

Traditional Knowledge on Use of Medicinal Plants by Tamang Community of Dolakha, Nepal

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Abstract

Ethnobotanical knowledge is precious knowledge for drug discovery. Not only documentation of such knowledge but also the validation and actual field observation through scientific approach is necessary. The purpose of this study was to document medicinal plants (MPs) used by Tamang community of Dolakha district, Central Nepal. Ethnomedicinal knowledge was documented and validated through semi-structured interviews, focus group discussions with key informants, transect walks and workshops. A total of 57 (5 cultivated and 52 wild) medicinal plants belonging to 38 families of angiosperms with 55 genera, 1 lichen and 1 fungus to treat various 42 ailments has been documented. Herbs were most popular life form of MPs (36), while root was most used part of MPs (11). Juice was common mode of preparation of remedies (36%). Ophthalmological disorders, urinary disorders, cancer had higher FIC value (1) indicating higher agreement among the respondents. Similarly *Swertia chirayta*, *Paripolyphylla*, *Taxus wallichiana*, *Gaultheria fragrantissima* and *Bergenia ciliata* had high preference for treatment of various diseases as well as trade value. Public awareness regarding identification, conservation and long term utilization of potential medicinal plants in the local habitat along with preference to cultivation practice for trade value is recommended.

Keywords: Ailment category, Conservation, Ethnomedicine, Focus group discussions, Indigenous knowledge, Informant consensus factor

Introduction

Traditional knowledge, also known as folk knowledge, refers to the perception of natural environment by local people (Martin, 1995). Ethnobotany is directly linked to numerous entities like food, shelter, medicine, entertainment, livelihood improvement and conservation of natural resources. Among the other applications of ethnobotany, medicinal use of plants is one of the major applications which consequently contribute to drug discovery and socio-economic development by exposing the historical and present use of plants.

Nepal, due to its specific geographical features, landscape and vegetation, is rich in biological diversity. Potential biodiversity, phytogeographical variation within short distance has ensured the existence of multi-cultural and different socio-economic variation among people. Such aspects reflect variation in Traditional Knowledge and practices among different ethnic groups. Nepal is

considered as the excellent repository of the cultural heritage for diverse ethnic groups and it has a rich tradition of folk practices for utilization of wild plants (Manandhar, 1991).

Different 123 ethnic communities with 125 dialects are living in Nepal (CBS, 2011). The perception of nature by various ethnic communities is different. This makes the nation rich in traditional knowledge of utilization and conservation of natural resources.

According to Manandhar (2002) about 80% population of Nepal depend on traditional medicine for primary healthcare. But, indigenous culture along with ethnomedicinal plants are decreasing day by day due to lack of concern, proper knowledge of scientific harvesting technique and conservation program (Kunwar & Duwadee, 2003). Hence, it is crucial to document traditional knowledge related to plant use before it vanished from the society.

Since the late 19th century (1885-1901) the concept of ethnomedicine has been developed in Nepal. In

1969 the first book “Chandra-Nighantu” or “Bir-Nighantu” regarding medicinal plants was published by the Royal Nepal Academy. Later many botanists (Pandey, 1964; Adhikari & Shakya, 1977; Malla & Shakya, 1984-1985; Manandhar, 1985, 1990, 1994; Malla & Chhetri, 2009; Singh et al., 2012; Shrestha et al., 2014) carried out number of ethnobotanical studies on different parts of Nepal. Although several ethno botanical studies have been carried out in Nepal, many areas still remain unexplored (Upreti et al., 2010). Such explorations are important for finding interesting plants with great bioprospecting potential which can cure lethal diseases of human. Therefore the aim of this study was to explore traditional knowledge on use of medicinal plants by Tamang community.

Materials and Methods

Study area

The present study was carried out in Jugu, mountainous village of Dolakha District which lies in Gaurishankar Rural Municipality ward number 1 and 2. It is the north-east part of Dolakha District and extends from 27°50' to 27°43' north and 86°8' to 86°15' east, and has altitude range from 950 m asl. to 3000 m asl. Depending on the altitudinal gradient, the climate of Jugu can be categorized into Sub-tropical, Warm temperate and Sub-alpine. The average annual temperature of Jugu ranges from 8.17°C (minimum) to 20.71°C (maximum) (Karki &

Ghimire, 2020). The village covers an area of 34 sq. km where 40% of the land is cultivated and 60% of the land is forest (Jugu VDC Profile, 2009).

Sampling informants in Tamang community

The communities which generally reside away from the modern cities and closure to the nature and have their own cultural practice, own mother tongue are called as indigenous communities (Bhattachan, 2000). Tamang is one of the most dominant indigenous communities of Central Nepal. Etymologically, Tamang (Ta= horse and Mang= trader) means horse traders which accounts 5.8% of total population of the nation (NPHC, 2011). This community is second dominant population after Brahman and Chhetri in Dolakha district (DDC, 2016). Tamang people of study area follow both Hindu and Buddhist religion, and celebrate Dashain, Tihar and Lhosar. They are engaged in agriculture, cultivation, collection and trade of medicinal plants, animal rearing and few in governmental service.

The practice of using plant resources vary according to tradition viz. during marriage, father and elders of groom visit brides home ‘Aling’ with ‘Sagun’ (a bottle of local alcohol covered with seed of *Oroxylum indicum*). Accepting the ‘Sagun’ by bride family means the acceptance of request of bride family.

Data Collection and analysis

The ethnobotanical study was carried out by six field visits during October 2017 to December 2018. Ethnobotanical knowledge documented by purposive sampling and validated through 40 household survey (semi-structured questionnaire), focused group discussion and resource mapping, transect walk involving local people and village workshops. Medicinal plant cultivators, traders and collectors were considered as key informant. The questionnaire was mainly focused to gather local names of plant, parts used, diseases, and method of preparation.

