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## Indigenous health management of Tharu tribals in the eastern part of Parsa, Nepal

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### Abstract

Present study aims to explore the indigenous knowledge of medicinal plants used by Tharu community of Parsa district, Nepal to treat various human diseases. This study was carried out from March 2017 to February 2018, in Parsa district of Nepal. The data were collected using semi structured interviews, group discussion, field visit, and observations with participants. A total of 66 medicinal plants, distributed in 55 genera and 37 families, were collected and identified to treat 50 ailments. In the growth forms 26 plants (39%) were shrubs, 23 plants (35%) were trees, 11 plants (17%) were shrubs and 6 plants (9%) were climbers. Highest number of plants used for medicinal purposes was from the two families Lamiaceae and Amaranthaceae (32.4%). The most frequently utilized plant parts as medicines were leaves. Paste was widely used mode of herbal remedies where oral administration was the dominant route. Documentation of these plants will play great role in biodiversity conservation. Extraction and identification of effective chemicals present in the studied medicinal plants could play significant role in the discovery of new pharmaceutical drug for the humanity.

**Keywords:** Indigenous knowledge, medicinal plants, parsa, Tharu, herbal medicines, tribals

### Introduction

Plant resources have remained an integral part of human society throughout history. After fulfilling the primary needs like food and shelter, man has sought for a suitable remedy plants for curing various diseases (WHO, 2000) [34]. Traditional medicine has been used for thousands of years with great contributions made by practitioners to human, particularly as primary health care providers at the community level and has maintained its popularity worldwide (WHO, 2008) [35].

Traditional medicine is defined as indigenous medicine that is used to maintain health and to prevent, diagnose, and treat physical and mental illnesses differently from allopathic medicine based on theories, beliefs, and experiences (WHO, 2012) [36].

Nepal's rich biodiversity can be accounted for its unique geographical position as well as altitudinal and climatic variation. The country comprises over 7000 species of higher plants. Species diversity in Nepal can be well known from the fact that over 1,500 species of medicinal plants have been discovered and described among which more than 300 species are endemic to the country. The list of the Nepalese medicinal plants exceeds over 20% of the known vascular plant species of the country. The Himalayan region harbors about 12,000 species of medicinal and aromatic plants, supporting the livelihood of about 600 million people living in the area (Shengji 2001) [25]. The ethnic people residing in different geographical belts of Nepal depend on wild plants to meet their basic requirements and all the ethnic communities have their own pool of secret ethnomedicinal and ethnopharmacological knowledge about the plants available in their surroundings which has been serving rural people with its superiority. Particularly, the medicinal and aromatic plants are flourished well in the virgin Himalaya as well as in damp tropical forests, many of which are still waiting to disclose their many secrets. Unfortunately large number of wild plants are at the verge of disappearance due to over exploitation and ecological disturbances but detail information about their economic potential are yet not fully recorded. Furthermore, the practice and dependence of aboriginal on these resources is rapidly declining owing to changing life style, reluctance of elderly people on passing the secret on their use and negligence of youngsters. Therefore, the knowledge of utilization of the resources is of great importance and it can be promoted by considering and documenting the diversity of the plant resources and their indigenous knowledge of utilization (Kunwar and Bussmann 2008, Kunwar *et al.* 2008) [20, 21].

Recently updated database revealed a total of 1950 species of medicinal plants used in Nepal and out of which 1906 species are identified under vascular groups comprising 1614 native,

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192 introduced and cultivated and 100 naturalized taxa (Ghimire, 2008) <sup>[12]</sup>. Scientists in Nepal are deeply distressed over the losses of Nepal's biodiversity and indigenous knowledge of the communities and have pledged themselves to find a way to arrest this destruction (Chaudhary, 1998) <sup>[2]</sup>. The plant and plant resources for medicinal use are collected by local people and herbal healer from various habitats such as forest, scrubland, grassland and cultivated fields and use them as crude drugs. It is known that the way of administration to cure disease using a particular plant widely differs among the indigenous people and also healers, jhakris and amchies, (Manandhar, 2002; Shrestha and Dhillion, 2003) <sup>[22, 29]</sup>. Ethnobotanical study based upon Tharu community has been also done in other part of the country; Ethnobotanical study of Tharu tribes of Chitawan district (Dangol and Gurung 1991, 2002) <sup>[10, 11]</sup>. Although, ethnobotanical studies have been done in many different parts of the country but, comparatively very less work has been done in Parsa district. Particularly in four VDC's where this study was carried out, this type of work has been not done in past. The aim of the present work is to explore new medicinal use of the wild plants in the local community as well as documentation of their use value

## Materials and Methods

### Study Area

Parsa District is located between 84° 8' to 85° 27'E longitude and 27° 0' to 27° 26'N latitude. The altitude of district varies between 122 to 925 m from sea level. This study was carried out in four villages; Madhuwan mathwal, Gadi, Shankar sharaiya and Sonbarsa of this district (Fig.1). In all villages Tharu community is in highest population.



