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Indigenous Knowledge on Medicinal Non-Timber Forest Products(NTFP) in Parbat District of Nepal

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ABSTRACT: Present study aims to focus on the hidden indigenous knowledge on medicinal non- timber forest products (NTFP) among the four ethnic tribes (Gurung, Magar, Kumal and Majhi) of Parbat district. NTFP are being collected from the different areas of the local forests. Ethnobotanical investigation has been carried out to accumulate traditional knowledge on the use of 28 species of plants belonging to 27 genera under 22 families. Relative reliability index (RRI) has been calculated for rating different plant species having medicinal value.

KEYWORDS: Ethnobotany; Traditional Healers; Relative Reliability Index (RRI); Nepal.

INTRODUCTION

Millions of people throughout the world currently derive an extensive portion of their subsistence needs and income from gathered plant and animal products (Iqbal M, 1993; Walter S, 2001). Non-timber forest products (NTFP) are plants or plant parts that have perceived economic or consumption value sufficient to encourage their collection and removal from the forest. Non-timber forest products (NTFP) are considered as any commodity obtained from the forest that does not necessitate harvesting trees (Emery MR, 2001). It has also great social and cultural significance (Cooks ML, Wiersum KF, 2003). It includes game animals, fur-bearers, nuts, seeds, berries, mushrooms, oils, forages, medicinal plants, peat, fuelwood, food, wrapping materials, birds, reptiles and fishes etc. It can also be referred to as all the resources/products that may be extracted from forest ecosystem and are utilized within the household or are marketed (FAO, 1990).

Ethnomedicinal plants play an important role in the life support systems and well being of indigenous mankind (Purohit SS, Vyas SP, 2004). Indigenous people living on their traditional territory largely rely on ethnomedicinal plants for healthcare and they are therefore rich in ethnopharmacological knowledge (Uprety et al., 2010). Inspite of ongoing socio-cultural transformation in the Himalayan regions local communities still possess invaluable knowledge of plants and their uses (Kunwar RM, Sharma SP, 2004). Medicinal plants help in alleviating human suffering and are widely used for subsistence, home remedies, and trade (Kunwar RM,

Nepal BK, Kshhetri HB, Rai SK, Bussmann RW 2006). Ethnic people like Gurung, Magar, Kumal and Majhi in Nepal, have good association with the plants resources they use for the treatment of various day to day ailments. These ethnic people have a common Nepali dialect. Some other ethnobotanical studies have thrown some light on the traditional knowledge in Nepal (Pandey PR, 1964; Adhikari PM, Shakya TP, 1977; Bhattarai NK, 1992; Ghimire SK, Shrestha AK, Shrestha KK, Jha PK, 2000; Joshi KK, Joshi SD, 2001; Mahato RB, Chaudhary RP, 2005). Parbat district from the ethnobotanical point of view is one of the least investigated districts. With the exception of few contribution (Manandhar NP, 2002). On the basis of scrutiny of literature it was realized to initiate the present study.

Description of Study Area

Parbat is one of the four districts of Dhaulagiri Zone in western development region of Nepal(**Figure 1**). It lies between 27° 58' N to 28° 39' N latitudes and 83° 34' E to 83° 59' E longitudes with altitude ranging from 520m- 3309m a.s.l. The district covering an area of 494 sq. km. with hills, valleys, plateaus and gorges. The major ethnic tribes inhabiting the area are Gurung (5.09 %), Magar (10.72 %), Kumal (0.25 %) and Majhi (0.23 %) with total population of 173,748 (according to 2001 census). This district has sub-tropical, temperate and sub alpine monsoon type of climate. It is traversed by two big rivers Kaligandaki and Modi as well as other rivulets, streams and streamlets, where natural breeding of different species of fishes is constantly taking place that highly encourages for fishing to ethnic tribes who have very rich folklore about traditional fish harvesting.

