Ethnomedicinal Plant Resources of Tamang Community in the Konjyosom Rural Municipility, Lalitpur District, Nepal

Ratna Silwal Gautam, Sudha Joshi Shrestha and Ila Shrestha

Correspondence

Ratna Silwal Gautam*, Sudha Joshi Shrestha and Ila Shrestha

Department of Botany, Patan Multiple Campus, Patan Dhoka, Lalitpur, Nepal.

*Corresponding Author: silwalratna@gmail.com

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Research

Abstract

Background: In Nepal, plant resources play an important role in the health of local communities. However, in many parts of the country, this role and its patterns are understudied. The purpose of this study was to document medicinal plant species and assess their use among the Tamang community in Lalitpur district, Central Nepal.

Methods: Ethnomedicinal information was collected through focus group discussions, semi structured interviews with local peoples and key informants from the Tamang community using rapid rural appraisal tools (RRA) across the five wards vz. Nallu, Chaughare, Bhardew, Dalchoki and Sankhu of the Konjyosom rural municipality. Botanical voucher samples were collected for scientific identification. The quantitative data were analyzed for informants consensus factor (ICF), relative frequency of citation (RFC) and fidelity level (FL).

Results: A total of 176 plant species were recorded under 82 families and 158 genera as medicinal to treat different ailments. Among them, 169 species were angiosperms, one gymnosperm and six pteridophytes. Herbs (78 spp.) occurred most frequently in the study area, and the leaves (38 spp.) were commonly foraged. The most common route of consumption was oral (98 spp.) and the paste (36 spp.) was frequently administered. The majority of the species (58%) were collected from the forest. The ICF value ranged from 0.26 (digestive) to 0.97 (respiratory). The RFC value for species ranged from 0.01 to 0.87 and *Curcuma longa* has the highest value of 0.87. The FL index ranged from 42.86% to 100% and the most preferred medicinal plant species was *Curcuma longa* with the FL index of 51% which was used to treat cuts, wounds and common cold.
Conclusion: Medicinal plants have played a significant role in the health care of local people. This study provides a comprehensive documentation of ethnomedicinal plant species using among the Tamang community of Konjyosom rural municipality, Lalitpur district. This study concluded that it is necessary to document and preserve biodiversity and its associated knowledge, which may lead to additional research activities.

Keywords: Ethnic people; Ethnobotanical, Informants, Interview

Background

The term ethnobotany was first coined by John W. Harshberger as the study of the interaction between people, plants, and culture (Harshberger 1896). Ethnobotany includes ethnomedicine, which is a collection of empirical local practices rooted in local and indigenous knowledge systems (Bussmann & Sharon 2006). Presently, ethnobotany has become increasingly valuable in the development of health care and conservation programs in different parts of the world. Ethnomedicine is associated with the study of traditional medicine practices and is being recognized

worldwide due to the support in formulation and innovation of various modern medicines (Acharya & Acharya 2009, Acharya 2012, Umair *et al.* 2017). It is a suitable source of information regarding useful medicinal plants that can be targeted for sustainable domestication and management (Njoroge *et al.* 2004). The use of plants as medicine is slowly increasing in the developed world (Bernal *et al.* 2011) because they have minor or no side effects (Jordan *et al.* 2010).

From time immemorial many medicinal plants are well known in Nepal for various ailments (Bhattarai & Basukala 2016). The number of flowering plants enumerated in Nepal is 6,973 species of angiosperm and 26 species of gymnosperm (MoFSC 2014). Kunwar *et al.* (2022) recorded 1,762 medicinal plants from 77 districts of Nepal. In context of Nepal, ethnobotany study started when Banerji (1995) published a paper on medicinal and food plants from east Nepal. Since 1980s there has been exhaustive ethnobotanical work is going on. Plant resources are still being used in many regions of Nepal to fulfill subsistence requirements or to market as edible fruits, vegetables, fodder, medicinal herbs, and raw materials for home construction and domestic products. Tamang is one of the major ethnic community comprising 5.8% (1,539,830) of the total population in Nepal and 13.1% (468,132) of total population in Lalitpur district (NPHC 2011). Only few ethnobotanical studies have been conducted among the Tamang community in different parts of Nepal and very few ethnobotanical studies have been conducted in Lalitpur district. The ethmedicinal studies carried out among the Tamang community of Nepal are tabulated in Table 1. Tamang people comprise a majority of population in the Konjyosom rural municipality. The traditional medical practice is in danger of extinction on a local and regional level due to a lack of documentation and a shift in lifestyle (Rajbanshi & Thapa 2019). The present study aims to document the ethnomedicinal knowledge of Tamang people in the treatment of various human diseases and analyze the ethnobotanical parameters quantitatively viz. Informant Consensus Factor (ICF), Relative Frequency of Citation (RFC) and Fidelity Level (FL).

Table 1. Ethnomedicinal studies carried out on Tamang ethnic groups in Central Nepal

References	Location	Plant diversity
Shrestha & Joshi (1993)	Lele, Lalitpur district	51 species from 31 families
Malla & Chhetri (2009)	Kavrepalanchok district	58 species from 37 families and 59 genera
Upreti *et al.* (2010)	Rasuwa district	53 species from 36 families
Luitel *et al.* (2014)	Makwanpur district	161 species from 86 families and 144 genera
Shrestha *et al.* (2014)	Rasuwa district	46 species from 26 families
Shah *et al.* (2018)	Dhading district	81 species from 50 families and 78 genera
Joshi *et al.* (2020)	Makwanpur district	189 species from 78 families and 164 genera
Nepali *et al.* (2020)	Nuwakot district	45 species from 24 families and 36 genera
Dhital *et al.* (2021)	Dolakha district	57 species from 38 families and 55 genera
Maharjan *et al.* (2021)	Lalitpur district	50 species from 27 families

Materials and Methods

Study area

The study was conducted in the Konjyosom rural municipality of Lalitpur district, a rural village of Lalitpur district, located in Bagmati province, Central Nepal (Figure 1). The Konjyosom rural municipality is located in the southern part of Lalitpur district and is bordered by Godawary municipality on the north, Godawary municipality and Bagmati rural municipality on the west, Bagmati and Mahankal rural municipality on the south and Mahankal rural municipality and Kavrepalanchok district on the east. The municipality covers an elevational range of 1053 m to 2619 m above sea level (asl) with a geographical area of 44.16 km^2. It lies between 27°28′36" to 27°33′39" N latitude and 85°18′27" to 85°24′23" E longitude. The average annual temperature and rainfall in this rural municipality is 14.8˚C and 1697 mm respectively. The name of this municipality 'Konjyosom' literally means the 'God Buddha' in Tibetan language. The municipality includes five wards viz. Bhardew, Nallu, Chaughare, Dalchoki and Sankhu. The Konjyosom rural municipality had a population of 9709 of which 4596 were men and 5113 were women. The major ethnic groups are Tamang (75.78%), Brahmin (13.91%), Chhetri (2.83%), Newar (2.24%), Magar (2.30%) and Pahari (1.44%) (Konjyosom Rural Municipality 2019).