Fig 1: Map of Study Area

### Selection of Participants

A total of 60 participants (41 men and 19 women) were selected randomly from the representatives. Common participants and knowledgeable traditional medicine practitioners (key participants) of the district were selected using random and purposive sampling approaches, respectively, following Martin (1995) <sup>[6]</sup>. Twenty key participants were selected purposively and systematically based on the recommendations of knowledgeable elders, local authorities, and local teachers. The selection of key participants was also based on the quality of explanations that particular participants gave during an interview. Local healers

automatically qualified as key participants being traditional experts who are guardians of indigenous knowledge of medicinal plants.

### Data Collection

Data were collected from March 2017 to February 2018. The standard data collection methods (Martin 1995, Alexiades 1996 and Cotton 1996) <sup>[6, 7, 8]</sup> was followed to document indigenous knowledge of the local community on health, use, conservation, and threats of medicinal plants. The techniques employed for data collection were semi structured interviews, group discussion, guided field work and observations with participants. Data were generated from both primary and secondary sources. Most data were collected from primary sources. The secondary sources include review of the literature i.e. journals, articles and books.

Brief group discussions were made with participants regarding the medicinal plants in the study area. The discussions also covered on threats medicinal plants, conservation of the medicinal plants, and transferability of knowledge in the community. Questionnaires also included mode of preparation of medicines such as, decoction, powder, paste, juice and mixture of other plants used as ingredients.

### Identification of Plants

The plants were identified on the basis of related flora (HMG/Nepal 1970, 1984, 2001, Stainton, 1988 <sup>[32]</sup>, Hooker, 1883) and verified by cross checking with the authentic voucher specimens present in the National Herbarium and Plant Laboratory, Godavari, Lalitpur, Nepal. Common names collected during interviews were compared with Shrestha's dictionary of Nepalese Plant Name (1998) to confirm common names of the plants. Plants were classified according to Cronquist classification. The use of various medicinal plants reported in this study was compared with previously published ethno botanical literatures in Nepal.

### Data Analysis

The collected data were entered into Excel spreadsheet 2007 and summarized using descriptive statistical methods. The plants were categorized according to their use value for treating various diseases. All enumerated plants were also categorized based upon their habit, plant parts used as herbal medicines, mode of preparation of medicines and route of administration of medicines. Preference ranking was conducted for five important medicinal plants used to treat stomachache. Ten randomly selected participants from total key participants were participated in this exercise to identify the best preferred medicinal plants for treatment of stomachache.

### Results

A total of 66 plant species belonging to 55 genera and 37 families for the treatment of 50 ailments were recorded. In the growth forms 26 plants (39%) were shrubs, 23 plants (35%) were trees, 11 plants (17%) were shrubs and 6 plants (9%) were climbers (Fig. 2). Highest number of plants used for medicinal purposes (6 plants from each family) was from the two families Lamiaceae and Amaranthaceae whereas (5 plants from each family) four families Rutaceae, Zingiberaceae, Liliaceae and Moraceae are in the second category. Stomach pain, diarrhea and dysentery are common health problems in all villages. These plant species are commonly available and used for the treatment of various problems like cough, fever, headache, body pain, burns, animal bite, cut injury, diabetes,

high blood pressure, tuberculosis, heart problem, stomach problems, worm, pox, jaundice, sinusitis, reproductive problem, allergy, pimple, hair fall, sunburn, etc. Different parts of plant like, leaf, root, bark, fruit, flower, stem, rhizome, bulb, corm and whole plant body are used for treatment of different ailments. Leaves were the most frequently utilized plant parts for preparation of indigenous herbal medicines and then root and fruit were in second category (Fig. 3). The modes of preparation of medicines are as, paste, juice, powder, decoction, infusion, whole plant ash and jell. Paste was widely used mode of preparation of herbal remedies; juice and powder were in second and third position (Fig. 4). In the mode of administration of medicine oral (68%)

was the highest and topical (31%) was in second position (Fig 5). The ailments are listed along with the local and scientific name of the plants used as medicine along with their habit, family and parts used in the treatment (Table 1).