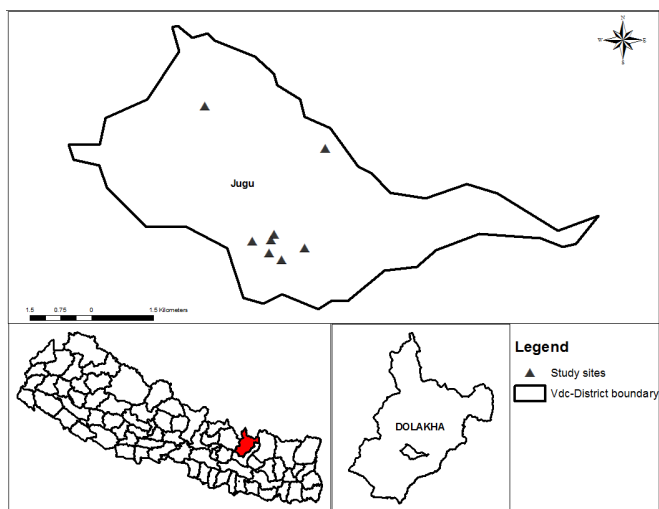


Figure 1: Map of the study area (Jugu).

Specimen collection, identification and documentation

Specimens of cited ethnomedicinal plants were photographed and collected from various sites with their Tamang names during transect walk along the walking trails and inside forest with local people. Field note for each species was recorded in the field meanwhile. The specimens were identified using standard literatures (Polunin & Stainton, 1984) and with the help of experts as well as cross checked with specimen housed in National Herbarium, Godawari, Nepal (KATH) and mounted in standard herbarium sheet following standard method (Rajbhandari & Rajbhandary, 2015). The plants which were rare were not collected but photographed. Herbarium specimens have been deposited at Tribhuvan University Central Herbarium (TUCH). The identified scientific name and families of medicinal plants were checked with www.catalogueoflife.org.

Factor of informants consensus, also called as informant consensus factor (ICF) by Trotter and Logan (1986), was calculated in order to validate the homogeneity of informant's knowledge. It was calculated as:

$$FIC = \frac{N_{ur} - N_t}{(N_{ur} - 1)}$$

Where, ' N_{ur} ' is the number of use reports in each ailment category and ' N_t ' is the total number of taxa used in each ailment category. High valued medicinal plants of study area were identified based on the result obtained from preference ranking, the method used in Makawanpur district by Joshi (2014) modified from Martin (1995).

Preference ranking

Firstly total medicinal plants of the study area were listed and 15 informants (out of 40 interviewed), based on their experience, knowledge were asked to give the rank from 1-5 to each medicinal plants based on local use and trade value. Rank 5 was used for most used or high valued plant in terms of both local use and trade value and decreasing number was for decreasing value, hence 1 for least used species. Rank given for each species were summed and 6 species with highest rank score were considered as

most preferred species. Six most preferred species were then again used for preference analysis separately based on their local use value and trade value according to Martin (1995).

Results and Discussion

Ethnobotanical knowledge of Tamang communities

Mainly plants are used for medicinal, edible, fiber, religious, fodder and firewood purposes. Tamang community in the study area was not totally isolated from other cultural societies hence, the culture of Tamangs do not seem to totally different than that of others. However some elderly people and leaders of Tamangs have retained their traditional knowledge & culture. They have enough knowledge of use of plant resources for their subsistence and livelihood. Several potential medicinal plants are found in the study area but most of the people were quite unknown about them. However people have very common practice of use of some common herbs as medicinal plants for cutting wounds, cold and cough. A total 57 plant species were used for medicinal purpose.

Taxonomic distribution of medicinal plants

A total of 57 medicinal plants belonging to 38 families of flowering plants belonging to 55 genus and one lichen and one fungus have been documented which has been used for treatment of 42 ailments (Table 1). However, 161 medicinal plants were reported from Tamang community of Makawanpur District to cure various 89 human ailments (Luitel et al., 2014). Similarly 46 medicinal plants were reported from Tamang community of Rasuwa District to cure 38 human ailments among which 13 medicinal plants had culinary and cultural use also (Shrestha et al., 2014).

Asteraceae was the largest family with 7 species because Asteraceae have maximum number of genera among dicot plants, followed by Ericaceae and Rosaceae with 3 species each. Nine families (Apiaceae, Amaryllidaceae, Araceae, Asparagaceae, Polygonaceae, Ranunculaceae, Saxifragaceae,

Urticaceae and Zingiberaceae) had 2 species while remaining 25 families with single species.

Life form of medicinal plants (MPs)

Among total documented medicinal plant species, 36 species were herbs, followed by nine, tree species, and four species of shrub and climbers each and two parasite species. *Viscum album* and *Cuscutacas sytoides* were the parasitic plants that are used for medicinal purpose (Figure 2). The potential use of herbs as medicine could be high availability in study sites in comparison to shrubs and trees. This result was similar to the ethnobotanical study of Nepal (Shrestha & Dhillon, 2003; Uprety et al., 2010).

