
Acorus calamus L.	Bach	Acoraceae	Rhizome	Fresh rhizome decoction clears the vocal cord.
Aegle marmelos (L.) Corr.	Bel	Rutaceae	Fruit	One teaspoonful of young dried fruit powder mixed with water is given at early morning in empty stomach to cure dysentery and gastric problems.
Alocasia macrorrhiza Schott.	Man-kachu	Araceae	Petiole	Petiole ash mixed with coconut oil is applied as emollient on carbuncle.
Alstonia scholaris (L.) R. Br.	Chatim/ Chatan	Apocyanaceae	Stem bark	Stem bark paste applied on breast for better lactation.
Amaranthus spinosus L.	Kanta Khuria	Amaranthaceae	Root	Fresh mature root decoction gives physical strength and used in indigestion problem, dysentery and diphtheria.
Ampelocissus latifolia (Roxb.) Planch.	Goali lata	Vitaceae	Root	Root paste mixed with 12 "Golmarich" (*Piper nigram*) and applied to cure gout and rheumatism.
Andrographis paniculata (Burm. f.) Wall. Ex Nees	Kalmegh	Acanthaceae	Leaf	Leaf decoction used for could and cough, diabetes and leaf paste applied on hair before 30 minutes of bath to control dandruff.
Argemone mexicana L.	Siyal kanta	Papaveraceae	Root	Root decoction used for piles.
Aristolochia indica L. Figure**-**6	Iswarmul	Aristolochiaceae	Root	Fresh root and leaf decoction is given in early morning to cure stomachache, fever, indigestion problem and diarrhoea.
Artemisia vulgeris L.	Nagdona	Asteraceae	Leaf	Fresh leaf paste applied externally on the forehead to reduce headache and sinus problem.
Averrhoa carambola L.	Kamranga	Oxalidaceae	Fruit	Roasted fruit is kept under the sky overnight to catch the dew and make it juice mixed with pinch of sugar is given at early morning to cure cough and bronchitis especially for child.
Azadirachta indica A. Juss.	Neem	Meliaceae	Stem bark	Stem bark and leaves boiled with water and applied on carbuncle, boil and skin diseases for quick healing.
Bambusa tulda L.	Bansh	Poaceae	Stem	Juice of roasted young shoot is applied to cure earache.
Basella alba L.	Pui	Basellaceae	Stem	Dried stem ash used as tooth paste to cure pyorrhea.
Bauhinia acuminata L.	Swet Kancan	Caesalpiniaceae	Flower	Dried flowers crushed and then lightly wormed with mustered oil applied externally to cure skin diseases.
Blumea lacera (Burm. f.) DC.	Kukurmuta	Asteraceae	Root	Root (2-3 pieces) decoction mixed with "Ada" (*Zingiber officinale*) and pinch of salt is given to cure flatulence and indigestion problem.
Boerhavia diffusa L. Figure**-**7	Punarnaba	Nyctaginaceae	Whole plant	Whole plant decoction is given to cure burning sensation during urination.
Bombax ceiba L.	Shimul	Bombacaceae	Root	Fresh root (1-2 years old plant) used in “Meho” (gonorrhoea) and physical weakness.
Borassus flabellifer L.	Tal	Palmae	Root	Fresh root decoction mixed with the roots of *Achyranthes aspera* are boiled and gargle to cure toothache.
Butea monosperma (L am.) Taub.	Palash	Papilionaceae	Leaf	Fresh leaf juice used as aphrodisiac and enhances sperm count.
Cajanus cajan (L.) Huth	Arhar	Papilionaceae	Leaf	Fresh leaf juice is given at early morning to treat jaundice.
Calotropis gigantea (L.) W. T. Aiton	Akanda	Asclepiadaceae	Leaf	A leaf warm with “Ghee” is applied to relief from paralysis, rheumatism and body pain.
Canna indica L.	Kalabati	Cannaceae	Root	Root paste applied on the upper surface of the cheek