Preference ranking of 5 medicinal plants that were reported as effective for treating stomachache was conducted after selecting ten key participants. Stomachache is the most commonly occurring disease treated by more medicinal plants. The participants were asked to compare the given medicinal plants based on their efficacy. The results showed that *Acorus calamus* scored the highest mark and ranked first indicating that it was the most effective in treating stomachache and followed by *Vitex negundo* (Table 2).

**Table 1:** List of Diseases, Plants their Habit, Family and use in different Ailments

Serial No.	Diseases	Plants scientific & vernacular name	Habit	Family	Parts used & treatment process
1	Diabetes	(i) <i>Momordica charantia</i> (Tito karela)	Climber	Cucurbitaceae	Fruits are externally rubbed below the foot; fruit juice is also used except for gastric patients.
		(ii) <i>Syzygium cumini</i> (Jamun)	Tree	Myrtaceae	One table spoon powder of bark or seeds is taken by mixing with milk.
		(iii) <i>Tinospora cordifolia</i>	Climber	Menispermaceae	One inch stem is used as decoction or powder.
		(iv) <i>Murraya koenigii</i> (Mitho neem)	Shrub	Rutaceae	Decoction of 3 to 4 leaves is taken.
2.	High blood pressure	(i) <i>Clerodendrum viscosum</i> (Bhant)	Shrub	Verbinaceae	Leaf twigs are eaten as raw or steamed.
		(ii) <i>Rauwolfia serpentina</i> (Sarpagandha)		Apocynaceae	Leaves or root juice of one
		(iii) <i>Tamarindus indica</i> (Imali)	Tree	Fabaceae	Fruit eaten raw or as pickle
		(iv) <i>Hibiscus rosa-sinensis</i> (Ghanti phool)	Shrub	Malvaceae	One flower extract is used.
3	Heart problem	(i) <i>Terminalia arjuna</i> (Arjun)	Tree	Combretaceae	One table spoon bark powder mixed with milk or as decoction is taken.
4	Jaundice	(i) <i>Saccharum officinarum</i> (Ukhu)	Herb	Poaceae	Stem juice is taken.
		(ii) <i>Cuscuta reflexa</i> (Aakash beli)	Climber	Convolvulaceae	Juice of plant is taken.
5	Pox & measles	(i) <i>Azadiracta indica</i> (Neem)	Tree	Meliaceae	Leaf paste applied over affected portion or directly used to relief itching.
		(ii) <i>Spondias pinnata</i> (Khirro)	Tree	Annacadiaceae	Tender leaves boiled and the water is applied or leaf paste is used.
6	Cough	(i) <i>Ocimum sanctum</i> (Tulasi)	Herb	Lamiaceae	Leaf paste with <i>Zingiber officinale</i> and honey is taken one tea spoon thrice daily after food.
		(ii) <i>Curcuma anguistifolia</i> (Kalohaledo)	Herb	Zingiberaceae	Juice of raw rhizome is taken.
		(iii) <i>Zingiber officinale</i> (Zinger)	Herb	Zingiberaceae	Rhizome as raw or in paste form with honey.
		(iv) <i>Cinnamomum zelanicum</i> (Dalchini)	Tree	Lauraceae	A half teaspoon powder mixed with honey is taken before sleep.
		(v) <i>Adhatoda vesica</i> (Asuro)	Herb	Acanthaceae	Decoction of leaf, root or flower is taken.
7	Fever	(i) <i>Costus speciosus</i> (Betlauri)	Herb	Zingiberaceae	Rhizome is used.
		(ii) <i>Allium sativum</i> (Lahsun)	Herb	Liliaceae	Bulblets are taken in raw form.
8	Sinusitis	(i) <i>Leucas cephalotes</i> (Dronpuspi)	Herb	Lamiaceae	Leaf or flower juice is applied into nose.
9	Tonsillitis	(i) <i>Sapindus mukrossi</i> (Ritha)	Tree	Sapindaceae	Seeds are used with hot water to gargle.
10	Stomach problem	(i) <i>Tinospora cordifolia</i> (Gurju)	Climber	Menispermaceae	Stem juice is taken.
		(ii) <i>Andropogon muricatus</i> (Khas)	Herb	Poaceae	Root infusion is taken.
		(iii) <i>Acorus calamus</i> (Bojho)	Herb	Araceae	Small amount of rhizome is chewed.
		(iv) <i>Vitex negundo</i> (Simali)	Shrub	Verbinaceae	Leaf juice is used to reduce abdominal pain.
		(v) <i>Murraya koenigii</i> (Mitho neem)	Shrub	Rutaceae	Decoction of root bark is used.
		(vi) <i>Matricaria chamomilla</i> (Kamomye)	Herb	Asteraceae	Infusion of dry flowers is taken.
11	Burns	(i) <i>Mangifera indica</i> (Aanp)	Tree	Annacadiaceae	Ash prepared from dried leaves is applied on affected area.
		(ii) <i>Aloe vera</i> (Ghiu kumari)	Herb	Liliaceae	Leaf gel is applied over the burn area.
12	Allergy	(i) <i>Azadirachta indica</i> (Neem)	Tree	Meliaceae	Leaf as paste applied on affected area.
		(ii) <i>Curcuma longa</i> (Besar)	Herb	Zingiberaceae	Rhizome used as paste, applied on affected area.
13	Cut injury	(i) <i>Tagetes erecta</i> (Saypatri)	Herb	Asteraceae	Leaf smashed and applied to cut portion.
		(ii) <i>Ageratum conyzoides</i> (Gondhua)	Herb	Asteraceae	Leaf and flower smashed and applied to cut portion