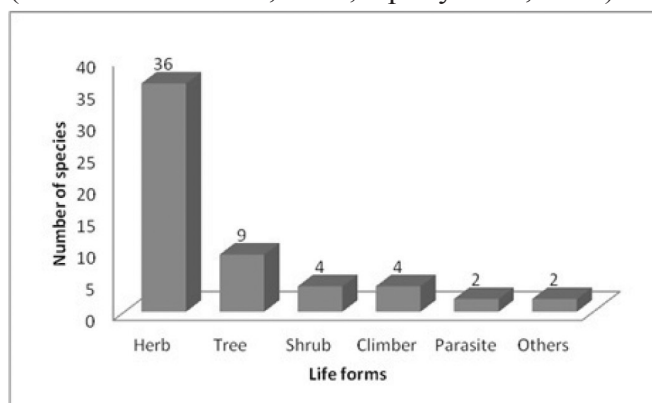


Figure 2: Number of different life form of MPs.

Parts used of medicinal plants (MPs)

Different parts of medicinal plants were used for treating different diseases. These included roots of 11 species, leaves of nine species, rhizomes of seven species, whole plants of five species, stems, tubers and barks of four species each, fruits of five species were used. Flowers and seeds were found least used part i.e., only of three species (Figure 3).

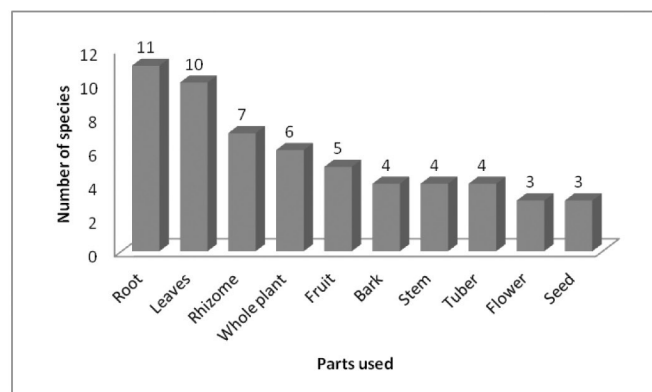


Figure 3: Different parts used of MPs.

Among used parts, 39% were underground parts followed by 19% of reproductive parts, leaves with 18%. Stem and bark of 14% medicinal plants is used. Whole plant of 6 species (i.e., 10%) is used (Figure 4). If the magnitude of use of MPs whose underground parts and reproductive parts increases, it can seriously damage the plant resources because those parts which make those plants vulnerable to exploit are highly used.

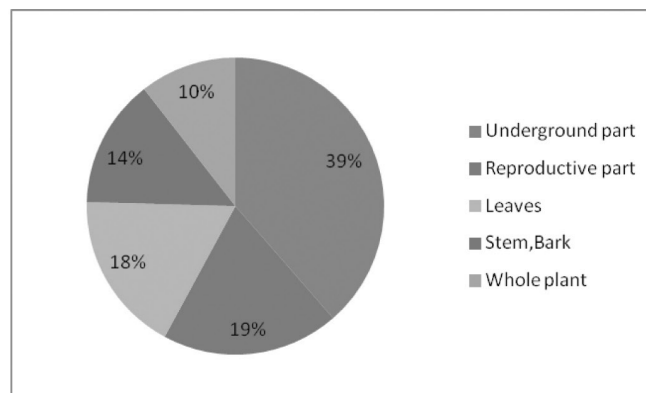


Figure 4: Percentage of different parts used of MPs.

Different parts of medicinal plants ranging from root, rhizome, tuber, stem, leaves, bark, latex, seed, fruit, flower to whole plants were used. The most commonly used part was root (19.3%) followed by leaves (17.55%), rhizome (12.29%), whole plant (10.53%), fruit (8.78%), tuber, bark and stem (7.02%), seed and flower (5.27%). Root contains comparatively more amount of bioactive compounds and available during the year (Srithi et al., 2009; Bhattarai, 2018) which may results its higher utilization in local therapeutics. Similar results were obtained in ethnomedicinal studies carried out in other parts of country and abroad (Shrestha & Dhillion, 2003; Rokaya et al., 2010; Uprety et al., 2010; Singh et al., 2012; Shrestha et al., 2014). Here underground parts (root, tuber, rhizome) of 38.6% medicinal plants were found to be used which was followed by reproductive parts (19.3%), whole plant (10.53%) indicating them to higher threat risk. Comparatively the medicinal plants whose underground parts are collected and used are more vulnerable and are more likely to become threatened because uprooting causes the destruction of whole plant and if it is before fruiting season, the vulnerability is even higher (Shrestha et al., 2014).

Use frequency of medicinal plants in different diseases categories

Number of medicinal plants used to treat different ailment categories showed that highest numbers of species were used for external injuries/ bleeding and gastrointestinal because these are most common and widespread diseases followed by parasitic and

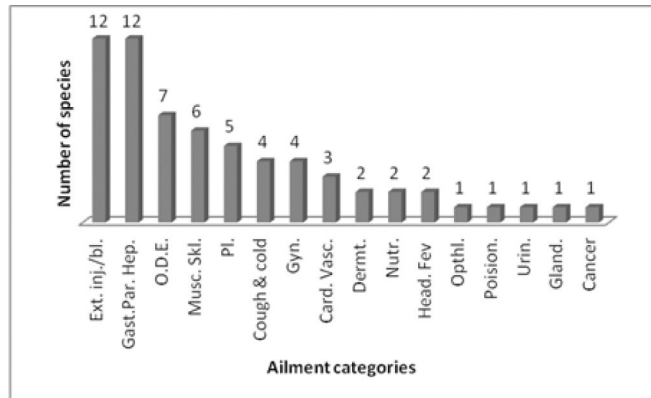


Figure 5: Number of species used in different diseases category (Note: Ext. inj./bl. : External injuries/bleeding, Gast.Par. Hep: Gastrointestinal, parasitic and hepatobiliary disorders, O.D.E. : Oral, dental and ENT problems, Musc. Skl.:Musculo-skeletal disorders, Gyn.: Gynecological problems, Card. Vasc.: Cardiovascular disorders, Dermt.: Dermatological problems, Nutr.: Nutritional disorders, Head. Fev.: Headache/fever, Opthl.: Ophthalmological problems, Urin.: Urinary system disorders, Gland.: Glandular problems).

hepatobiliary disorders (12 species in each). These were followed by oral, dental and ear problems with 7 species, musculo-skeletal disorders with 6 species and so on. Ophthalmological, urinary system, glandular disorder, cancer and poison categories were treated with each 1 species (Figure 5).