Indigenous communities are those that live close to nature have their own cultural practices, and speak their own mother tongue. Tamang is one of Central Nepal's most powerful indigenous communities, Tamang (Ta = horse and Mang = trader) means horse traders and accounts for 5.8% of the nation's total population (NPHC 2011). Previously,

Tamang community fulfill their different requirements from plants (Manandhar 2002). The Tamang community are reported to have good indigenous knowledge of using wild plants for various purposes, most importantly as wild edible fruits and medicinal value (Nepali *et al.* 2020). In this rural municipality, the major religion is Buddhism (63.37%) and 75.04% people speaks the Tamang language. The major festivals are Dashain, Tihar, Lhosar, Buddha Purnima, Maghi, Janai Purnima etc. In Konjyosom rural municipality, Tamang is the major ethnic group and found in all five wards of municipality. In ward number four, Nallu 93.44% of population is Tamang. Tamang people reside near the forest and depend upon agriculture and animal husbandary. They collect fodder, firewood and various medicinal plants from forest for the treatment of different types of human and livestock diseases (Konjyosom Rural Municipality 2019).

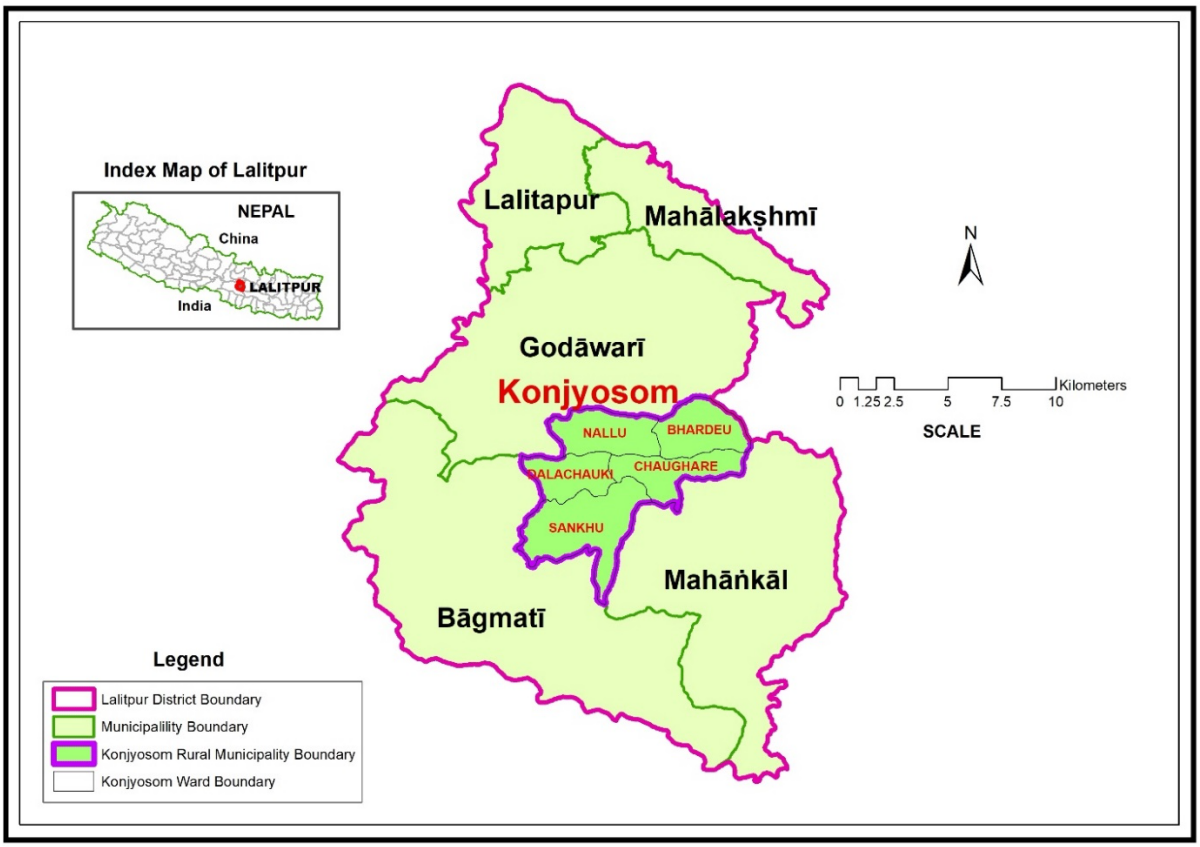

Figure 1. Map of the study area (Konjyosom rural municipality)

Field work and ethnobotanical data collection

The study was carried out during the period of March 2020 to April 2022. Field trips were made more frequently to gather information on the ethnomedicinal uses of plants in the research area. In order to get the consent for the study, a meeting with municipality authorities and ward representatives was held prior to the collection of data. The informants and members of the forest user groups of community forests also gave their verbal consent. Semi-structured open-ended questionnaires were prepared for the interview. The questionnaire was designed to collect information of the plants used by Tamang people such as local names of plants, uses, parts used, methods of preparation and method of application. Five focus groups, one in each of the rural municipality's five wards, and 203 semi-structured interviews with informants from the Tamang ethnic groups utilizing rapid rural appraisal tools (RRA) were used to gather ethnomedicinal data. The local healers were regarded as the key informants. There were 203 informants, 120 of whom were men and 83 of them were women. According to their ages, the informants in this study were divided into four groups: teenagers, young age, middle age and old age on the basis of their age (Dulal *et al.* 2022). Teenagers were defined as informants who were under the age of 20. Young age, middle age and old age were used to describe the informants who were between the ages of 20 and 40, 41 and 60 and above 60 respectively. According to the age group classification, 23% of the informants were over 60, 34% were between 41 and 60, 38% were between 20 and 40, and 10% were under 20 (Table 2). The overall age range of the informants was 15 to 79.

Among the total informants, 25% were illiterate, 43% of informants were with primary education, 21% with higher secondary level and only 10.5% with bachelor's and master's Degrees. Male informants made up 59% of the total compared to female informants with 41%. The distribution of informants by age, gender, and education level is shown in Table 2.

Table 2. Demographic structure of informants

Indicators	Category	No. of Informants	Percentage of informants
Age	Below 20	10	5
	20-40	77	38
	41-60	70	34
	Above 60	46	23
Gender	Male	120	59
	Female	83	41
Education	Illiterate	51	25
	Primary	88	43
	Higher secondary	43	21
	Bachelors	20	10.5
	Masters	1	0.5

In the group discussions, the names of the medicinal plants, the components utilized, and the mode of usage was confirmed. Local residents assisted in gathering the plant specimens. Field notes on taxonomic characteristics, such as local names, locations, habits, habitats, flower colors, blooming times, and specific character states, if any, were taken during the collection to aid in identification. Before storing the gathered specimens in polythene bags, they were appropriately identified with a field number. The gathered specimens were pressed between newspapers and dried according to procedure for herbarium specimen preparation (Jain & Rao 1967) and identified using standard herbarium specimens deposited in KATH (National Herbarium and Plant Laboratories, Godawary, Lalitpur) and literatures (GoN 1986, GoN 1969 and Malla 1976). The valid names of the plant specimens were identified by using the database www.ipni.org, www.theplantlist.org, www.worldfloraonline.org and www.tropicos.org.