MATERIALS & METHODS

Data Collection

Ethnobotanical data was collected in four different VDC's of Parbat district during August to October 2010. Medicinal plants were selected on the basis of their use by the four ethnic tribes viz. Gurung, Magar, Kumal, Majhi and the species that were consistently used to treat the same remedies by traditional healers and knowledgeable local persons. From each ethnic group 3 to 5 healers and 10 to15 households in each VDC's were participated in the study. A total of 51 selected inhabitants were interviewed, out of 51, 46 were male and only 5 woman. The age of the healers and knowledgeable person were between 40-80 years. Guidelines for the interviews and group discussions were developed to facilitate the collection on information. A checklist was developed and used to determine which plant species were used to treat what kind of diseases. They were interviewed by constructing structured and semi-structured questionaires. While noting ethnomedicinal information, every care was taken to record the local names of plants, parts used, method of drug preparation and uses. Plant species were identified by the National Herbarium and Plant Laboratories (KATH), Godawari Lalitpur, Nepal. Voucher specimens have been deposited in the Department of Environmental Science and Engineering (DESC), Kathmandu University, Nepal.

Data Analysis

Relative Reliability Index (RRI):

Respondents consensus focused on the use of indigenous knowledge to estimate user variability of different medicinal plants to cure various human diseases by the ethnic people. Though theoretically, all ethonobotanical claims were taken as equally reliable. Reliability of every claim cannot be of same degree. Relative reliability index (RRI) was used to express the reliability of ethnobotanical data as a single numerical value. Relative Reliability Index is expressed as logarithm of fraction of '1'. Relative reliability index (RRI) = log [1/ (A+B+C+D+E)]. To calculate relative reliability index (RRI), every claim/information is assigned a

value ranging from 01 -04 in each of the five sets of criteria listed as A, B, C, D, and E. Value of RRI varies from 0.9 (lowest reliability) to 1.1 (highest reliability) (Khan AA, 2001). The plants used for preparation of medicines are enumerated as follows;