Regarding the mode of administration of medicines prepared to treat different ailments, oral application was most profound except skin diseases and bone fractures for which topical application of medicine was used. Similar findings were obtained for mode of administration of folklore medicines in other parts of the country and abroad (Bhattarai et al., 2005; Singh et al., 2012; Lulekal et al., 2013; Luitel et al., 2014; Malla et al., 2015).

Factor of informant's consensus (FIC)

Factor of informant's consensus provides a measure of reliability for the given claim of evidence in the ethnomedicinal studies (Malla&Chhetri, 2012). Different 16 human ailment categories were found in the study area which was used to treat by using medicinal plants (Table 1).

Table 1: Different human ailment categories, ailments and number of MPs used.

S.N.	Ailment category	Ailments	Number of species used
1	Cardio-vascular disorders	High blood pressure, Rheumatic heart diseases	3
2	Cough and cold	Common cold, Cough	4
3	External injuries/ bleeding	Cuts, wounds, Burns	12
4	Gastrointestinal, parasitic and hepatobiliary disorders	Gastritis, Stomachache, Indigestion, Diarrhea, Dysentery, Worm, Tapeworm, Jaundice	12
5	Oral, Dental and ENT	Mouth infection, Toothache, Ear infection, Sore throat, Tonsillitis, Sinusitis, Foreign body in throat	7
6	Pulmonary disease	Pneumonia	5
7	Dermatological problems	Ringworm, Itch	2
8	Ophthalmological disorder	Eye infection, Keratitis	1
9	Poisoning	Snake bite	1
10	Gynecological disorders	Post-natal mother, Lactation stimulant, Abortion, Menstruation problems	4
11	Musculo-skeletal disorders	Cracks and fractures, Body pain, Sprain	6
12	Urinary system disorders	Urination blockade	1
13	Glandular problem	Mumps	1
14	Nutritional disorders	Tonic	2
15	Headache/fever	Headache, Fever	2
16	Cancer	Cancer	1

The FIC value for each ailment categories was calculated (Table 2). The result of the FIC showed that there was greater agreement in most of the categories with more than 0.80 FIC value. Ophthalmological problems, poisoning, urinary system disorder and cancer had got highest value of FIC with 1. These ailments were followed by headache and fever with FIC value 0.98 indicating great agreement among the informants. The least agreement between the informants was recorded in the pulmonary diseases and musculo-skeletal disorders with 0.43 and 0.55 FIC value respectively.

In present study the value of FIC ranged from 0.43-1. More than 62.5% values of FIC were found to be more than 0.8 indicating more agreement among the informants. This higher level of consensus among them about the use of particular taxa for curing ailments in the study area indicates ethnomedicinal use of plants is in practice (Singh et al., 2012; Shrestha et al., 2014). But for pulmonary diseases, use of plants is varied among the informants obtaining FIC value lowest (0.43). Hence some of ailment categories like pulmonary diseases, external injuries and gastrointestinal disorder had shown lower FIC value signifying less common use of medicinal plants for treating them. It also might be due to less communication and exchange

of knowledge among Tamang people caused due to modernization, less interest and faith of medicinal plants by young generation. Musculoskeletal ailment category had also lower FIC value (0.55) which was accordance with findings of Malla et al. (2015). Also it indicates these ailment categories may be more frequent in the study area as in other studies (Shrestha et al., 2014; Malla et al., 2015) for which people may have developed their own way to treat them by exploring therapeutic strength of many species.

Preference ranking among 57 listed MPs

Out of 40 respondents, 15 were asked to give the rank from 1 to 5 for each cited medicinal plants. Ranking was based on both local use value and trade value. Rank value '1' was for least useful plant or least traded plant which accordingly increases with increasing value i.e., 5 for most useful or most traded species (Table 3). Six species viz. *Swertia chirayita* (67), *Paris polyphylla* (65), *Taxus wallichiana* (63), *Gaultheria fragrantissima* (61) and *Bergenia ciliata* (61), *Astilberivularis* (60) got the average rank value more than 60 which considered them as most preferred species. The lowest rank value was obtained 24 for *Agapetes* sp. indicating that as the least useful or traded species.

Table 2: FIC values for different ailment categories. (Manandhar, 1991)

S.N.	Ailment category	Use reports (Nur)	Number of taxa (Nt)	FIC
1	Ophthalmological disorder	12	1	1
2	Poisoning	4	1	1
3	Urinary system disorders	4	1	1
4	Glandular problem	4	1	1
5	Cancer	12	1	1
6	Headache/fever	36	2	0.98
7	Nutritional disorders	20	2	0.95
8	Dermatological problems	8	2	0.86
9	Cardio-vascular disorders	12	3	0.82
10	Cough and cold	16	4	0.8
11	Oral, Dental and ENT	24	7	0.74
12	Gynecological disorders	12	4	0.73
13	Gastrointestinal, parasitic and hepatobiliary disorders	30	12	0.63
14	External injuries/ bleeding	28	12	0.6
15	Musculo-skeletal disorders	12	6	0.55
16	Pulmonary disease	8	5	0.43

Conclusions

Present study revealed 57 medicinal plants including one lichen and one fungi species were used to treat 42 human ailments including three animal ailments. Knowledge of plant utilization for treatment of different ailment in Tamang community was profound but at present it was less in practice due to modernization and lesser faith of local healing system by young generation. However, elder people have retained their knowledge of plant utilization. As the knowledge was limited to few healers and elder people, informant's consensus was varied from less to high (0.43-1).