				to reduce toothache.
Cassia fistula L.	Sona gach	Caesalpiniaceae	Leaf	Tender leaf decoction is given to cure constipation.
Cassia sophera L.	Chekenda / Kalkasunda	Caesalpiniaceae	Root	Root decoction mixed with "Ada" (*Zingiber officinale*) is given to cure stomachache and fever. Leaf paste applied to treat gout and body pain.
Centella asiatica (L.) Urb.	Thankuni / Dholamonia	Apiaceae	Leaf	Fresh leaves (5-6) chewed at early morning preferably in empty stomach to control diabetes, chronic dysentery, blood stool and diarrhoea.
Chromolaena odorata (L.) R. M. King & H. Rob.	Assam Lata	Asteraceae	Leaf	Leaf paste applied on cuts and wound to stop bleeding.
Cissus quadrangularis L. Figure-9	Harjora	Vitaceae	Whole plant	Stem paste warmed with "Ghee" is applied on the fractured bones. Whole plant eaten as vegetable to reduce constipation problem.
Clerodendrum indicum (L.) Kuntze	Bhamot	Verbenaceae	Stem	Fresh young stem used as a garland to cure a special type of boil in children.
Clerodendrum viscosum Vent.	Ghentu / Bhant	Verbenaceae	Leaf	Fresh leaf decoction is given in empty stomach to expel intestinal worm (tapeworm, guinea worm).
Coccinia grandis (L.) Voigt.	Telakucha	Cucurbitaceae	Leaf	Fresh leaf juice is given to control diabetes, cold and cough. Decoction of leaf also applied on head to reduce the body temperature.
Cocculus hirsutus (L.) Diels	Jaljamani / Faritboti	Menispermaceae	Leaf	Fresh leaf juice mixed with pinch of sugar is given to cure "Meho" (gonorrhoea), physical weakness. It also acts as sexual stimulant and delays ejaculation.
Coix lacryma-jobi L.	Kanch	Poaceae	Root	Root decoction used for menstrual disorder.
Commelina benghalensis L. Figure-8	Kanchire	Commelinaceae	Leaf	Leaves are rubbed over the affected areas to treat skin irritation.
Corchorus olitorius L.	Tebra pat / Tita pat	Tiliaceae	Leaf	Dried leaf infusion mixed with pinch of salt and turmeric powder is given at morning in empty stomach to expel intestinal worms.
Costus speciosus (Konig) Smith.	Kuttus / Jangli Ada	Costaceae	Rhizome	Fresh rhizome decoction mixed with pinch of salt and "Ada" (*Zingiber officinale*) is given to cure indigestion and flatulence.
Crateva religiosa G. Forst.	Barun	Capparaceae	Stem bark	Stem bark paste used for rheumatism and burning sensation of body.
Croton bonplandianum Baillon	Churchuri	Euphorbiaceae	Latex	Latex of the plant used for stop bleeding from cuts and wounds.
Cryptolepis buchananii Schult. Figure-9	Kalmashna	Asclepiadaceae	Root	Root decoction mixed with sugar (100 g), garlic (50 g) and milk (250g) is boiled, the preparation is taking twice a day for curing rheumatic pain.
Curculigo orchioides Gaertn. Figure-10	Talmuli	Hypoxidaceae	Root	Fresh root of the plant is used for increasing vitality and act as sexual stimulant. Root paste is used in arthritis and joint pain (gout). Root mixed with "Pan" (*Piper betel*) is given to cure piles.
Curcuma aromatica Salisb.	Shut	Zingiberaceae	Rhizome	Fresh rhizome decoction mixed with honey is given to children to cure cough and bronchitis.
Cuscuta reflexa Roxb	Swarnalata	Convolvulaceae	Whole plant	Whole plant decoction intake in empty stomach to cure "Meho" (gonorrhoea).
Cynodon dactylon (L.) Pers.	Durba	Poaceae	Whole plant	Whole plant chewed and the paste applied on cuts and wounds for stop bleeding. Fresh plant decoction mixed with one slice of *Curcuma longa* is given to cure leucorrhea and infertility.
Cyperus rotundus L.	Mutha	Cyperaceae	Tuber	Decoction of tuber with pinch of salt is given at