14	Dysentery	(i) <i>Alternanthera sessilis</i> (Bhringi jhar)	Herb	Amaranthaceae	Whole plant is taken as raw or as vegetable.
		(ii) <i>Psidium guajava</i> (Amba)	Tree	Myrtaceae	Leaf twig as paste is taken orally.
		(iii) <i>Spondias pinnata</i> (Khirro)	Tree	Annacardiaceae	Leaf paste or fruit is eaten in raw form.
		(iv) <i>Zizyphus jujuba</i> (Bayer)	Tree	Rhamnaceae	Decoction of bark is taken.
		(v) <i>Aegle marmelos</i> (Stone apple)	Tree	Rutaceae	Ripe fruit is used as squash.
		(vi) <i>Ficus benghalensis</i> (Banyan tree)	Tree	Moraceae	Young leaf extract is taken orally.
		(vii) <i>Terminalia tomentosa</i> (Asna)	Tree	Combretaceae	Decoction of bark is taken orally..
15	Pain reliever after Child birth	(i) <i>Achyranthes aspera</i> (Datiwan)	Herb	Amaranthaceae	Fresh root decoction is taken.
		(ii) <i>Dillenia pentagyna</i> (Tantri)	Tree	Dilleniaceae	Paste of bark is applied on lower abdomen.
16	Blood purifier	(i) <i>Gardenia Jasminoides</i> (Indrakamal)	Shrub	Rubiaceae	Fruit is used after boiling.
		(ii) <i>Solanum indicum</i> (Kateli)	Herb	Solanaceae	Boiled fruits preferable except for gastric patients.
17	Gall bladder stone	(i) <i>Bryophyllum pinnatum</i> (Patharchur)	Herb	Crassulaceae	Leaf juice is taken in empty stomach.
18	Toothache	(i) <i>Nicotiana tobaccum</i> (Tambaku)	Herb	Solanaceae	Leaf directly used on affected area.
		(ii) <i>Streblus asper</i> (Kaksi)	Tree	Moraceae	Leaf juice is applied on affected area.
19	Hair fall & dandruff	(i) <i>Mimosa pudica</i> (Lajjawati)	Herb	Fabaceae	Paste of leaf and flower is applied on head.
		(ii) <i>Murraya koenigii</i> (Mitho nim)	Shrub	Rutaceae	Leaf paste is applied on head.
20	Reproductive problems	(i) <i>Chlorophytum arundinaceum</i> (Seto musli)	Herb	Anthericaceae	Root powder is used to cure impotency.
		(ii) <i>Ficus benghalensis</i> (Bar)	Tree	Moraceae	Dry root powder is given to cure female sterility.
21	Diarrhea	(i) <i>Aegle marmelos</i> (Stone apple)	Tree	Rutaceae	Leaf paste or tender leaves are steamed and taken orally.
		(ii) <i>Dillenia pentagyna</i> (Tantari)	Tree	Dilleniaceae	Decoction of bark is used.
		(iii) <i>Zyzyphus jujuba</i> (Bayar)	Tree	Rhamnaceae	Decoction of bark is used.
22	Irregular menstruation	(i) <i>Hibiscus rosa-sinensis</i> (Ghanti phul)	Shrub	Malvaceae	Dried root powder is mixed with water and taken orally; flower paste is also used.
		(ii) <i>Saraca indica</i> (Ashok phul)	Tree	Caesalpiniaceae	Dried bark powder is taken with milk.
23	Anaemia	(i) <i>Phyllanthus emblica</i> (Amla)	Tree	Euphorbiaceae	Fruit is used as raw, juice or in dried form.
24	Fungal infection	(i) <i>Lawsonia inermis</i> (Mehadi)	Shrub	Lythraceae	Leaf paste is applied over infected area.
25	Piles	(i) <i>Aegle marmelos</i> (Bel)	Tree	Rutaceae	Fruit pulp is taken with milk.
		(ii) <i>Amorphophallus campanulatus</i> (Ole)	Herb	Araceae	Corm is used as vegetable.