Though the area was rich in number of useful and valuable medicinal plants, most of local people were quite unknown about them and they were involved in illegal collection (For e.g. *Allium wallichii*, *Pleione*

praecox and *Trichosanthes tricuspidata*), awareness programs and trainings regarding identification, conservation and long-term utilization of potential medicinal plants were needed urgently.

Author Contributions

A.P. Dhital, S. Karki and S. Kafle collected all the data in the field, interviewed, conducted the research and handled the data. M. Paudel outlined the manuscript. M. Siwakoti and D. Lamichhane reviewed the manuscript. All authors read and approved the final manuscript.

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Table 3: List of total medicinal plants used by Tamang community of Jungu, Dolakha. (* Cultivated species)

S.N.	Scientific name	Family	Local name(s)	Collection number	Habit	Parts used	Diseases	Mode of preparation and use
1	<i>Agapetes</i> sp.	Ericaceae	Tolarke		Herb	Tuber (Rin)	Placenta removal (Sathi Jhareko)	Cooked
2	<i>Ageratina adenophora</i> (Spreng.) R. King & H. Rob.	Asteraceae	Banmara	D007	Herb	Leaves (Lapitelaba), shoots	Cuts (Thajji), Wounds (Por)	Juice
3	<i>Allium sativum</i> L.	Amaryllidaceae	Bhotelasun, Bot-Nho (Tam.)		Herb	Tuber (Rin)	Ringworm (daad)	Paste
4	<i>Allium wallichii</i> Kunth.	Amaryllidaceae	Ban lasun, Chilime (Tam.)		Herb	Tuber (Rin)	Cough and Cold (Sorang-Syapchim)	Decoction
5*	<i>Aloe vera</i> (L.) Burm.f.	Asphodelaceae	Ghyukumari		Herb	Leaves (Lapitelaba) latex	Burns (MeseKroji)	Juice
6	<i>Anemone</i> sp.	Ranunculaceae	Tinpate	D009	Herb	Leaves (Lapitelaba)	Sinusitis	Juice, smell
7	<i>Argentina lineate</i> (Trevir.) Soják	Rosaceae	Mulapate/Banmula	D010	Herb	Root (Rin)	Gastritis (Phokroji), Worm (Juka), Tonsillitis (Ghati Dukheko)	Juice
8	<i>Arisaema</i> sp.	Araceae	Bako		Herb	Tuber (Rin)	Wounds (Por), Mumps	Paste
9	<i>Artemisia indica</i> Willd.	Asteraceae	Titepati, Thamja (Tam.)	D011	Herb	Shoots	Rheumatic disease (Sul)	Juice, To worm
10	<i>Asparagus racemosus</i> Willd.	Asparagaceae	Kurilo	D012	Herb	Tuber (Rin)	Lactation promoter (Dudh Badhaune)	Cooked
11	<i>Astilbe rivularis</i> Buch.-Ham. ex D. Don	Saxifragaceae	Thulookhati	D001	Herb	Rhizome (Rin)	Post-natal mother (Sutkeri), tonic (Tagat dine), Body pain (Jiu Dukheko)	Decoction
12	<i>Mahonia napaulensis</i> DC.	Berberidaceae	Lekchutro		shrub	Bark (Pako), Stem (Sing)	Eye infection (Mi Minji)	Paste
13	<i>Bergenia ciliata</i> (Haw.) Sternb.	Saxifragaceae	Pakhamved, Baramendo (Tam.)	D002	Herb	Rhizome (Rin)	Post-natal mother (Sutkeri), tonic (Tagat dine), Body pain (Jiu Dukheko)	Decoction
14	<i>Buddleia asiatica</i> Lour.	Scrophulariaceae	Bhimsepati	D014	Tree	Root (Rin)s	Pneumonia (Dokh)	Juice
15	<i>Camabis sativa</i> L.	Cannabaceae	Gaja	D015	Herb	Leaves (Lapitelaba)	Undigestion in animal (Dhadayako)	Raw
16	<i>Centella asiatica</i> (L.) Urb.	Apiaceae	Ghodtapre, Ghodpaite (Tam.)	D016	Herb	Shoots	Throat pain, Tonsillitis, Pneumonia (Dokh)	Juice, Raw
17	<i>Chlorophytum nepalense</i> (Lindl.) Baker	Asparagaceae	Tite	D017	Herb	Root (Rin), Flower (Mendo)	High Blood Pressure	Decoction
18	<i>Cirsium vertutum</i> (D. Don) Spreng.	Asteraceae	Sugurekanda	D019	Herb	Root (Rin)	Placenta removal (Sathi Jhareko)	Juice
19	<i>Clematis buchananiana</i> DC.	Ranunculaceae	Sinusitiselahara	D020	Climber	Shoots	Sinusitis	Juice, Powder, Smell
20*	<i>Curcuma aromatic</i> Salisb.	Zingiberaceae	Besar		Herb	Rhizome (Rin)	Cold and cough (Sorang-Syapchim)	Powder, decoction
21	<i>Cuscuta cassioides</i> Nees	Convolvulaceae	Aakashbela	D021	Parasite	Whole Plant (Dhong)	Jaundice (Harital)	Juice
22	<i>Gaultheria fragrantissima</i> Wall.	Ericaceae	Machhimo, Chajaj (Tam.)	D003	shrub	Shoots, Leaves (Lapitelaba)	Sprain (Thokiyako, Markoko), Body pain (Jiudukhnu)	Oil extract
23	<i>Geranium</i> sp.	Geraniaceae	Pachamle	D028	Herb	Leaves (Lapitelaba)	Pneumonia (Dokh)	Juice
24	<i>Hydrocotyle nepalensis</i> Hook.	Apiaceae	Firkejar	D030	Herb	Whole Plant (Dhong)	Snake bite	Juice, paste
25	<i>Hypericum elodeoides</i> Choisy.	Hypericaceae	Mandanejar	D031	Herb	Shoot	Cuts (Thajji), Wounds (Por)	Juice