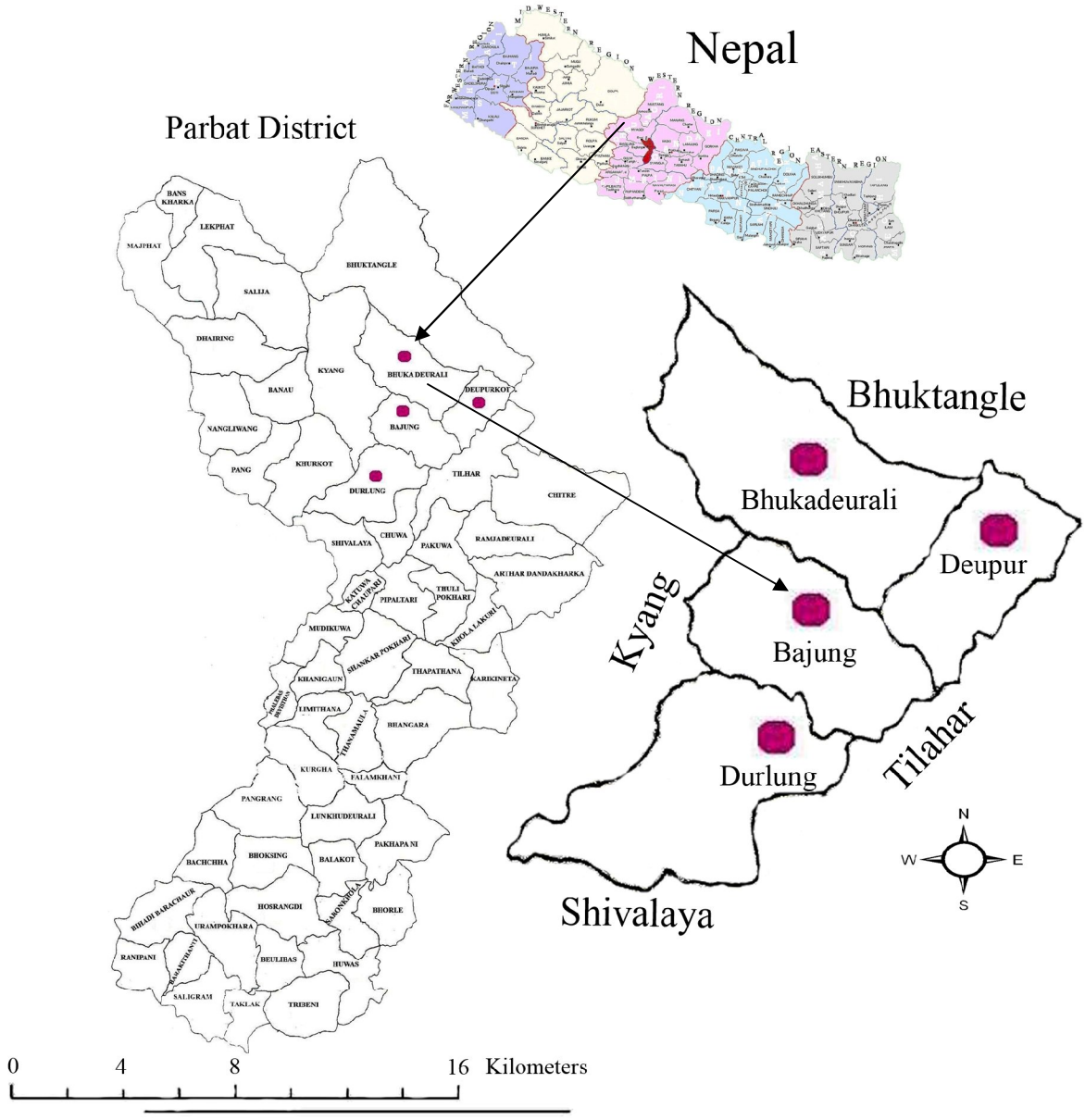

Figure 1 Map of Nepal. The red spots showing localities of the study area: Bhukadeurali, Deupur, Bajung & Durlung VDC's of Parbat District.

RESULTS & DISCUSSION

Enumeration

Interactions with the ethnic tribes and abundance of plants, 28 species were selected from the study area. Species have been arranged alphabetically, mentioning the family in parenthesis, vernacular name, locality, collector's name (BM) and voucher specimen number followed by plant parts and mode of use. The vernacular name is abbreviated as Gurung (G), Magar (M), Kumal (K) and Majhi (Ma).

Table 1 Characteristics of ethnobotanical plants used by ethnic tribes

S.N.	Scientific name	Family	Vernacular name	Collector's name/Voucher no.	Plant parts & mode of use
1	**Acacia catechu** (L.f.) Willd.	Fabaceae	'Khayar' (M, Ma)	BM/ 0066	Decoction of the root is applied to treat muscular swelling
2	**Anaphalis contorta** (D. Don) Hook	Asteraceae	'Buki phul' (G),	BM/ 0015	Paste of the leaves is taken to treat cough and cold. Paste of root is applied to cure cuts and wounds.
3	**Anemone vitifolia** Buch.-Ham. ex. DC.	Ranunculaceae	'Dhanero' (M, G), 'Bhaisyamarelo' (M)	BM/ 0048	Juice of the root is used in case of dysentery and earache.
4	**Arisaema costatum** (Wall.) Mart.	Araceae	'Banko' (M)	BM/ 0040	Paste of the tuber is applied to treat in backache.
5	**A. flavum** (Forsk.) Schott	Araceae	'Banko' (M),	BM/ 0007	Juice of the leaves is given to cure fever.
6	**Arundina graminifolia** (D.Don) Hochr.	Orchidaceae	'Bamboo orchid' (M)	BM/ 0090	Paste of the flowers is applied to treat scabies.
7	**Begonia picta** Sm.	(Begoniaceae)	'Magarkanche' (G),	BM/ 0091	Juice of the leaves about 4 teaspoons three times a day is given to relieve fever. Juice of the root about 6 teaspoons three times a day is given in cases of peptic ulcer.
8	**Butea minor** Buch.-Ham. ex Baker,	(Fabaceae)	'Bhujetro' (M),	BM/ 0061	Two teaspoons of powder of seeds is given to treat indigestion.
9	**Calotropis gigantea** (L.) Dryand.	(Asclepiadaceae)	'Aank' (G, M),	BM/ 0046	Bark juice is given in case of diarrhoea and dysentery.
10	**Campanula pallida** Wall.	(Campanulaceae)	'Ganobuti' (G, M),	BM/ 0022	Juice of the root is used for diarrhoea and dysentery.
11	**Cassia occidentalis** L.	(Fabaceae)	'Chhinchhine' (M),	BM/ 0065	Juice of the leaves is given in indigestion.