Data analysis

The data gathered from the field trips was organized, classified, and analyzed in MS Excel 2010 into local names of the plants, families, life forms, parts utilized, modes of application, forms of usage, plant origin, and medical uses of the plants. Tables, bar graphs, and pie charts were used to display the results. A simple linear regression and Pearson correlation test was performed to observe the relationship between informants and number of plants described by them. Moreover, a chi-square test for independence was carried out to test for a significant difference between the genders and the number of plants described by them. All statistical analyses were performed in R version 4.0.3.

The different diseases categories were grouped into 17 categories (Adhikari *et al.* 2019, Joshi *et al.* 2020) following the classification of WONCA (World Organization of Family Doctors) WONCA International Classification Committee (2005). The use of plant resources as medicine was quantitatively assessed using the informant consensus factor (ICF), relative frequency of citation (RFC) and fidelity level (FL) according to the following mentioned equations.

***Informant Consensus Factor (ICF)*:**

The Informant Consensus Factor is the mathematical expression in ethnobotanical research work which was used to calculate the homogeneity in the information of informants. The Informant Consensus Factor (ICF) was calculated following Heinrich *et al.* (2009) to find out the homogeneity between information and informants.

$$\text{ICF} = \frac{Nur - Nt}{Nur - 1}$$

Where, ICF= Informant consensus factor, Nur = the number of use report in a particular disease category by informants, Nt= the number of taxa or species used to treat that particular category of diseases by informants.

***Relative Frequency of Citation (RFC)*:**

RFC is calculated to identify the plant species mostly used by the local people (Tardio & Pardo-de-Santayana 2008). The RFC value is '0' when no one refers to the plant as being useful and '1' when all the informants refer to the plant as being useful. RFC is calculated as

$$\text{RFC} = \frac{FC}{N}$$

Where, RFC= Relative Frequency of Citation, FC=Number of informants who reported the use of medicinal plant species, N=total number of informants took part in the survey.

***Fidelity Level (FL)*:**
The fidelity level (FL) index was calculated to check the most preferred plant species used to cure a particular ailment in the study area (Friedman *et al*. 1986). The FL value is higher for those plant species that are widely used by local people to treat a particular ailment.

$$\text{FL (\%)} = \frac{NP}{N}\ x\ 100\%$$

Results and Discussion

Ethnomedicinal knowledge

As regards the knowledge of ethnomedicinal resources in informants, teenagers aged below 20 are less interested in local sources in comparison to the elderly people. Among 203 informants, only ten informants under the age of 20 have shared their ethnomedicinal knowledge for treating different conditions, particularly respiratory disease. They shared their knowledge about the use of *Zingiber officinale*, *Curcuma longa*, *Tinospora sinensis* and *Ocimum tenuiflorum* for the treatment of Covid-19, common cold, cough and other influenza. Teenager's knowledge about those plants might be due to the popular use of those plants for immunity development during the recent Covid-19 pandemic. Moreover, according to the Pearson correlation (r = 0.797) and a linear regression (R^2 = 0.618), old - aged people were found to have a sound knowledge of medicinal plants in comparison to young people (Figure 2). The result showed that the traditional knowledge regarding the treatment of various diseases using the locally available plant resources were positively correlated with the age of local people. Such low knowledge on medicinal plants in younger generation and more knowledge in older generation was also reported by Luitel *et al*. 2014), Tamang *et al*. (2017), Dulal *et al*. (2022), Magar *et al*. (2022).

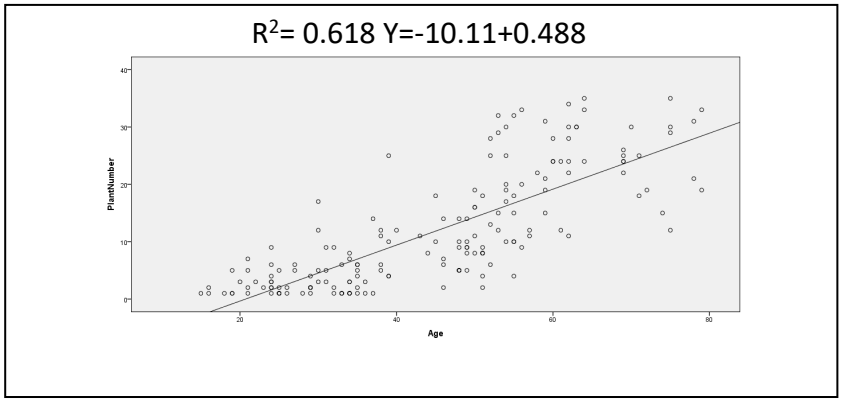

Figure 2. A simple linear regression between the age of informants and the number of plants described by informants

Further a significant difference (p-value < 0.00000021) between the men and women was observed regarding the number of medicinal plants described by the informants (Table 3). The study thus also revealed that women were more knowledgeable than men about the ethnomedicinal plants and their uses in the treatment of human diseases. The study done by Luitel *et al*. (2014) also reported the women as more knowledgeable on the ethnomedicinal plants. More ethnomedicinal knowledge on women could be because of most women in rural communities are involved in household activities and spend more time at home gathering wood, timber, local vegetables, and herbs (Voeks & Leony 2004, Dulal *et al*. 2022). Moreover, women during such household activities might have exchange their ethnomedicinal knowledge among themselves.

Table 3. Chi-square test between the genders and number of plants described by informants.

Plants number	Male	Female	
Number of plants described	126	167	X^2=22.45
Number of plants undescribed	50	9	p-value<0.0000002
Total number of plants	176	176	

Ethnomedicinal plant diversity

In the present study, a total of 176 plant species belonging to 82 families, and 158 genera are used by the Tamang community of the study area (Appendix 1). A total of 169 species of Angiosperms, six species of Pteridophytes and one species of Gymnosperm (*Pinus roxburghii*) were recognized as ethnomedicinal plants in the study area. Among the 176 ethnomedicinal plants, 78 species (44%) are herbs, 49 species (28%) are trees, 34 species (19%) are shrubs, and 15 species (9%) are climbers (Figure 3). Herbs are more commonly found and used as the main source of ethnomedicne. They are simple to gather and store (Shrestha & Dhillon 2003). Herbs were also the most prevalent growth form used by Tamang community in the Dolakha district, followed by trees, shrubs, and climbers (Dhital *et al.* 2021). Most species used in the traditional health care system of the Konjyosom rural municipality were harvested from forest (58%) followed by marginal land (22%), cultivated (15%) and Market (5%) (Figure 4.). The common practices of harvesting of ethnomedicinal plants all over Nepal as observed in eastern Nepal (Bhattarai & Khadka 2016), central Nepal (Joshi *et al.* 2020), western Nepal (Budhamagar *et al.* 2020) and far western Nepal (Kunwar *et al.* 2013) was also the same. As the study was conducted during the Covid-19 pandemic when the people were more aware of the values of using natural remedies, the findings revealed that plant resources such as *Cuminum cyminum*, *Trachyspermum ammi*, *Syzygium aromaticum*, and *Cinnamomum tamala* were even purchased from markets and used to treat common cold and cough.