26	Malaria fever	(i) <i>Caesalpinia bonduc</i> (Karanjwa)	Shrub	Caesalpiniaceae	Powder of seed is taken with black pepper.
		(ii) <i>Alstonia scholaris</i> (Chhatiwan)	Tree	Apocynaceae	Stem bark is boiled and the water is taken.
27	Dental care	(i) <i>Moringa oleifera</i> (Sajina)	Tree	Moringaceae	Dried leaves, root, bark or stem is chewed.
		(ii) <i>Ficus benghalensis</i> (Bar)	Tree	Moraceae	Aerial root is used as datiwan.
28	Asthma	(i) <i>Clerodendrum viscosum</i> (Bhant)	Herb	Verbinaceae	Dried or boiled tender leaves and flower extract is recommended.
29	Rheumatic arthritis	(i) <i>Vitex negundo</i> (Simali)	Shrub	Verbinaceae	Powdered root is taken orally.
		(ii) <i>Spondias pinnata</i> (khirro)	Tree	Annacardiaceae	Powder of bark is taken orally.
30	Skin problem	(i) <i>Adhatoda vesica</i> (Asuro)	Herb	Acanthaceae	Warm decoction of fresh leaf is taken.
		(ii) <i>Ficus benghalensis</i> (Bar)	Tree	Moraceae	Tender leaf paste is applied on infected area.
31	Increase lactation	(i) <i>Alternanthera sessilis</i> (Bhringi jhar)	Herb	Amaranthaceae	Leaf and stem are used as food.
		(ii) <i>Ricinus communis</i> (Arandi)	Shrub	Euphorbiaceae	Juice of leaves and root taken orally.
32	Snake bite	(i) <i>Andrographis peniculata</i> (Kalmegh)	Herb	Acanthaceae	Fresh leaf juice is taken orally.
33	Wasp bite	(i) <i>Allium sepa</i> (Pyaj)	Herb	Liliaceae	Peeled leaf or its juice is applied externally.
34	Scorpion bite	(i) <i>Aristolochia indica</i> (Isharmule)	Climber	Aristolochiaceae	Leaf juice is used externally.
35	Pneumonia	(i) <i>Solanum indicum</i> (Kateli)	Herb	Solanaceae	Boiled fruit taken as food or salad.
36	Intestinal Worm	(i) <i>Andrographis peniculata</i> (Kalmegh)	Herb	Acanthaceae	Decoction of root and leaf is taken.
37	Mumps	(i) <i>Ricinus communis</i> (Arandi)	Shrub	Euphorbiaceae	Leaves are applied over affected area as bandage.
38	Ring worm	(i) <i>Ocimum sanctum</i> (Tulasi)	Herb	Lamiaceae	Mixture of leaf and lime is applied over infected portion.
39	Vomiting	(i) <i>Mentha viridis</i> (Podina)	Herb	Lamiaceae	Leaves mix with honey and boiled unripened mango.
40	Dog bite	(i) <i>Abrus precatorious</i> (Rati gedi)	Climber	Fabaceae	Seed paste or oil is recommended.
41	Headache	(i) <i>Ocimum sanctum</i> (Tulasi)	Herb	Lamiaceae	Paste or juice of leaves is applied on forehead.
42	Nerve problem	(i) <i>Allium sativum</i> (Lahsun)	Herb	Liliaceae	Raw bulb let is recommended.
43	Bone fracture	(i) <i>Cucurma longa</i> (Besar)	Herb	Zingiberaceae	Rhizome paste is used as bandage over the area.
44	Leprosy	(i) <i>Moringa oleifera</i> (Sajina)	Tree	Moringaceae	Bark juice is taken orally.
45	Kidney stone	(i) <i>Hydrangia anomala</i> (Bahuni kath)	Climber	Hydrangeaceae	Decoction of various parts of plant is used.
46	Cold and flu	(i) <i>Allium sativum</i> (Lahsun)	Herb	Liliaceae	Bulb lets smashed, heated in mustard oil and applied over under arms, nose and chest.