	Ghas			morning in empty stomach to cure chronic dysentery. Paste of the whole plant mixed with "Ada" (*Zingiber officinale*) is applied to cure a special type of boil on finger tip (locally called "Thosa").
Datura metel L.	Dhutura	Solanaceae	Leaf	Leaf paste applied as massage balm to get relief from rheumatic pain.
Deeringia amaranthoides (Lam.) Merr. Figure-11	Atmora	Amaranthaceae	Stem	Young mature stem along with stem of "Chotchota" *Triumfetta rhomboidea* wear as garland to cure jaundice. Leaf also eaten as vegetable.
Desmodium triflorum (L.) DC.	Tin pata / Tepati	Papilionaceae	Leaf	Fresh leaf decoction is given in empty stomach to cure flatulence.
Dioscorea alata L.	Pora alu / Mach alu	Dioscoreaceae	Rhizome	Rhizome eaten as vegetable.
Dregea volubilis Benth. ex Hook. f.	Jukti	Asclepiadaceae	Stem	Stem paste mixed with roots of *Ampelocissus latifolia* and "Golmarich" (*Piper nigram*) applied for bone fracture.
Drynaria quercifolia (L.) J. Smith	Pokhiraj	Polypodiaceae	Leaf	Dried leaf mixed with 12-18 "Golmarich" (*Piper nigrum*) and warmed in mustard oil and is applied locally to reduce muscle pain.
Eclipta prostrata L.	Kesut	Asteraceae	Whole plant	Whole plant decoction is taken to relief from irritation and inflammation during urination. The whole plant decoction is also applied on hair before 30 minutes of bath to reduce hair fall and promote hair growth.
Eleusine indica (L.) Gaertn	Kan Chulkani	Poaceae	Root	Fresh root decoction mixed with sugar is given at morning in empty stomach to cure "Meho" (gonorrhoea).
Euphorbia hirta L.	Dudh kushi	Euphorbiaceae	Whole plant	Whole plant paste used to treat rheumatism.
Euphorbia nerifolia L.	Manasa Sij	Euphorbiaceae	Leaf	Leaf paste boiled in mustard oil and gently applied on the chest to cure bronchitis.
Flacourtia indica (Burm. F.) Merr. Figure-12	Bainchi / Paniala	Flacourtiaceae	Stem bark	Stem bark mixed with stem bark of "Shimul" (*Bombax ceiba*) and boiled in water is given twice a day to cure physical weakness, Leucorhea and "Meho" (gonorrhoea).
Geodorum densiflorum (Lam.) Schlt. Figure-13	Bon-ada	Orchidaceae	Tuber	Tuber paste applied on joint pain and arthritis.
Gloriosa superba L. Figure-14	Ulatchandal	Liliaceae	Root	Tuber paste mixed with "Ada" (*Zingiber officinale*) and "Tepati" (*Desmodium triflorum*) applied to cure joint pain.
Glycosmis pentaphylla Retz.	Atiswar	Rutaceae	Root	Root paste applied for rupture the boil or carbuncle and relief from joint pain. Mature stem used as tooth brush.
Heliotropium indicum L.	Hatisur	Boraginaceae	Root	Root paste warm with mustard oil and massage to cure rheumatism.
Helminthostachys zeylanica (L.) Hook.	Akbir	Ophioglossaceae	Rhizome	Rhizome paste applied to cure sciatica.
Hemidesmus indicus R.Br.	Anantamul	Asclepiadaceae	Root	One teaspoonful fresh root decoction or dried powder mixed with a cup of lukewarm milk is given to promote sexual debilities and physical weakness.
Hibiscus rosa-sinensis L.	Jaba	Malvaceae	Leaf	Leaves (5-7) decoction mixed with "Gur" (Jaggery) eaten in empty stomach to reduce dysentery.
Holarrhena pubescens	Kurci /	Apocyanaceae	Stem	Stem bark infusion is given at early morning to cure