12	**Castanopsis indica** (Roxb.) A. DC.	(Fagaceae)	'Katus' (G, M),	BM/ 0043	Juice of the bark and leaves is given twice a day in cases of indigestion.
13	**Cipadessa baccifera** (Roth.) Miq.	(Meliaceae)	'Asare' (G),	BM/ 0059	Juice of the root is given in cases of indigestion.
14	**Cleome viscosa** L.	(Capparaceae)	'Torijhar' (M), 'Hurbule' (Ma),	BM/ 0072	Paste of the root is applied externally to treat earaches.
15	**Coelogyne corymbosa** Lindl.	(Orchidaceae)	'Sunakhari' (G, M),	BM/ 0082	Paste of the pseudobulb is applied to the forehead to relieve fever.
16	**Cyathula tomentosa** (Roth.) Moq.	(Amaranthaceae)	'Aankhle kuro' (G, M),	BM/ 0030	Juice of the root, about 6 teaspoons three times a day, is taken with water for indigestion and peptic ulcer.
17	**Desmodium concinnum** DC.	(Fabaceae)	'Gahatejhar' (K),	BM/ 0097	Juice of the root, about 2 teaspoons three times a day, is given in case of indigestion.
18	**Euphorbia hirta** L.	(Euphorbiaceae)	'Dudhejhar' (G, K),	BM/ 0068	The plant juice is dripped into the earache by Gurung and Magar community). Paste of the root is used to treat cuts and wounds.
19	**Fagopyrum dibotrys** (D.Don) H.Hara,	(Polygonaceae)	'Banbhande' (G, M),	BM/ 0027	Decoction of the leaf is used to treat muscular swellings.
20	**Galium aparine** L.	(Rubiaceae)	'Khangrejhar' (M),	BM/ 0057	Plant juice is applied for cuts and wounds. Doses about 4 teaspoons is given three times a day for indigestion.
21	**Gaultheria fragrantissima** Wall.	(Ericaceae)	'Ayodix' (M),	BM/ 0023	Leaf juice is used externally to treat muscular swelling.
22	**Justicia procumbens** L.	(Acanthaceae)	'Bisaunejhar' (G, M),	BM/ 0024	Paste of plant is applied to backache.
23	**Lecanthus peduncularis** (Royle) Wedd.	(Urticaceae)	'Kholejhar' (M).	BM/ 0019	The root is grounded and applied to muscular swelling.
24	**Lyonia ovalifolia** (Wall.) Drude.	(Ericaceae)	'Angeri' (M),	BM/ 0020	Juice of the leaves is applied to treat scabies.
25	**Maesa chisia** Buch.-Ham. ex D.Don.	(Myrsinaceae)	'Bilauni' (M, K),	BM/ 0100	Paste of ripe fruit is applied to treat scabies.
26	**Mimosa pudica** L.	(Fabaceae)	'Lajawatijhar' (M, K),	BM/ 0055	Juice of the plant, about 5-6 teaspoons, three times a day is taken to treat fever. Paste of the leaf is applied to relieve glandular swelling.

27	**Osbeckia stellata** Buch.-Ham ex D. Don.	(Melastomataceae)	'Angaru' (M),	BM/ 0054	Juice of the root, about 3 teaspoons twice a day, is given to treat diarrhoea and dysentery. Juice of the leaves is applied to treat scabies.
28	**Oxyspora paniculata** (D. Don) DC.	(Melastomataceae)	'Bakhrakane' (M),	BM/ 0095	Leaf juice, about 4 teaspoons twice a day, is used to relieve diarrhoea and dysentery.