47	Eye problem	(i) <i>Punica granatum</i> (Anar)	Tree	Lythraceae	Two drops of fruit juice is put in eyes.
		(ii) <i>Michelia champaca</i> (Champ)	Tree	Magnoliaceae	Infusion of flower is used.
48	Bronchial Asthma	(i) <i>Ocimum basilicum</i> (Tulasi)	Herb	Lamiaceae	Leaf juice mixed with black peeper and honey is used.
		(ii) <i>Terminalia bellirica</i> (Barro)	Tree	Combretaceae	Fried fruit pieces are taken orally.
49	Eyesight problems	(i) <i>Amaranthus viridis</i> (Latte sag)	Herb	Amaranthaceae	Leaves or tender parts are taken as vegetable.
		(ii) <i>Albizia lebbek</i> (Kalosiris)	Tree	Mimosaceae	Anjan prepared from seeds is used as kadal in eyes.
50	Baldness	(i) <i>Plumbago zeylanica</i> (Chitu)	Shrub	Plumbaginaceae	Paste of bark is applied on head.
		(ii) <i>Amaranthus viridis</i> (Latte sag)	Herb	Amaranthaceae	Tender parts are consumed.

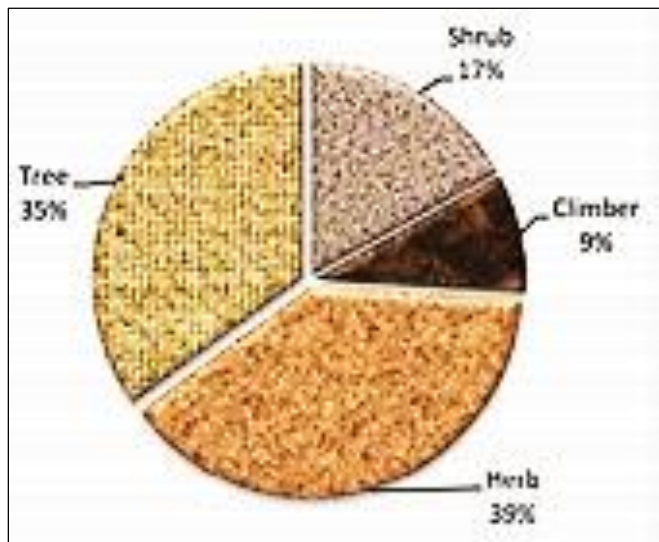


Fig 2: Proportion of total plant species based upon their habit

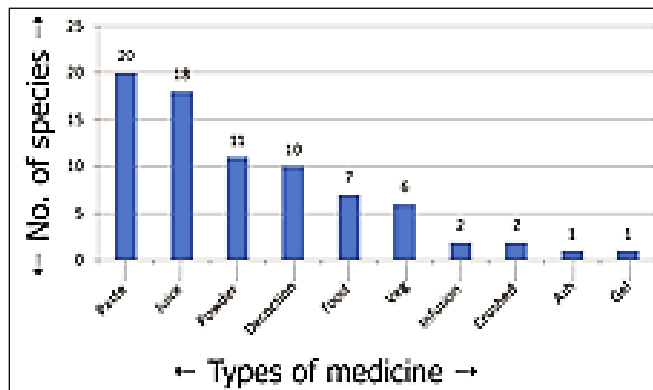


Fig 3: Mode of preparation of medicine in study area

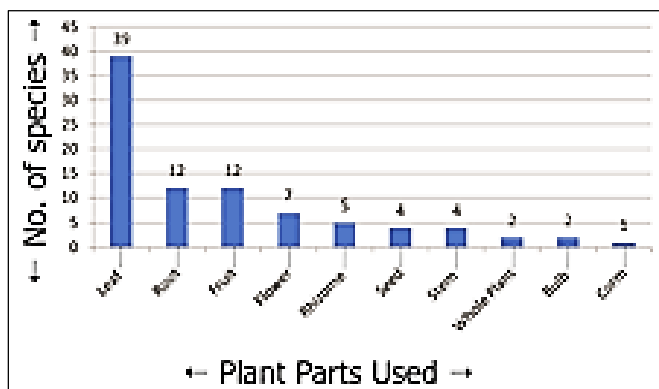


Fig 3: Plants parts used in indigenous medicine

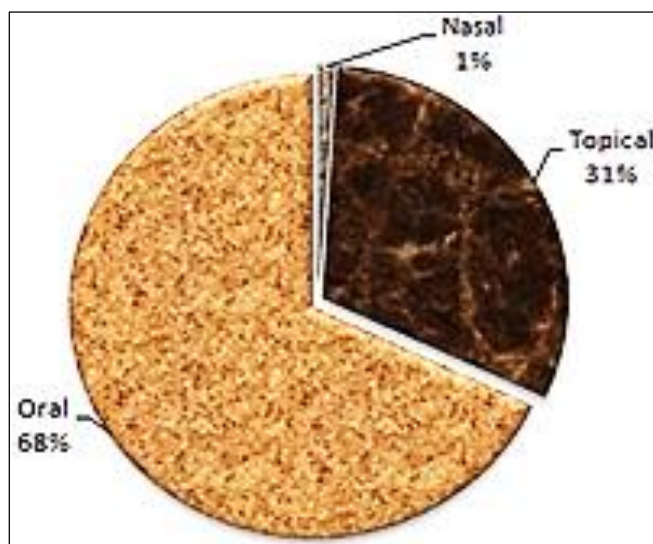


Fig 5: Route of administration of medicines

Table 2: Preference Ranking of Medicinal Plants used for treating Stomachache

Medicinal Plants used	Respondents (A-J)										Total	Rank
	A	B	C	D	E	F	G	H	I	J		
<i>Vitex negundo</i>	5	4	5	5	4	5	4	5	4	5	46	2
<i>Acorus calamus</i>	5	5	5	5	5	5	5	5	5	5	50	1
<i>Andropogon muricatus</i>	4	3	4	5	4	3	2	3	5	4	37	4
<i>Murraya koenigii</i>	5	3	5	3	5	4	5	4	5	3	42	3
<i>Matricaria camomila</i>	4	3	2	3	5	4	3	4	3	5	36	5

**Discussion**

The most common diseases in the study area are stomachache, diarrhea and dysentery. For the stomach ache, the plants used are *Tinospora cordifolia*, *Andropogon muricatus*, *Acorus calamus*, *Vitex negundo*, *Murraya koenigii* and *Matricaria camomilla*. But among these plants *Acorus calamus*, *Murraya koenigii* and *Vitex negundo* are most commonly used plants. The plants used for dysentery are *Altenanthera sessilis*, *Psidium guajava*, *Spondias pinnata*, *Zizyphus jujuba*, *Aegle marmelos*, *Ficus benghalensis* and *Terminalia tomentosa*. Among these plants *Psidium guajava*, *Zizyphus jujuba* and

*Aegle marmelos* are most commonly used plants. Similarly for diarrhea *Aegle marmelos*, *Dillenia pentagyna* and *Zizyphus Jujuba* are commonly used. The plants used to treat diabetes are *Momordica charantia*, *Syzygium cumini*, *Tinospora cordifolia* and *Murraya koenigii*. To control high blood pressure local people use *Clerodendrum viscosum*, *Rauwolfia serpentina*, *Tamarindus indica* and *Hibiscus rosa-sinensis*. *Terminalia arjuna* is used to treat any heart related problems. Similarly in jaundice tribals use *Cuscuta reflexa* and *Saccharum officinarum*. In pox and measles leaves of *Azadiracta indica* and *Spondias pinnata* are used externally.