S.N.	Scientific name	Family	Local name(s)	Collection number	Habit	Parts used	Diseases	Mode of preparation and use
26	<i>Ixeridium</i> sp.	Asteraceae	Kampate	D062	Herb	Leaves (Lapitelaba)	Ear infection (minji)	Juice
27	<i>Leucoscepterum canum</i> Sm.	Lamiaceae	Ghurmis	D033	Tree	Root (Rin)	Throat pain (Ghatidukhnu)	Juice
28	Lichen	Lichen	Seiojhyau		Lichen	Whole Plant (Dhong)	Cuts (Thajji), Wounds (Por)	Powder
29	<i>Lindera neesiana</i> (Wall. ex Nees) Kurz	Lauraceae	Siltmur	D034	Tree	Fruit (Rojim)	Undigestion (Dhadiyako)	Decoction
30	<i>Morella esculenta</i> (Buch.-Ham. ex D. Don) I.M. Turner	Myricaceae	Kafal, Namin (Tam.)	D037	Tree	Bark (Pako)	Sinusitis, Gastritis (Phokroji), Bone fracture (Kichchi)	Paste, Powder, smell
31	<i>Nicotiana tabacum</i> L.	Solanaceae	Kachopat		Herb	Leaves (Lapitelaba)	Lice in animal (Jumra)	Juice
32	<i>Oreoseris</i> sp.	Asteraceae	Jhulo	D063	Herb	Root (Rin)	Worms in animals (Juka)	Raw
33	<i>Oroxylum indicum</i> (L.) Kurz	Bignoniaceae	Totala, Ko-Mendo (Tam.)		Tree	Seeds	Pneumonia (Dokh)	Paste
34	<i>Oxalis corniculata</i> L.	Oxalidaceae	Chari amilo, Sakirbu (Tam.)	D038	Herb	Shoot	Cuts (Thajji), Wounds	Juice
35	<i>Paris polyphylla</i> Sm.	Melanthiaceae	Satuwa, Tintalebako (Tam.)	D004	Herb	Rhizome (Rin)	Cuts (Thajji), Gastritis (Phokroji) (Gastic)	Paste, powder
36	<i>Pouzolzia sanguinea</i> (Bulme) Merr.	Urticaceae	Chiple	D039	Herb	Root (Rin), Leaves (Lapitelaba)	Urination blockade (Niranja)	Juice
37	<i>Prunus cerasoides</i> D. Don	Rosaceae	Paiyu, Sinwa (Tam.)	D040	Tree	Fruit (Rojim), Bark (Pako)	Tapeworm (Name), Bone fracture (Kichchi)	Raw, paste
38	<i>Rheum australe</i> D. Don	Polygonaceae	Padamchal, Chhurcha (Tam.)		Herb	Rhizome (Rin)	Sprain (Markeko), Body pain (Jiudukheko)	Boiled paste
39	<i>Rhododendron arboretum</i> Sm.	Ericaceae	Laligurans, Paramendo (Tam.)	D044	Tree	Flower (Mendo)	Foreign body in Throat (Ghatima Machhako Kadaadkeko)	Powder
40	<i>Rubia majith</i> Roxb.	Rubiaceae	Majitho/Machhito	D045	Climber	Shoots	Cuts (Thajji)	Juice
41	<i>Rubus ellipticus</i> Sm.	Rosaceae	Ainselu, Pulung (Tam.)	D046	shrub	Root (Rins)	Bone fracture (Kechehi), Pneumonia (Dokh)	Juice, paste
42	<i>Rumex nepalensis</i> Spreng.	Polygonaceae	Halhale	D048	Herb	Root (Rin)	Ringworm (daad)	Juice
43	<i>Scindapsus officinalis</i> (Roxb.) Schott	Araceae	Kanehirnu	D051	Climber	Stem (Sing)	Bone fracture (Kichchi)	Paste
44	<i>Smilax purhanpuy</i> Ruiz	Smilacaceae	Kukurdaino		Climber	Stem (Sing), Root (Rin)	wand evil spirit (AakhalAgeko), Abortion (Garbhapatan)	Raw
45	<i>Solena amplicaulis</i> (Lam.) Gandhi	Cucurbitaceae	Golkakro, Golikakro	D053	Climber	Fruit (Rojim), Root (Rin)	Throat pain (Ghatidukhnu), Stomatitis (Mu minji)	Raw, paste
46	<i>Stellaria media</i> (L.) Vill.	Caryophyllaceae	Maurejhar		Herb	Shoots	Cuts (Thajji), Wounds (Por)	Juice
47	<i>Swertia chirayita</i> (Roxb.) H. Karst.	Gentianaceae	Chiraito, Timba (Tam.)	D005	Herb	Whole Plant (Dhong)	Headache (Taulko Dukheko), Fever (Iwato Kahiji), Body pain (Jiu Dukheko)	Decoction
48*	<i>Tagetes erecta</i> L.	Asteraceae	Sayapatri, Mendo (Tam.)		Herb	Flower (Mendo)	Pneumonia (Dokh)	Juice
49	<i>Taxus wallichiana</i> Zucc.	Taxaceae	Lauthsalla, Dhyangre (Tam.)	D006	Tree	Stem (Sing), Bark (Pako)	Cancer, Gastritis (Phokroji)	Decoction
50	<i>Trametes versicolor</i> (L.) Lloyd	Polyporaceae	Ratochyau, WalaSyamu (Tam.)		Fungi	Fruit (Rojim)ing body	Dysentery (Chhirwarutpa)	Cooked
51*	<i>Trigonella foenum-graecum</i> L.	Leguminosae	Methi	D056	Herb	Seed	Bone fracture (Kichchi)	Paste
52	<i>Urtica dioica</i> L.	Urticaceae	Sisno	D068	Herb	Root (Rin)/Shoot	Bone fracture (Kichchi), High blood pressure	Paste, cooked