Wall. ex G. Don Figure**-**15	Indrajab		bark	chronic dysentery and seed powder mixed with water is used in diabetes and guinea worm.
Hygrophila auriculata (Schumach.) Heine	Kulekhara	Acanthaceae	Leaf	Fresh leaves (5-7) decoction is taken twice daily to relief from allergy.
Ipomoea mauritiana Jacq.	Bhui Kumra	Convolvulaceae	Tuber	One teaspoonful tuber powder mixed with one cup of lukewarm milk is given during bed time as sexual stimulant.
Jatropha curcus L.	Varenda	Euphorbiaceae	Latex	Latex used in toothache.
Jatropha gossypiifolia L.	Lal Varenda	Euphorbiaceae	Latex	Latex used in pyorrhea and applied on boil.
Justicia adhatoda L.	Harbashak	Acanthaceae	Leaf	Leaves boiled with water and sugar candy, mixture is given for better lactation.
Justicia gendarussa B urm. f.	Bishtarak	Acanthaceae	Whole plant	Whole plant paste used to treat rheumatism.
Kalanchoe pinnata (Lam.) Pers.	Patharkuchi	Crassulaceae	Leaf	Fresh leaf decoction used for dissolve kidney stones. Leaf juice is used to treat cold and cough, flatulence and acidity. Leaf paste applied also on burns to quick healing from burning sensation.
Lawsonia inermis L.	Mehendi	Lythraceae	Root	Fresh root decoction is used as sexual stimulant.
Leucas aspera (Willd.) Link.	Dandakalash/ Dulfi	Lamiaceae	Root	Fresh root decoction given in empty stomach and taking smell of the plant used to treat asthma and tuberculosis.
Litsea glutinosa (Lour.) C. B. Rob.	Pipulti / Darod maida	Lauraceae	Leaf	Leaf decoction mixed with pinch of salt and turmeric powder is given to cure dysentery and fresh leaf juice mixed with sugar is given to cure "Meho" (gonorrhoea). Only leaf decoction is applied on head to reduce body temperature.
Ludwigia adscendens (L.) H. Hara Figure**-**16	Keshra-dam	Onagraceae	Whole plant	Whole plant paste applied for bone fracture and rheumatism.
Luffa echinata Roxb.	Bhat-kalla	Cucurbitaceae	Fruit	Fruit eaten as vegetable to control blood sugar level.
Madhuca longifolia (Koen. ex L.) Macbride	Mahua	Sapotaceae	Stem bark	Stem bark boiled in water and the extract is given to cure physical weakness.
Mangifera indica L.	Aam	Anacardiaceae	Leaf	Tender leaf decoction used for stomachache. Bark decoction mixed with lime water is given to cure dysentery and diarrhoea.
Marsilea quadrifolia L.	Susni	Marsileaceae	Leaf	Leaf decoction mixed with a cup of lukewarm milk given at bed time to cure insomnia.
Mimosa pudica L.	Lajjabati	Mimosaceae	Root	Fresh root boiled with water and used as gargle to cure toothache. Root decoction also used for leucorrhea and blood dysentery.
Molineria capitulata (Lour.) Herb. Figure**-**17	Bansmora	Liliaceae	Root	Root decoction is given to cure piles.
Momordica charantia L.	Karola	Cucurbitaceae	Leaf	Leaf decoction and fruit juice is used to treat diabetes, allergy and guinea worms.
Mucuna pruriens (L.) DC. Figure**-**18	Alkusi	Papilionaceae	Seed	The seeds are fried with "Ghee" and sugar and make pills. Each pill taken during bed time for sexual stimulant and vitality.
Murraya koenigii (L.) Spreng.	Kari Pata	Rutaceae	Leaf	Fresh leaf decoction is given at early morning to control blood sugar.
Nyctanthes arbor-tristis L.	Shiuly / Sephali	Oleaceae	Stem bark	Stem bark and leaf decoction is given to control of remittent fever and blood sugar.
Nymphaea rubra Roxb. ex Andrews	Lal saluk	Nymphaeaceae	Flower	Dried flowers powder mixed with water is given to cure piles. Dried flowers mixed with roots of