Plant parts used and mode of remedy preparations

Plant parts were used to prepare different medicinal formulation such as roots, leaves, whole plant, bark, tuber, flower, seeds and fruit (Figure 2). Most of the preparations roots (35%) were used for the preparation of medicines predominantly followed by leaf (32%), whole plant (12%), bark (6%), tuber (6%), flower (3%), seeds (3%) and fruit (3%). The common use of roots and leaves for the preparation of remedies is due to the availability of plant part. Leaves remain green and available in most of the years and also ease in the preparation of remedies. Most relevant method of medicine preparation were as juice (56%), paste (30%), decoction (7%) and powder (7 %) (Figure 3). The frequent use of water as dilutant was found in preparation of medicine. During the study it was fount that tribal healers of these communities collect medicinal plants from the variety of habitats. Mainly wild plants were collected from nearby forest and some times these healers also collect medicinal plants from agriculture land and barren land.

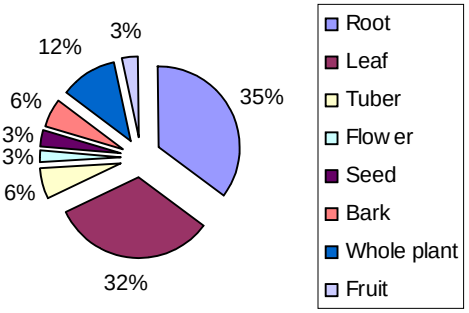

Figure 2 Plant parts used in the preparation of medicine

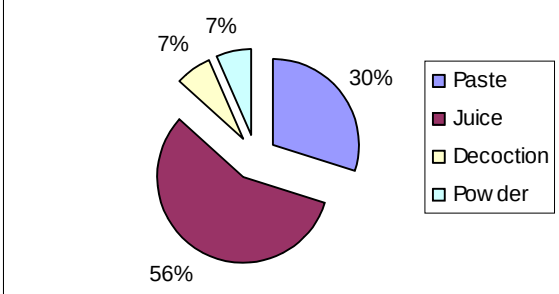

Figure 3 Form of medicine used

Table 2: Relative Reliability Index (RRI), Rating -disease wise (Khan, 2001)

Reliability Rating For Indigestion

Botanical Name	Local Name	vA	vB	vC	vD	vE	Total	RRI
Butea minor	'Bhujetro' (M)	02	01	02	02	01	08	0.9
Castanopsis indica	'Katus' (G, M)	04	02	02	02	02	12	1.1
Cipadessa baceifera	'Asare' (G)	03	02	02	01	01	09	0.95
Cythula tomentosa	'Aankhlekuro' (G, M)	03	02	02	02	01	10	1.0
Cassia occidentalis	'Chhinchhine' (M)	02	02	02	01	02	09	0.95

Desmodium concinnum	'Gahatejhar' (K)	04	02	02	02	02	12	1.1
Galium aparine	'Khangrejhar' (M)	03	02	02	02	01	10	1.0

Reliability Rating For Diarrhoea & Dysentry

Botanical Name	Local Name	vA	vB	vC	vD	Ve	Total	RRI
Anaphalis contorta	'Bukiphul' , 'Taptap' (G)	04	02	02	01	01	10	1.0
Calotropis gigantean	'Aank' (G, M)	04	01	02	01	02	10	1.0
Campanula pallida	'Ganobuti' (G,M)	03	01	02	01	01	08	0.9
Oxyspora paniculata	'Bakhrakane' (M)	04	02	02	01	01	10	1.0
Osbeckia stellata	'Angaru' (M)	03	02	02	02	02	11	1.04

Reliability Rating For Muscular Swelling

Botanical Name	Local Name	vA	vB	vC	vD	vE	Total	RRI
Acacia catechu	'Khayar' (M, Ma)	04	02	02	02	02	12	1.1
Fagopyrum dibotrys	'Banbhande' (G, M)	04	02	02	02	01	11	1.04
Gaultheria fragrantissima	'Ayodix' (M)	04	02	02	02	02	12	1.1
Lecanthus peduncularis	'Kholejhar' (M)	03	01	02	01	01	08	0.9
Mimosa pudica	'Lajawati jhar' (M, K)	04	02	02	02	01	12	1.04