S.N.	Scientific name	Family	Local name(s)	Collection number	Habit	Parts used	Diseases	Mode of preparation and use
53	<i>Viola sp.</i>	Violaceae	Kalajhar, Dotarma (Tam.)	D059	Herb	Leaves (Lapilaba)	Cuts (Thaji) Wounds (Por)	Juice
54	<i>Viscum album L.</i>	Santalaceae	Harichur	D060	Parasite	Whole Plant (Dhong)	Bone fracture (Kichchl)	Paste
55	<i>Xanthium strumarium L.</i>	Asteraceae	Bhedekuro		Herb	Root (Rin)	Dysentery (Chhirwarutpa)	Juice
56	<i>Zanthoxylum acanthopodium DC.</i>	Rutaceae	Timur, Promo (Tam.)	D061	Tree	Fruit (Rojim)	Toothache (Dat Dukheko), Indigestion (Dhadiyako)	Powder, decoction
57*	<i>Zingiber officinale Roscoe</i>	Zingiberaceae	Aduwa		Herb	Rhizome (Rin)	Cold and cough (Sorang-Syapchim)	Decoction

Table 4: Rank given by each respondent to 57 cited medicinal plants by 15 respondents.

S.N.	Accepted scientific name	Rank based on Local use															Score	Rank
		R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15		
1	<i>Swertia chirayta</i> (Roxb.) Karst.	5	4	4	5	4	5	4	4	5	4	4	4	5	4	5	67	1 st
2	<i>Paris polyphylla</i> Sm.	5	4	4	5	4	4	3	4	4	4	3	4	5	4	4	65	2 nd
3	<i>Taxus wallichiana</i> Zucc.	4	5	4	5	5	4	5	4	3	4	4	4	3	4	4	63	3 rd
4	<i>Bergenia ciliata</i> (Haw.) Sternb.	4	4	4	3	5	3	4	3	4	5	4	4	5	4	4	61	4 th
5	<i>Gaultheria fragrantissima</i>	4	5	4	4	5	4	5	4	4	3	4	4	3	4	3	61	4 th
6	<i>Astilbe rivularis</i> Buch.-Ham. ex D. Don	4	3	4	5	4	4	3	3	5	4	4	4	5	4	4	60	5 th
7	<i>Zanthoxylum acanthopodium</i> DC.	5	4	3	4	5	4	3	4	4	4	3	3	4	3	4	59	6 th
8	<i>Scindapsus officinalis</i> (Roxb.) Schott	4	3	3	4	4	5	4	5	4	4	3	3	4	4	4	58	7 th
9	<i>Viscum album L.</i>	3	2	3	4	3	4	4	5	4	5	5	4	3	4	4	56	8 th
10	<i>Zingiber officinale</i> Roscoe	3	4	4	4	3	4	2	4	3	4	5	4	5	4	4	56	8 th
11	<i>Solena amplexicaulis</i> (Lam.) Gandhi	3	4	3	2	5	4	4	4	3	4	4	4	4	3	3	55	9 th
12	<i>Trametes versicolor</i> (L.) Lloyd	4	3	4	3	3	4	3	4	4	4	5	3	3	3	3	55	9 th
13	<i>Prunus cerasoides</i> D. Don	3	2	3	2	4	5	4	4	3	4	4	4	3	4	4	54	10 th
14	<i>Urtica dioica</i> L.	4	4	3	3	2	3	4	4	3	4	5	3	4	4	4	54	10 th
15	Lichen	3	4	5	5	2	3	2	4	2	3	4	3	4	4	5	52	11 th
16	<i>Lindera neesiana</i> (Wall. ex Nees) Kurz	4	2	3	4	4	3	4	4	4	3	4	3	3	3	3	51	12 th
17	<i>Morella esculenta</i> (Buch.-Ham. ex D. Don) I.M.Turner	5	3	4	5	3	4	3	2	3	2	3	4	4	3	3	51	12 th
18	<i>Rubus ellipticus</i> Smith	3	2	3	4	4	4	3	4	3	3	4	4	3	4	3	51	12 th
19	<i>Rheum australe</i> D. Don	5	4	3	4	3	4	3	2	3	4	3	3	2	3	3	49	13 th
20	<i>Viola sp.</i>	2	3	3	4	3	2	4	3	4	3	4	4	3	3	3	48	14 th
21	<i>Tagetes erecta</i> L.	2	3	3	4	3	2	3	4	4	3	3	3	2	4	4	47	15 th
22	<i>Trigonella foenum-graecum</i> L.	3	4	4	2	2	3	4	4	3	4	3	2	3	3	3	47	15 th