In cough and cold people use *Ocimum sanctum*, *Curcuma angustifolia*, *Zingiber officinale*, *Cinnamomum zelanicum* and *Adhatoda vesica* orally. Root of *Achyranthes aspera* is used both externally and orally for easy delivery and bark of *Dillenia pentagyna* as a pain reliever after child birth.

Local people use *Gardenia jasminoides* and *Solanum indicum* as blood purifier. It was also notified that few plants have their multipurpose medicinal use like; *Ficus benghalensis* is used in dysentery, dental care, skin problems and by females to check sterility. *Spondias pinnata* is used in pox, measles, dysentery and rheumatic arthritis. *Aegle marmelos* is used in diarrhea, dysentery and piles. Similarly *Murraya Koenigii* is used in hair fall, dandruff and diabetes. *Vitex negundo* is used in rheumatism and diabetes. *Dillenia Pentagyna* is used as pain reliever after child birth and diarrhea. *Amaranthus viridis* is used in baldness and eye sight problems. *Hibiscus rosa-sinensis* is used in heart problems and irregular menstruation.

Although, many researchers from Nepal, India, China and other countries have mentioned the ethanobotanical uses of the many plants included in this study. Manandhar N.P. (1986)<sup>[23]</sup>, Rai (2003)<sup>[26]</sup>, Singh S. (2015)<sup>[31]</sup>, Yadav (1999)<sup>[37]</sup>, Singh *et al.* (2012)<sup>[30]</sup>, Sankaranarayanan *et al.* (2010)<sup>[27]</sup> also reported uses of few plants mentioned in this study. The medicinal plant species documented in the study area having medicinal utility are also supported by the findings of other researchers. Ghimire (1999)<sup>[5]</sup>, Rai (2003)<sup>[26]</sup>, Tamang (2003) also reported the use of *Aloe vera* for treating the burnt wound but Singh *et al.* (2012)<sup>[30]</sup> reported the use of this species for curing eye infection. This study also supported this finding. Tamang *et al.* (2014) reported use of *Tagetes erecta* in fever, this study found its effective use in cuts. Yadav (1999)<sup>[37]</sup> mentioned use of bark and latex of *Ficus benghalensis* in skin disease, dysentery and joint pain. Similarly, Singh *et al.* (2012)<sup>[30]</sup>, mentioned use of bark and latex of *Ficus benghalensis* in diabetes and muscular pain. Singh S. (2015)<sup>[31]</sup> reported use of *Ficus benghalensis* in facial treatment, ear problem, hair loss, dental problem and excessive sleepness. Present study also supported these uses but its new use in dysentery was also noted.