				Eleusine indica and pinch of sugar is given in empty stomach to cure leucorrhea.
Ocimum basilicum L.	Babu Tulsi	Lamiaceae	Seed	Dried seeds are crushed with water and applied on the carbuncle for rupture.
Ocimum gratissimum L.	Ram Tulsi	Lamiaceae	Leaf	Leaf decoction mixed with a few drops of honey is given at early morning for come out of dry cough.
Ocimum sanctum L.	Tulsi	Lamiaceae	Leaf	The juice of leaves mixed with one teaspoonful honey used to treat cold and cough, bronchitis, whopping cough and fiver.
Ocimum tenuiflorum L.	Krishna Tulsi	Lamiaceae	Leaf	Fresh leaf crushed with "Chini atap chaul" (aromatic rice) and made decoction is taken twice a day for curing tuberculosis.
Oxalis corniculata L.	Amrul	Oxalidaceae	Leaf	Leaf decoction used to cure smokers cough.
Phyla nodiflora (L.) Greene	Koi Okhra	Verbenaceae	Whole plant	Whole plant paste used in bone fracture.
Phyllanthus emblica L.	Amlaki	Phyllanthaceae	Fruit	Infusion of dried fruits useful in acidity, constipation, insomnia and also in diabetes.
Physalis peruviana L.	Fatki	Solanaceae	Root	Fresh root decoction mixed with a few drops of honey is given to cure whooping cough.
Piper betel L.	Pan	Piperaceae	Leaf	Leaf juice is given to cure indigestion and killing lice.
Piper longum L.	Pipul	Piperaceae	Whole plant	Whole plant cooked as vegetable is given after child birth for better lactation and relief from birth pain.
Plumbago zeylanica L.	Sada chita	Plumbaginacea e	Root	The root decoction used as emollient for gout and hydrocele.
Pongamia pinnata (L.) Pierre	Karanja / Gokaranja	Papilionaceae	Seed	Seed oil is useful for hair growth and gout. Stem helpful in reducing toothache when used as tooth brush.
Portulaca oleracea L.	Nunia sag	Portulacaceae	Whole plant	Whole plant eaten as vegetable to reduce constipation.
Premna serratifolia L.	Ganiari	Verbenaceae	Leaf	Dry leaf infusion is given in empty stomach to cure indigestion problem.
Psidium guajava L.	Peyara	Myrtaceae	Leaf	Tender leaves (2-3) chewed to cure mouth ulcer, pyrrohoea, bad breath and sluggish fever. Stem bark infusion mixed with lime water used to cure diarrhoea and dysentery.
Pterospermum acerifolium (L.) Willd.	Muchkund a Chapa	Sterculiaceae	Flower	The dried flower's powder mixed with jaggery and made tablets. One tablet is given once in a day in empty stomach to improve liver functions.
Rauvolfia serpentina (L.) Benth. ex Kurz	Sapagandh / Chandovad o	Apocyanaceae	Leaf	Leaves (2-3) kept under the pillow to reduce insomnia.
Ricinus communis L.	Reri / Varenda	Euphorbiaceae	Seed	Seed oil applied to cure chronic arthritis and gout. The leaves are warmed with coconut oil and applied to breast for improve lactation.
Salvinia auriculata Aubl	Khudi pana / Musakarni	Salviniaceae	Whole plant	Whole plant paste mixed with 8-21 "Golmarich" (*Piper nigram)* applied to cure bone fracture.
Scoparia dulcis L.	Chinimichr i / Jastimadhu	Scrophulariacea e	Leaf	Fresh leaves decoction is given at early morning to cure dysentery.
Sida cordifolia L.	Swet Berala	Malvaceae	Root	Root decoction is given in empty stomach to cure "Meho" (gonorrhoea).
Smilax ovalifolia	Bagnocha/	Smilaceae	Root	The roots are used for dysentery and rheumatism.