S.N.	Accepted scientific name	Rank based on Local use															Score	Rank			
		R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15					
23	<i>Clematis buchananiana</i> DC.	2	3	2	3	2	4	3	3	4	3	4	3	4	2	4	4	3	4	46	16 th
24	<i>Rhododendron arboreum</i> Sm.	4	3	3	4	4	3	2	3	4	3	4	3	4	2	3	3	2	3	46	16 th
25	<i>Pouzolzia sanguinea</i> (Bulme) Merr.	2	1	3	4	4	3	3	2	3	4	3	3	4	3	3	4	3	3	45	17 th
26	<i>Smilax purhampuy</i> Ruiz	3	2	3	5	3	3	4	3	3	4	3	3	2	3	4	2	3	2	45	17 th
27	<i>Aloe vera</i> (L.) Burm.f.	2	3	3	2	3	3	2	4	4	2	3	4	4	3	4	2	3	2	44	18 th
28	<i>Curcuma aromatica</i> Salisb.	3	3	4	2	3	4	4	2	3	4	2	3	4	2	2	3	3	2	44	18 th
29	<i>Argentina lineate</i> (Trevir.) Soják	4	3	3	3	1	2	2	3	4	2	3	4	4	3	4	3	2	3	44	18 th
30	<i>Asparagus racemosus</i> Willd.	2	3	3	4	4	2	2	3	3	2	3	3	2	3	4	3	2	3	43	19 th
31	<i>Cirsium verutum</i> (D. Don) Spreng.	3	2	2	4	3	3	2	2	3	2	3	4	3	3	3	4	3	2	43	19 th
32	<i>Cuscuta cassytoidea</i> Nees	2	3	3	2	2	3	4	3	3	2	3	3	2	2	3	4	4	3	43	19 th
33	<i>Berberis napolensis</i> (DC.) Spreng.	2	3	2	3	3	2	3	4	3	2	4	3	3	2	4	3	2	4	43	19 th
34	<i>Rumex nepalensis</i> Spreng.	2	3	3	2	3	3	2	4	3	2	4	3	2	3	2	4	3	4	43	19 th
35	<i>Centella asiatica</i> (L.) Urb.	4	3	3	3	2	2	3	3	4	3	3	3	4	3	3	3	2	2	42	20 th
36	<i>Hydrocotyle nepalensis</i> Hook.	3	3	2	3	3	4	3	3	2	3	3	3	2	3	2	2	3	3	42	20 th
37	<i>Stellaria media</i> (L.) Vill.	3	2	3	2	2	4	3	2	2	4	3	2	2	2	4	3	3	4	42	20 th
38	<i>Rubia manjith</i> Roxb.	2	2	2	1	3	2	4	3	2	4	3	2	2	3	2	4	4	4	41	21 st
39	<i>Artemisia indica</i> Willd.	3	3	2	2	3	3	2	3	3	2	3	3	3	2	4	2	3	2	40	22 nd
40	<i>Cannabis sativa</i> L.	2	3	3	2	3	4	3	2	2	3	2	2	2	2	2	3	3	4	40	22 nd
41	<i>Chlorophytum nepalense</i> (Lindl.) Baker	2	3	2	2	1	2	3	3	2	3	2	4	2	2	2	3	4	4	39	23 rd
42	<i>Allium wallichii</i> Kunth	2	3	3	2	2	2	3	2	3	2	3	2	3	2	2	3	3	3	38	24 th
43	<i>Ixeridium</i> sp.	3	2	3	2	2	2	1	3	3	3	3	3	4	2	2	3	2	3	38	24 th
44	<i>Allium sativum</i> L.	2	3	3	4	2	2	3	2	2	3	2	3	3	3	3	1	2	2	37	25 th
45	<i>Nicotiana tabacum</i> L.	3	2	2	1	2	2	3	2	3	2	3	3	2	2	2	3	2	4	36	26 th
46	<i>Oxalis corniculata</i> L.	2	3	3	2	2	3	2	3	1	2	3	1	2	2	3	3	2	3	36	26 th
47	<i>Oreoseris</i> sp.	2	3	3	2	2	3	3	2	2	3	2	2	3	1	1	2	2	3	34	27 th
48	<i>Xanthium strumarium</i> L.	2	3	3	1	1	2	3	3	2	3	2	3	2	2	2	3	1	3	34	27 th
49	<i>Leucosceptum canum</i> Sm.	2	2	2	3	2	3	2	2	2	2	2	1	2	2	2	3	1	2	31	28 th
50	<i>Oroxylum indicum</i> (L.) Kurz	3	3	1	2	1	2	2	1	2	2	2	2	3	2	2	2	3	2	31	28 th
51	<i>Ageratina adenophora</i> (Spreng.) R. King & H. Rob.	1	2	2	3	3	2	3	2	3	2	3	1	1	2	2	2	2	1	30	29 th
52	<i>Arisaema</i> sp.	1	2	2	1	1	2	1	3	3	2	3	2	3	2	2	2	2	1	28	30 th
53	<i>Geranium</i> sp.	1	2	2	1	2	3	2	2	1	2	2	2	2	1	1	2	3	2	28	30 th
54	<i>Anemone</i> sp.	2	2	3	1	2	2	1	2	1	2	1	2	1	1	1	1	2	3	26	31 st
55	<i>Buddleja asiatica</i> Lour.	2	3	2	1	1	2	1	2	2	1	2	1	1	2	1	1	3	2	26	31 st
56	<i>Hypericum elodeoides</i> Choisy.	2	1	2	2	1	1	2	2	2	3	2	2	2	1	1	2	2	1	26	31 st
57	<i>Agapetes</i> sp.	1	2	2	1	2	2	1	1	1	2	1	2	1	1	1	2	2	3	24	32 nd