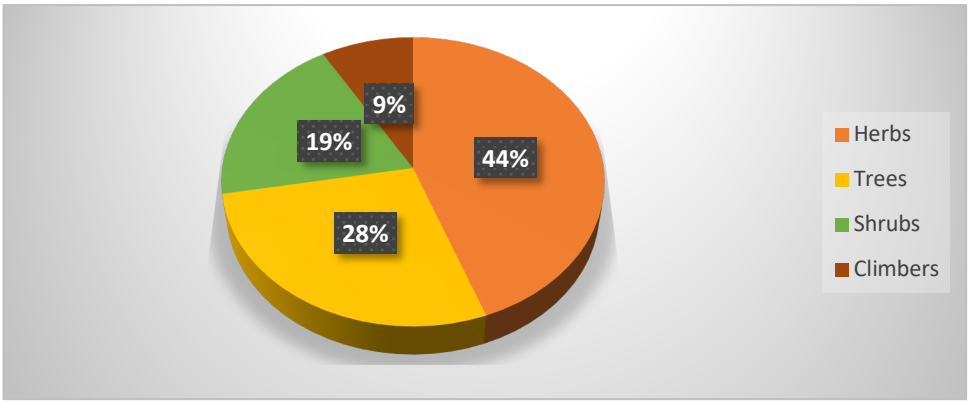

Figure 3. Life forms of ethnomedicinal plants

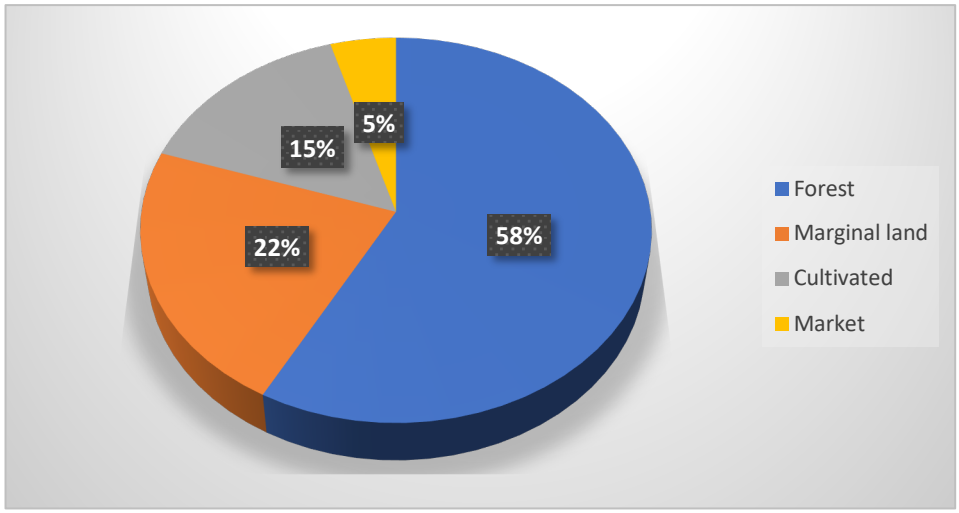

Figure 4. Sources of ethnomedicinal plant resources

The study revealed that Asteraceae was the largest family with 14 species followed by Fabaceae (9 species), Poaceae (7 species), Zingiberaceae (6 species), Amaranthaceae and Lamiaceae (5 species each) and Apiaceae, Euphorbiaceae

and Phyllanthaceae (4 species each). The families Amaryllidaceae, Anacardiaceae, Ericaceae, Menispermaceae, Myrtaceae, Orchidaceae and Solanaceae were the families having three species in each (Figure 5). Asteraceae was identified as the largest family with seven species used as ethnomedicinal by the Tamang community of the Dolakha district (Dhital *et al.* 2021). The study of Adhikari *et al.* (2019) and Bhatt *et al.* (2021) also revealed the predominance of ethnomedicinal plants from the families Asteraceae, Fabaceae and Poaceae. The widespread utilization of medicinal plant species from those families might be due to presence of diverse active phytochemicals in the form of alkaloids, terpenoids, flavonoids and phenols (Jan *et al.* 2011). The number of species representing the remaining families is given in Appendix 1.