Roxb.	Kumarilata.			Tender leaves act as sexual stimulant.
Solanum virginianum L.	Kantikari	Solanaceae	Fruit	Mature fruits crushed with "Golmarich" (*Piper nigrum*) and make paste, which is used as massage to reduce pain, swelling of arthritis and paralysis.
Solena amplexicaulis (Lam.) Gandhi	Rakhal Sasa	Cucurbitaceae	Fruit	Fruits are eaten as vegetable to control blood sugar level.
Spondias pinnata (L.f.) Kurz.	Amra	Anacardiaceae	Leaf	Fresh leaves decoction mixed with pinch of salt is given to cure dysentery.
Stephania japonica (Thunb.) Miers	Aknadi / Takalati	Menispermaceae	Leaf	Fresh leaf applied on carbuncle or boil for rupture and relief from pain.
Syzygium cumini (L.) Skeels	Jam	Myrtaceae	Leaf	Fresh leaf decoction mixed with pinch of table salt is given in empty stomach to control dysentery.
Terminalia arjuna (Roxb.ex DC.) Wt. & Arn.	Arjun	Combretaceae	Stem bark	Stem bark infusion is given at morning in empty stomach to cure gastrointestinal troubles and heart problems.
Terminalia bellirica (Gaertn.) Roxb.	Bahera	Combretaceae	Fruit	Infusion of dried fruits is given at morning in empty stomach to cure chronic dysentery, piles and constipation.
Terminalia chebula Retz.	Haritaki	Combretaceae	Fruit	Dried fruit infusion is given at early morning in empty stomach to promote liver functions and digestion.
Thunbergia laurifolia Lindl.	Swet Mahakal	Acanthaceae	Leaf	Leaf decoction mixed with "Durba" (*Cynodon dactylon*) is given to cure leucorrhea.
Tinospora cordifolia (Willd.) Hook. f.	Gulancha	Menispermaceae	Stem	Stem (1.5 kg) boiled with water (3 lit) and make into 1 lit from there half cup of mixture is given daily in empty stomach to control blood sugar, cholesterol and physical weakness.
Trichosanthes dioica Roxb.	Patol	Cucurbitaceae	Root	Fresh root decoction is given at early morning in empty stomach to expel the intestinal worm of children.
Tylophora indica (Burm.f.) Merr.	Antamul	Asclepiadaceae	Leaf	Leaf decoction is given to cure “Meho” (gonorrhoea).
Vanda tessellata (Rox b.) G. Don	Rasna / Pargacha	Orchidaceae	Root	Root decoction is given to cure physical weakness and promote sexual performances.
Vangueria spinosa Roxb.	Moyena kanta	Rubiaceae	Thorn	Thorns are fried in mustard oil and applied to cure piles.
Vernonia anthelminctica (L.) Willd.	Somraji	Asteraceae	Seed	Seeds are crushed with cream and applied to cure scabies.
Vernonia cinerea Less.	Sahadebi	Asteraceae	Root	Fresh root decoction used in piles, diarrhoea and stomachache.
Vitex negundo L.	Nishinda	Verbenaceae	Leaf	Dried leaves boiled in mustard oil are applied to cure rheumatism. Leaf decoction used also in fever and diabetes.
Wedelia chinensis (Osbeck) Merr	Bhringaraj	Asteraceae	Leaf	Leaves decoction applied on hair before 30 minutes of bath for promoting hair growth.
Zingiber montanum (J. Koenig) Link ex A. Dietr.	Bon Ada / Taraj	Zingiberaceae	Rhizome	Infusion of the fresh rhizome is given to cure menorrhagia and physical weakness.
Zingiber zerumbet (L.) Sm.	Jabakusum	Zingiberaceae	Rhizome	Decoction of fresh rhizome mixed with roots of "Aswagandha" (*Withania somnifera*) is given to cure leucorrhea and physical weakness.

Figure-2
Interviewing the tribals

The analysis of plants and ailments show that the ailments which are treated may be listed as "Meho" (gonorrhoea), allergy, asthma, cold and cough, bronchitis, whooping cough, tuberculosis, fever, cuts and wounds, rheumatism, scabies, boil, carbuncle, flatulence, leucorrhea, hydrocele, headache, stomachache, toothache, sciatica, intestinal worms, inflammation, paralysis, diarrhoea, jaundice, dysentery, bone fracture, piles, diabetes, insomnia, body pain, joint pain, constipation, physical weakness, skin diseases, pyorrhea etc. The plant parts used for medicinal purpose were leaf, whole plant, root, stem bark, fruit, stem, seed, tuber, latex, flower, petiole and thorn. The study shows that among the plant parts used, leaves is the single most important contributor (32%), followed by root (23%), whole plant (10%), stem bark (7%), fruit (6%), rhizome (5%) etc. for medicinal purposes (figure-4).