Reliability Rating For Fever

Botanical Name	Local Name	vA	vB	vC	vD	vE	Total	RRI
Arisaema flarum	'Banko' (M)	03	01	02	02	02	10	1.0
Begonia picta	'Magarkancha' (M)	04	02	02	02	02	12	1.1
Coelogyne corymbosa	'Sunakhari' (G,M)	04	01	02	02	01	11	1.04
Mimosa pudica	'Lajawati jhar' (M, K)	04	01	02	01	01	09	0.95

Reliability Rating For Scabies

Botanical Name	Local Name	vA	vB	vC	vD	vE	Total	RRI
Arundina graminifolia	'Bamboo orchid' (M)	04	02	02	01	01	10	1.0
Lyonia ovalifolia	'Angeri' (M)	04	02	02	02	01	11	1.04
Maesa chisia	'Bilauni' (M, K)	03	02	02	02	01	10	1.0
Osbeckia stellata	'Angaru' (M)	03	02	02	02	02	11	1.04

Reliability Rating For Earache

Botanical Name	Local Name	vA	vB	vC	vD	vE	Total	RRI

Anemone vitigolia	'Dhanero', (M)	03	02	02	02	01	10	1.0
Cleome viscora	'Torijhar' (M), 'Hurbule' (Ma)	04	02	02	02	01	11	1.04
Euphorbia hirta	'Dudhejhar' (G, K)	04	01	02	01	01	09	0.95

Reliability Rating For Cuts and Wounds

Botanical Name	Local Name	vA	vB	vC	vD	vE	Total	RRI
Anaphalis contorta	'Bukiphul' (G)	04	02	02	01	01	10	1.0
Euphorbia hirta	'Dudhejhar' (G, K)	04	01	02	01	01	09	0.95

Reliability Rating For Peptic Ulcer

Botanical Name	Local Name	vA	vB	vC	vD	vE	Total	RRI
Begonia picta	'Magarkancha' (M)	04	02	02	02	02	12	1.1
Cythula tomentosa	'Aankhle kuro' (G, M)	03	02	02	02	01	10	1.0

Reliability Rating For Backache

Botanical Name	Local Name	vA	vB	vC	vD	vE	Total	RRI
Arisaema costatum	'Banko' (M)	03	01	02	02	02	10	1.0
Justicia procumbens	'Bisaunejhar' (G,M)	03	01	02	02	01	09	0.95