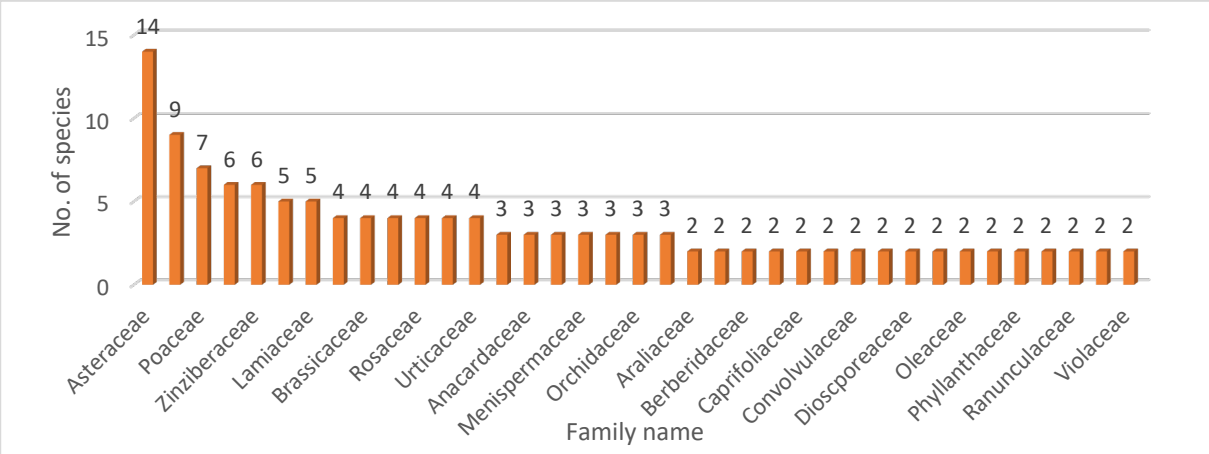

Figure 5. Most dominant families and the number of species in the study area

The plant parts used for treating different ailments were underground parts (roots/rhizomes/bulbs/tubers), young shoots, stem/barks/wood, leaves/petioles, flowers, fruits/seeds and resins. However, sometimes the whole plant was also used for medicinal purpose, particularly the herbs. The most frequently used part was leaves (38 spp.), followed by whole plants (23 spp.), fruits (20 spp.), twigs (17 spp.), rhizomes (12 spp.), bark (10 spp.), seeds (9 spp.), root (8 spp.), stem (8 spp.), tuber (6 spp.), flower (3 spp.), bulb (3 spp.), latex (2 spp.), resin, shoot, strobilus (1 sp.) and more than one parts are used in several other species (Figure 7). A chord diagram was used to show the relationship between plant growth forms and parts used (Figure 6). From this analysis of the chord diagram we could conclude that leaves and whole plant of herbs were the most frequently used parts whereas climbers were least chosen plant growth forms in the treatment of human diseases. The study showed that the Tamang people of Konjyosom rural municipality had used leaves vigorously for medicinal purposes. Leaves were the mostly used part for medicinal purposes in Dhading and Nuwakot districts (Shah *et al.* 2018; Nepali *et al.* (2021). However, the Tamang community in Makawanpur district was found to use mostly the fruits and leaves for medicinal purpose (Luitel *et al.* 2014). Similarly, a study carried out by Maharjan *et al.* (2021) in Lalitpur district found roots (underground parts) as widely used part in ethnomedicine, the harvesting of which is more unsustainable than leaves. The common uses of those parts for medicinal purpose are mainly because of presence of high percentage of bioactive compounds (Luitel *et al.* 2014). The use of leaves in preparation of ethnomedicine is more appreciable than other parts as the harvesting is more sustainable than other parts. The leaves are also reported to contain high concentration of biologically active substances compared to other parts (Srithi *et al.* 2009) which might be the reason for the use of leaves as important part and the removal of leaves or aerial parts is much more sustainable than other parts of plants (Giday *et al.* 2003).

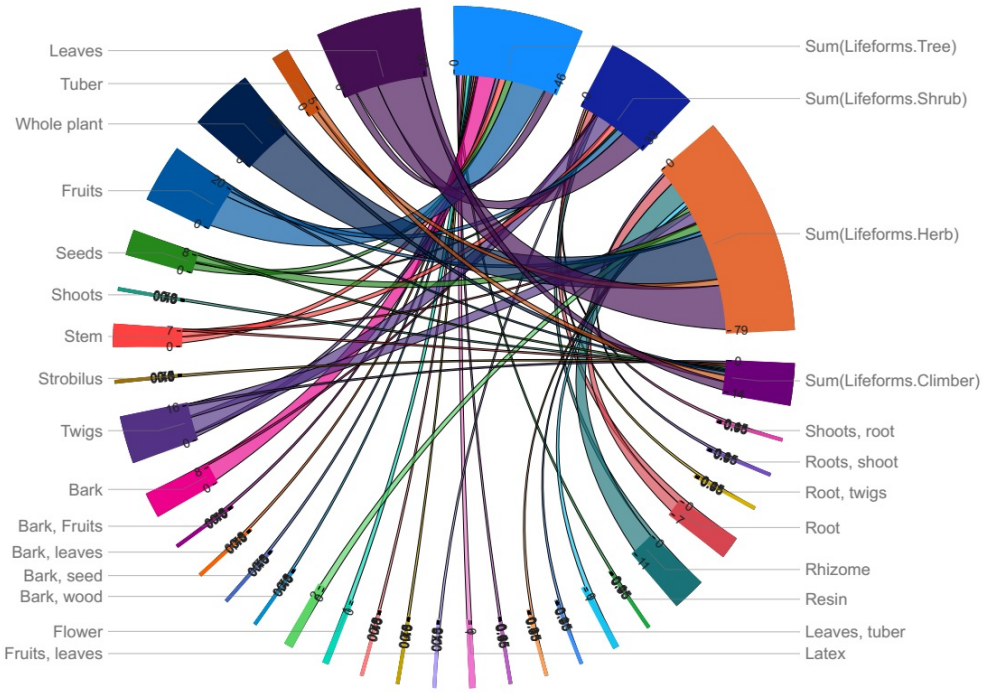

Figure 6. Chord diagram showing plant growth forms and parts used

The medical remedies were based on variety of preparation ranging from a preparation made out of a single plant for a single ailment to use of plants in combination (Figure 7). The most frequently used form of preparations was paste (36 spp.), followed by raw (33 spp.), infusion (23 spp.), juice (21 spp.), decoction (20 spp.), cooked (9 spp.) and powder (3 spp.). The remaining species were used in more than one form. A decoction was obtained by boiling the plant in water until the volume of liquid was reduced to more than 1/2 or 3/4 of the original amount of liquid. The paste was prepared by grinding fresh or dried material with water. The powder was prepared by grinding dried material. The plants used in raw form were used immediately after harvesting either fresh or dry. According to Shrestha *et al.* 2014), the paste was the most popular method of using medicinal plants among the Tamang community in Rasuwa district. However, in the Tamang community of Makawanpur district, powder form is the most common mode of use (Luitel *et al.* 2014).

The most common mode of application of medicine was oral (98 spp.) followed by external or topical application (33 spp.), plastered (7 spp.), massage (5 spp.) and aural (2 spp.). The other remaining species were administered in multiple mode of application (Figure 7). For example, *Cucurma longa* can be taken orally as decoction or applied externally as plastered on sprain or fractures. The study shows that the highest number of species (64 spp.) were used in the treatment of digestive disorders. Hence the oral mode of application in the treatment of diseases is the most common in the study area. The study of Nepali *et al.* (2020) among the Tamang community of Nuwakot district and Pangeni *et al.* (2020) among the Magar community of Palpa district also found the oral mode of application as the most common one.