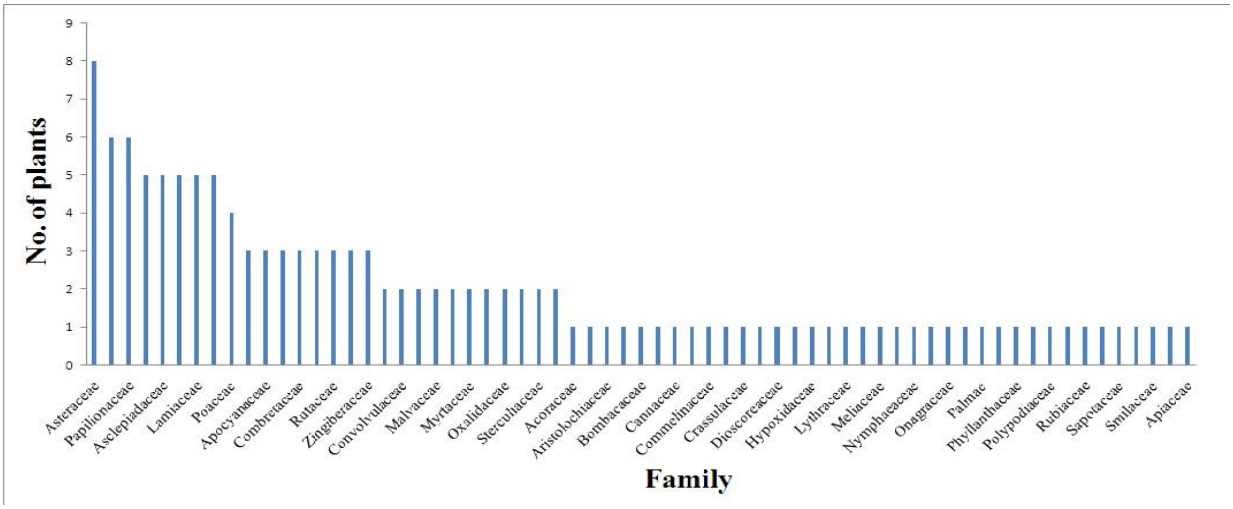

Figure-3
Family wise distributions of ethnomedicinal plants used by the tribals in Dakshin Dinajpur