Dhami (2008) reported use of *Hibiscus rosa-sinensis* in cough and cold and *Terminalia bellirica* in cuts and skin disease; this study found use of *Hibiscus rosa-sinensis* in high blood pressure and irregular menstruation and *Terminalia bellirica* in asthma. Dhami (2008) also reported use of *Alstonia scholaris* in diarrhea and dysentery and *Murraya koenigii* in diarrhea, dysentery and insect bite whereas this study reported use of *Alstonia scholaris* in malarial fever and *Murraya koenigii* in hair fall and dandruff.

Bhanumathi *et al.* (2000)<sup>[24]</sup> reported use of *Tamarindus indica* in scorpion bite; this study found its use in high blood pressure. Joshi (2008)<sup>[19]</sup> reported use of *Cuscuta reflexa* in jaundice and this study also supported similar use of this plant. Burlakoti *et al.* (2008)<sup>[21]</sup> reported use if *Tinospora cordifolia* as a tonic and this study found its use to treat diabetes.

Present study found some new medicinal uses of the plants mentioned in this study. Like *Fiscus benghalnsis* in dysentery, *Vitex nugundo* in rheumatic arthritis and stomach pain, *Hibiscus rosa-sinensis*, *Tamarindus indica* in high blood pressure, *Cuscuta reflexa* in jaundice, *Spondias pinnata* in pox and measles, *Costus speciosus* in fever, *Leucas cephalotes* in sinusitis, *Sapindus mukrossi* in tonsillitis. *Dillenia pentagyna* as pain reliever after delivery, and diarrhea, *Clerodendrum viscosum* in high blood pressure and asthma, *Solanum indicum* as blood purifier, *Moringa oleifera*

in dental care and leprosy, *Alternanthera sessilis* to increase lactation, *Andrographis peniculata* in snake bite and intestinal worms, *Hgdrangia anomala* to remove kidney stone and *Plumbago zeylancia* in baldness.

During the survey most of the people were found to be reluctant to share their knowledge because of their conservative beliefs. They believed that as a result of sharing of their indigenous knowledge, their medicine would not work out further. So there are chances that the indigenous knowledge systems might be lost with the sudden death of such storehouse person. This stresses the importance and urgent need of proper exploration and documentation of the ethnic herbal treatments.

One important finding of the present study is that the people of the area of study possess a remarkable knowledge of plants and their uses to treat a wide range of physical ailments. During the field survey, they also showed knowledge on the relationship between toxicity and administered dose, such as powder of bark or seed of *Syzygium cumini* which are regarded as to lower blood glucose level in small doses, but when taken in large quantities are described as causing hypoglycemia and also it should not be taken regularly for long period. Likewise, the leaves and flowers of *Clerodendrum viscosum* are claimed to cure asthma in small amounts, but cause vomiting when taken in excess amount. The interviews also showed that women have a better knowledge about medicinal plants than men, perhaps, due to their constant association with the forests and the agro-ecosystem. The present trend of therapeutic uses of plant in this region indicates that in spite of the establishment of small health centers, traditional practices on the uses of medicinal plants will continue to play a significant role in the socio-cultural life of these village communities. Prior to the loss of the ethnopharmacological information, efforts should be made to document useful species and the vast stores of indigenous ethenobotanical knowledge and practices

## Conclusion

In this study 66 plant species were identified to treat 50 types of health problems. This study revealed the rich ethno medicinal knowledge of the Tharu community of Parsa district. It was also found that most of the people in this area still depend on these herbal remedies for their day to day health care. Although Tribals use these plants for treating various ailments but they are not much aware about their conservation. They have idea about decreasing population of few plants but they are not aware about its cause. Even knowledge about medicinal value of the plants and mode of treatment passes to the next generation in verbal form in this community. So, documentation of these plants and their medicinal value will play great role in the biodiversity conservation. Extraction and identification of effective chemicals present in the studied medicinal plants could play great role in the discovery of new pharmaceutical drug for the humanity.

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