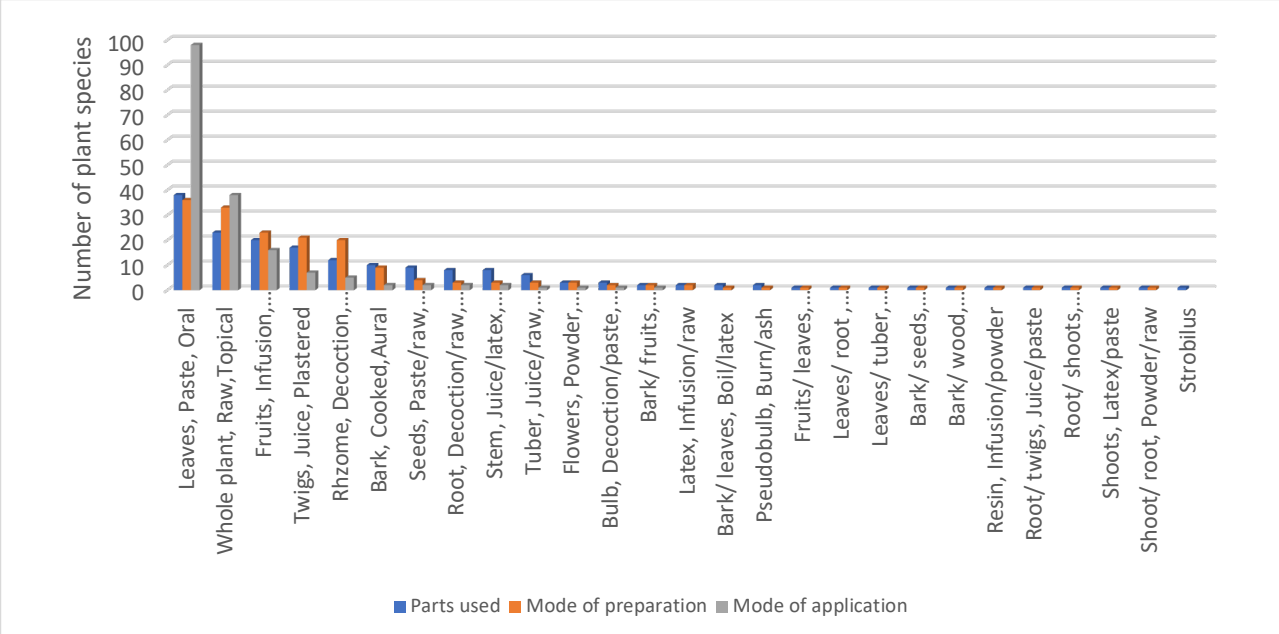

Figure 7. Parts used, mode of preparation and mode of applications of ethnomedicinal plants

Table 4. List of ethnomedicinal plants used by the local people of Konjyosom rural municipality, Lalitpur district Central Nepal.

Botanical name / Family / Habit	Local name	Voucher no.	RFC	FL %	Parts used	Mode of use	Preparation method	Local use
Justicia adhatoda L. **Acanthaceae / S**	**Asuro (Np) Auro (Ta)**	R0205	0.05	100	Twigs	Oral	Infusion	The twigs infusion is taken during fever.
Viburnum cotinifolium D. Don. **Adoxaceae / T**	**Malayo (Ta)**	N/A	0.01	100	Fruits	Oral	Raw	Ripen fruits are eaten raw to get relief from stomach pain.
Agave cantala Roxb. **Agavaceae / H**	**Kyatuke (Np) Getuke (Ta)**	N/A	0.13	100	Leaves	Oral	Juice	Leaf juice taken to cure constipation.
Achyranthes bidentata Blume **Amaranthaceae / H**	**Datiwan (Np, Ta)**	R020101	0.08	68.75	Whole plant	Oral	Juice	Plant juice is used as Diuretic and stem is used as toothbrush. Root juice is taken for easy fall of placenta after baby birth.
Alternanthera sessilis (L.) R Br. ex DC. **Amaranthaceae / H**	**Saranchisag (Np)**	R0212	0.04	100	Leaves	Topical	Juice	Leaves are squeezed and juice is applied in cuts and wounds.
Amaranthus spinosus L **Amaranthaceae / H**	**Kadelatte (Np)**	R0213	0.01	100	Twigs	Oral	Infusion	Shoot infusion is useful to treat female genital problem especially the abnormal vaginal secretion.
Chenopodium album L **Amaranthaceae / H**	**Bethe (Np) Bang gan (Ta)**	R0203	0.39	98.74	Twigs	Oral	Cooked	The young twigs are cooked as vegetables or pickle and is useful for constipation and increase immunity
Cyathula tomentosa (Roth) Moq. **Amaranthaceae / H**		R0206	0.02	100	Whole plant	Topical	Paste	The paste of the plant is applied to get rid of joint pains.
***Allium sativum* L. **Amaryllidaceae / H**	**Garlic (Np) No (Ta)**	R021136	0.05	100	Bulb	Oral	Raw	Two small pieces of garlic is taken with water orally to cure gastric and constipation.
Allium wallichii Kunth **Amaryllidaceae / H**	**Dundu (Np)**	R021127	0.01	100	Bulb	Plastered	Paste	Bulb paste is applied and wrapped with cloth in bone fracture and sprain.
Zephyranthes carinata Herb. **Amaryllidaceae / H**	**Hadelasun (Np)**	R02145	0.06	100	Bulb	Massage	Paste	The bulb Paste with leaves of *Xanthium strumarium* is applied in joint pain.
Choerospondias axillaris (Roxb.) B.L. Burtt & A.W. Hill **Anacardaceae / T**	**Lapse (Np) Kalang (Ta)**	R02146	0.03	100	Seeds	Topical	Burn/ash	The Seed ash with ghee is applied in boils.
Rhus wallichii Hook. f. **Anacardaceae / T**	**Bhalayo (Np) Gursing (Ta)**	R02183	0.04	100	Fruits	Oral	Raw	Fruit is used as anthelminthic.

Rhus javanica L. **Anacardaceae / T**	**Bhakamilo (Np) Grusing (Ta)**	R02185	0.07	100	Fruits	Oral	Raw	The fruit is eaten to treat diarrhoea. Its decoction is useful to cure stomach problems.
Centella asiatica (L.) Urb. **Apiaceae / H**	**Ghodtapre (Np) Tajyoi mra (Ta)**	R02189	0.36	43.06	Whole plant	Oral	Raw	Raw plant is taken during urine inflammation, as urine and blood purifier. It is also useful in fever and used as tonic.
Cuminum cyminum L. **Apiaceae / S**	**Jeera (Np, Ta)**	R02190	0.37	50	Seeds	Oral	Decoction	The seed decoction with *Zingiber officinale*, *Curcuma longa* and leaves of *Ocimum tenuiflorum* is useful to treat Common cold.
Foeniculum vulgare Mill. **Apiaceae / H**	**Saunf (Np) Soop (Ta)**	N/A	0.02	100	Fruits	Oral	Raw	Fruits chewed to get relief from fever and sore throat.
Trachyspermum ammi (L.) Sprague **Apiaceae / H**	**Jwano (Np, Ta)**	N/A	0.16	100	Fruits	Oral	Decoction	Sore throat and common cold.
Catharanthus roseus (L.) G. Don. **Apocyanaceae /H**		R02188	0.01	100	Leaves	Oral	Raw	The leaf juice is useful against diabetes.
***Colacasia esculenta* (L.) Schott **Araceae / H**	**Karkalo (Np) Taya (Ta)**	R0207	0.12	100	Whole plant	Oral	Cooked	The leaves and corm is cooked as vegetables and useful to cure gastrointestinal disorders. The sun dry leaves is cooked and given to cure dysentery.
Hydrocotyl sibthorpoides Lam. **Araliaceae / H**	**Sanoghodtapre (Np) Tajyoimra (Ta)**	R02192	0.09	52.95	Whole plant	Oral	Infusion	The plant infusion is given in fever and jaundice.
Macropanax dispermus (Blume) Kuntze **Araliaceae / H**	**Chiniya (Np)**	R02193	0.02	100	Twigs	Oral	Boil	Boiled young shoots is used as pickle and useful to recover body pain.
Asparagus racemosus Willd. **Asparagaceae / S**	**Kurilo (Np)**	R02094	0.05	60	Shoots, root	Oral	Decoction	Young shoots are cooked and taken as vegetables during urinary problems and in fatigue and weakness as body tonic.
Chlorophytum nepalense (Lindl.) Baker **Asparagaceae / H**	**Banpyaj (Np) Hlaxyapi(Ta)**	R02187	0.01	100	Tuber	Oral	Decoction	The tuber juice is useful to lower the high blood pressure.
Aloe vera (L.) Burm. f. **Asphodelaceae / H**	**Gheukumari (Np, Ta)**	R021128	0.82	60.61	Leaves	Oral, topical	Paste / raw	Peeled leaf pieces are taken orally to cure stomach disorders and high blood pressure. Leaf gel is applied to get relief from Skin burn.