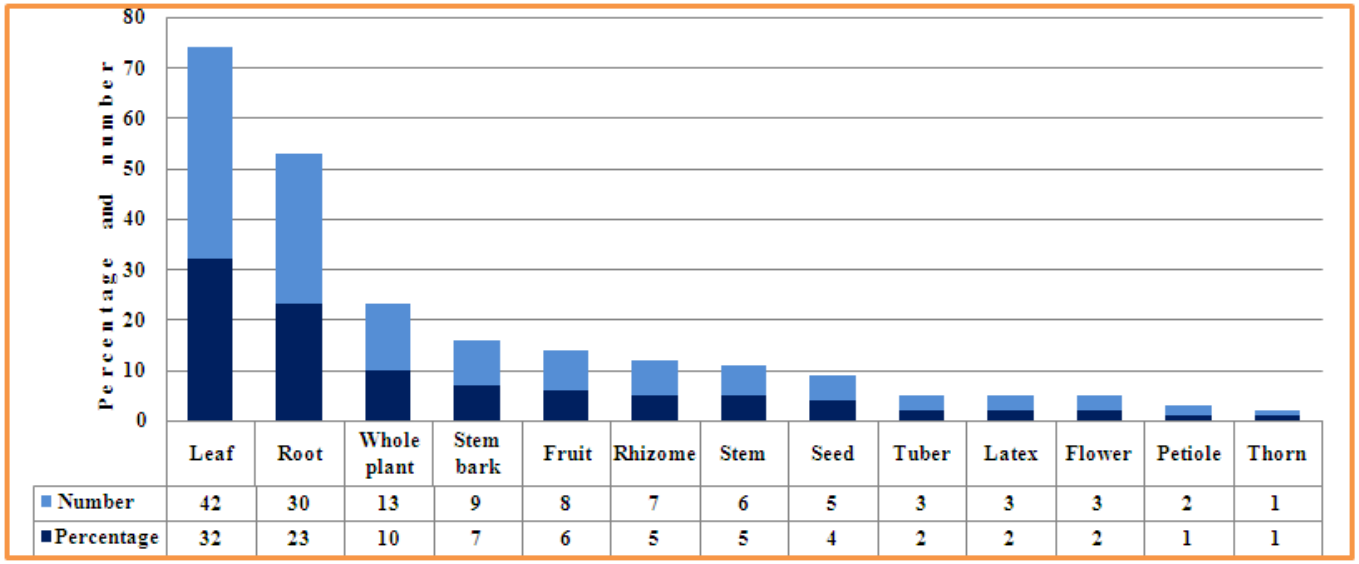

Figure-4
Graphical representation of number and percentage of plant parts used

Figure-5
A. *precatorius*

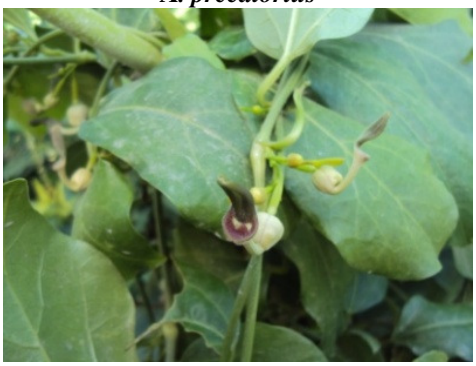

Figure-6
A. indica

Figure-7
B. diffusa

Figure-8
C. benghalensis

Figure-9
C. buchananii

Figure-10
C. orchioides

Figure-11
D. amaranthoides

Figure-12
F. indica

Figure-13
G. densiflorum

Figure-14
G. superba

Figure-15
H. pubescensis

Tribal and non-tribal people of the district use one plant for curing only one or more ailments. In some cases, along with the other plant parts and a few amount of salt, sugar, sugar candy, jaggery, piper, turmeric powder, black pepper, honey and cream was used. On the other hand, at instance lukewarming, heating, boiling and roasting is also recommended to enhance the efficacy of the remedies or make it more palatable for oral consumption. It was observed that the parts of medicinal plant are utilized in the form of decoction, juice, infusion and pastes for external use.

Figure-16
L. ascendens

Figure-17
M. capitulata

Figure-18
M. pruriens

The relations between numerical uses of plants with respect to ailments have been presented in table-2. The table-2 interestingly show that for treatment of gastrointestinal problems 34 plants are used which is highest with respect to number of plants used.

Table-2
Number of plant species used for the treatment of various ailments

Ailments cured	Number of plants used
Gastrointestinal problems (Flatulence, diarrhoea, dysentery, stomachache, acidity, indigestion, intestinal worm, constipation)	34
Sexual and gynecological problems "Meho" (gonorrhoea), Sexual stimulant, Leucorrhea, menorrhagia, lactation, urinary infection, hydrocele)	32
Orthopedic problems (Joint pain, gout, Sciatica, rheumatism, bone fracture, body pain, paralysis, arthritis)	25
Diabetes	13
Respiratory problems (Cold and cough, whooping cough, bronchitis, tuberculosis, asthma, sinus)	13
Dental care (Toothache, pyorrhea)	8
Skin diseases (Boil, carbuncle, scabies, allergy)	8
Piles	7
Others (cholesterol, killing lice, earache, headache, diphtheria)	5
Fever	5
Jaundice	4
Hair problems (Hair growth, hair fall, dandruff)	4
Blood clotting (Cuts and wound, stop bleeding)	3
Insomnia	3

Conclusion

A few medicinal plant species are used to treat the same ailments but mode of preparation and administration is different from earlier report. However, from our study we have recorded the use of plants for treating ailments other than that already reported[6-16]. This study may be used to preserve the knowledge of folk medicine used in Dakshin Dinajpur district. On the basis of this survey, further phytochemical investigation is needed for chemical characterization and specific active principle isolation.

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