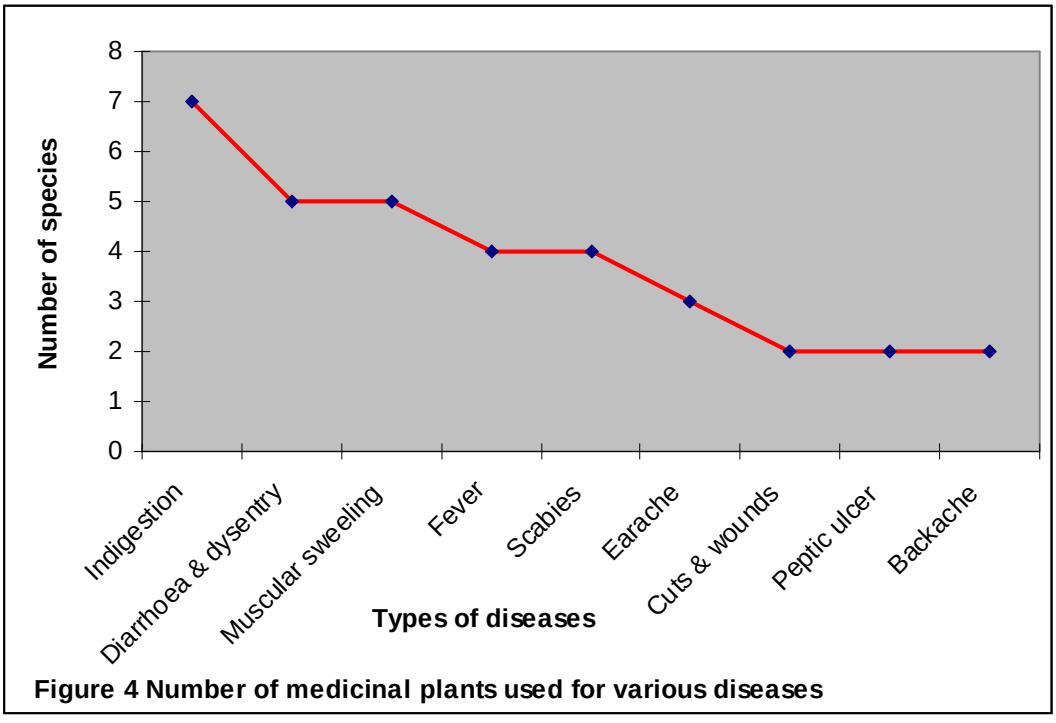

Figure 4 Number of medicinal plants used for various diseases

Altogether 28 plant species under 22 families and 27 genera have been identified as NTFP, which were essential for the preparation of herbal medicine by the local ethnic people. From the surveys, the NTFP were categorized into their ethnomedicinal values which are being used to treat eight different human diseases.

The ethnic tribes have been administrating the medicine to their families, both for the elderly people and young ones. It is not prepared individually at home but some local traditional healers who prepare the medicine from many plant species and sell it to the local communities.

On the basis of RRI, out of 28 plant species, 6 species were widely used to treat four different human disorders/ailments like indigestion, muscular swelling, fever and peptic ulcer. Plant species viz., *Castanopsis indica* and *Desmodium concinnum* were found to have the highest reliability rating 1.1 for the treatment of indigestion (Table 1). Similarly, *Osbeckia stellata* is used to treat diarrhoea and dysentery which has highest reliability 1.04, for muscular swelling *Acacia catechu* and *Gaultheria fragrantissima* which have the highest reliability 1.1, for fever and peptic ulcer *Begonia picta* is used which has reliability 1.1, for scabies *Lyonia ovalifolia* and *Osbeckia stellata* have 1.04, for earache *Cleome viscosa* has 1.04, for cuts and wounds *Anaphalis contorta* has 1.0, for backache *Arisaema costatum* has 1.0 reliability rating which were categorized as the best plant species respectively. Other species were also used to cure various human ailments but these were not seemed to be the best species according to the RRI.

CONCLUSION

Present study showed that the study area has medicinal non- timber forests products to treat wide variety of human ailments. According to the tribal communities and their traditional practices the majority of the ethomedicinal plants are selected for the treatment of human ailments. The tribal people used medicinal plants in the treatment of some very common diseases such as indigestion, diarrhoea and dysentery, muscular swelling, fever, scabies, earache, cuts and wounds, peptic ulcer and backache. So, it is necessary to acquire and preserves this traditional system of medicine by proper documentation and identification of plant species. This traditional knowledge and use of medicinal plants on the basis of RRI could boost new innovations for the photochemical analysis which have many applications for new medicinal trails and findings.

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Calotropis gigantea

Mimosa pudica

Butea minor

Castonopsis indica

Begonia picta

Cassia occidentalis

Arisaema costatum

Cythula tomentosa

Plate-1 Some plants collected during field survey in Parbat District

Osbeckia stellata

Coelogyne corymbosa

Lecanthus peduncularis

Euphorbia hirta

Cipadessa baccifera

Maesa chisia

Oxyspora paniculata

Campanula pallida

Phate-2 Some plants collected during field survey in Parbat District

Anaphalis contorta

Arundina graminifolia

Cloeme viscosa

Fagopyrum dibotrys

Acacia catechu

Galium aparine

Arisaema flarum

Gaultheria fragrantissima

Plate-3 Some plants collected during field survey in Parbat District

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