Ageratina adenophora (Spreng.) R.M. King & H. Rob. **Asteraceae / S**	**Kalmunte (Np)**	R021129	0.52	100	Twigs	Topical	Juice	Leaves or young twigs are squeezed and juice is put in wounds or cuts to stop bleeding.
Ageratum conyzoides L. **Asteraceae / H**	**Gandhejhar (Np)** **Gyagarmra (Ta)**	R021224	0.02	100	Leaves	Topical	Juice	Leaf juice is applied over wounds and cuts to stop bleeding.
Anaphalis busua (Buch. -Ham.) Hand. -Mazz. **Asteraceae / H**	**Bukiphul (Np)** **Taptap(Ta)**	R021324	0.18	100	Leaves	Topical	Paste	Leaf paste is applied on cuts and wounds.
Artemisia indica Willd. **Asteraceae / S**	**Titepati (Np)** **Chyanjin (Ta)**	R021325	0.66	56.4	Twigs	Massage, inhale	Burnt / infusion	Dry twigs are burnt and smoke is inhaled during asthma. Warm twigs are put in the muscular pain. Infusion or juice of plant is applied over the body surface to get rid of mosquitoes bite and to stop bleeding from cuts and wounds.
Galinsoga parviflora Cav. **Asteraceae / H**	**Ganne ghas**	R021327	0.05	100	Leaves	Topical	Juice	The leaves are squeezed and juice is applied in cuts and wounds to stop bleeding.
Cirsium wallichii DC. **Asteraceae / H**	**Thakal (Np)** **Jakar(Ta)**	R02127	0.06	75	Roots, shoot	Oral	Raw	The raw peeled stem and root is useful during fever and urinary inflammation.
Duhaldea cappa (Buch. -Ham. ex D. Don) Pruski & Anderb. **Asteraceae / S**	**Gaitihare (Np)** **Nakhum mendo(Ta)**	R02130	0.03	50	Root	Oral	Infusion	The root infusion is taken to treat fever and headache.
Eclipta prostrata L. **Asteraceae / H**	**Bhirgraj (Np)** **Thaba mra (Ta)**	R0204	0.1	100	Whole plant	Topical	Infusion	The plant infusion is applied in skin diseases.
Elephantopus scaber L. **Asteraceae / H**	**Sahasrabuti (Np)** **Syonglabu (Ta)**	R02159	0.1	65	Whole plant	Oral	Decoction	The decoction of plant is given in common cold, cough and fever.
Picris hieracioides L. **Asteraceae / H**	**Bandhude (Np)**	R02184	0.02	100	Leaves	Oral	Raw	Leaves are eaten as body tonic.
Sonchus oleraceus L. **Asteraceae / H**	**Dudhejhar (Np)** **Ngemra (Ta)**	R02085	0.17	69.7	Leaves, Root	Topical, aural	Juice / latex	Root paste applied for earache. Leaf latex used for cuts and wounds
***** *Tagetes erecta* L **Asteraceae / S**	**Sayapatri (Np, Ta)**	R02186	0.07	100	Leaves	Oral	Juice	Leaf juice is taken to cure pneumonia.

Xanthium strumarium L. **Asteraceae / S**	**Bhedekuro (Np)**	R02013	0.02	100	Leaves	Topical	Paste	The bark paste with the paste of *Zephyranthes carinata* is applied in joint pain to get relief.
Senecio nudicaulis Wall. ex DC. **Asteraceae / H**	**Dudhilo (Ta)**	R02199	0.09	82.36	Rhizome	Oral	Juice / Paste / Raw	Rhizome is eaten raw. Juice is useful in fever. Rhizome paste is applied in wound to get fast relief.
Diplazium esculentum (Retz.) Sw. **Athyriaceae / H**	**Neuro (Np)** **Degani (Ta)**	R021151	0.06	54.55	Leaves	Oral	Cooked	The vegetable of leaves are useful in hypertension and Diabetes.
Begonia picta Wall. **Begoniaceae / H**	**Magarkachi (Np)** **Khalung (Ta)**	R020107	0.15	100	Leaves	Topical	Raw	Leaf juice is used for the treatment of toe wounds and to stop bleeding from cuts.
Berberis asiatica DC. **Berberidaceae / S**	**Chutro (Np)** **Pijyur (Ta)**	R021175	0.51	92.24	Root	Oral	Decoction	Root decoction is used in jaundice and fever.
Mahonia napaulensis DC. **Berberidaceae / S**	**Jamanomandro (Np)**	R021152	0.04	100	Root	Oral, Topical	Infusion / Paste	Root infusion is taken during excessive thirst or Polydipsia. Root paste with the bark paste of *Quercus lanata* is applied in sprain or minor fracture.
Alnus nepalensis D. Don **Betulaceae / T**	**Utish (Np)** **Bamsing(Ta)**	R020211	0.03	100	Bark	Topical	Powder	Bark powder is applied to cure scabies.
Cynoglossum zeylanicum (Vahl ex Hornem.) Thunb. ex Lehm**.** **Boraginaceae / H**	**Bhedekuro (Np, Ta)**	R021210	0.17	100	Whole plant	Topical	Juice	The plant juice is applied in cuts and wounds.
***Brassica campestris* L. **Brassicaceae / H**	**Tori (Np)** **Namnam (Ta)**	R020213	0.04	71.43	Seeds	Oral	Raw	Raw or roasted seeds are useful during body pain, backache.
***Raphanus sativus* L. **Brassicaceae / H**	**Mula (Np) Labu (Ta)**	R021217	0.03	50	Seeds	Oral	Raw	Raw seeds are chewed during fever and jaundice.
Nasturtium officinale R.Br. **Brassicaceae / H**	**Simsag (Np)** **Syongdap (Ta)**	R021219	0.16	95.66	Twigs	Oral, topical	Cooked / juice	Plant juice is applied in cuts to stop bleeding. Cooked vegetables is useful during fever and jaundice.
Capsella bursa-pastoris L. **Medik Brassicaceae/H**	**Sephard's purse (Np)**	R021321	0.04	71.43	Twigs	Oral	Raw	Fresh young twigs are eaten raw to get relief from throat pain and fever.
Opuntia monacantha Willd. **Cactaceae / S**	**Madishekada (Np)**	R02119	0.02	100	Stem	Oral	Raw	The peeled stem is eaten raw to get relief from Urinary problems.

Cannabis sativa L. **Cannabaceae / S**	**Bhang (Np) Gaja (Ta)**	R02120	0.04	100	Leaves	Topical	Paste	Leaves paste is applied in skin diseases.
Celtis australis L. **Cannabaceae / T**	**Khari (Np, Ta)**	R02121	0.02	100	Bark	Oral	Infusion	Bark infusion is useful in tooth and gum problems.
Crateva unilocularis Buch-Ham. **Capparaceae / T**	**Sipligan (Np)**	R021130	0.08	100	Twigs	Oral	Decoction	The decoction or boiled or fermented twigs as pickle is useful to lower blood sugar level and high blood pressure. It is also useful to cure gastritis.
Nardostachys jatamansi (D. Don) DC. **Caprifoliaceae / H**	**Jatamansi (Np, ta)**	N/A	0.03	50	Rhizome	Oral	Raw	The rhizome is chewed during dysentery and mental tiredness to get relief.
Valeriana jatamansi Jones. **Caprifoliaceae / H**	**Runchejhar (Np)**	R021325	0.28	100	Whole plant	Topical	Paste	The plant paste is mixed *with Artemesia indica* in bath water during nausea and irritation of children.
Drymaria cordata (L.) Willd. ex Schult. **Caryophyllaceae/H**	**Abijalo (Np) Abijalmra(Ta)**	R02124	0.2	58.98	Whole plant	Oral	Infusion	The plant infusion is taken during gastrointestinal disorders and urinary problems.
Terminalia bellirica (Gaertn.) Roxb. **Combretaceae / T**	**Barro (Np) Bar(Ta)**	R021326	0.29	52.64	Fruits	Oral	Raw	Raw fruits are useful in gastrointestinal disorders and bronchial problems.
Terminalia chebula Retz. **Combretaceae / T**	**Harro (Np) Arla (Ta)**	R02126	0.12	100	Fruits	Oral	Raw	Raw fruits are useful in gastrointestinal disorders and bronchial problems.
Commelina benghalensis L. **Commelinaceae / H**	**Kane (Np) Nalimra (Ta)**	R0217	0.05	100	Whole plant	Oral	Cooked	Cooked plant as vegetable is useful during indigestion.
Cuscuta reflexa Roxb. **Convolvulaceae / C**	**Akashbeli (Np, Ta)**	R02125	0.57	78.27	Whole plant	Oral, massage	Infusion	The plant infusion is given in jaundice. It is applied in scalp to control hair fall and dandruff (khoiro lageko).
***Ipomoea batatas* (L.) Lam. **Convolvulaceae / H**	**Sakharkhanda (Np) Sakharteme (Ta)**	R02117	0.02	100	Tuber	Oral, topical	Boil / Latex	The boiled tuber is useful in diabetes.
Coriaria nepalensis Wall. **Coriariaceae/S**	**Machhaino (Np)**	R02118	0.02	100	Fruits, leaves	Oral	Juice / raw	Ripe fruits and leaf juice are taken to treat indigestion.
Cheilocostus speciosus (J. Koenig) C.D.S Specht **Costaceae / S**	**Betlauri (Np) Pukhrimakai (Ta)**	R020103	0.04	85.72	Rhizome	Oral	Cooked	The rhizome decoction is given during urine inflammation and stomachache.

Bryophyllum pinnatum (Lam.) Oken ***Crassulaceae* / H**	**Ajambari**	R020102	0.05	100	Leaves	Oral	Raw	Raw leaves are eaten in the morning to remove kidney stone.
***Momordica charantia* L. Cucurbitaceae / C**	**Titekarelo (Np) Kambakarilo (Ta)**	R021131	0.09	100	Fruits	Oral	Cooked	The cooked fruits are eaten to cure high blood pressure.
Solena amplexicaulis (Lam.) Gandhi **Cucurbitaceae / C**	**Golkankari (Np) Hrilangai(Ta)**	R020180	0.04	42.86	Seeds	Oral	Raw	Raw seeds are orally taken to cure kidney stone problem. These are useful during loss of appetite and Fever
Dioscorea bulbifera L. **Dioscoreaceae / C**	**Bantarul (Np)**	R020130	0.02	100	Tuber	Oral	Decoction	The tuber decoction is useful in loss of appetite.
Dioscorea deltoidea Wall. ex Griseb. **Dioscoreaceae / C**	**Bhyakur (Np) Tagi (Ta)**	R02019	0.02	100	Tuber	Oral	Boiled	The boiled tuber is useful for abdominal pain.
Tectaria coadunata (J. Sm.) C. Chr. **Dryopteridaceae / H**	**Kaloniuro (Np) Pengdegani (Ta)**	R02014	0.03	100	Leaves	Oral	Cooked	Cooked leaves is useful in gastrointestinal disorders.
Elaeocarpus sphaericus(Gaertn.) K. Schum. **Elaeocarpaceae / T**	**Rudraksha (Np) Lundungrashi (Ta)**	R021124	0.07	100	Fruits	Oral	Infusion	The fruit infusion is used to lower the high blood pressure.
Equisetum debile Roxb. ex Vaucher **Equisetaceae / H**	**Kurkure (Np)**	R021126	0.11	86.37	Whole plant	Oral, topical	Paste	The plant paste is applied over wound and the juice for diabetes.
Gaultheria fragrantissima Wall. **Ericaceae / S**	**Dhasingare (Np) Chanduwa (Np)**	R02012	0.23	100	Twigs	Plastered	Paste	The young twigs paste is applied on muscular pain, sprain or fracture.
Lyonia ovalifolia (Wall.) Drude **Ericaceae / T**	**Angeri (Np) Damsing (Ta)**	R02011	0.25	100	Twigs	Topical	Paste	The paste of young shoot is applied in wound and scabies.
Rhododendron arboreum Sm. **Ericaceae / T**	**Laligurans (Np) Pada mendo (Ta)**	R02010	0.02	100	Flower	Oral	Raw	Fresh or dry Flower is eaten to extract fish bone stuck in throat.
Euphorbia hirta L. **Euphorbiaceae / H**	**Akhlejhar (Np) Nge mra (Np)**	R02151	0.15	48.28	Whole plant	Topical, oral	Infusion / latex	The latex is applied in cut and wounds, skin diseases and boil. Plant infusion given in fever and earache.
Euphorbia royleana Boiss. **Euphorbiaceae / S**	**Siudi (Np) Geshya (Ta)**	R02181	0.15	89.29	Stem	Oral	Raw	The peeled stem is taken with *Stephania glandulifera* in stomach disorders, menstrual disorders and loss of appetite.
Mallotus philippensis (Lam.) Muell. Arg. **Euphorbiaceae / T**	**Sindure (Np)**	R02050	0.08	66.67	Fruits	Topical, oral	Paste / raw	The paste of dried fruits are applied on scabies and raw fruits are useful in eliminating intestinal worms.

Sapium insigne (Royle) Benth. ex Hook. **Euphorbiaceae / T**	**Khirro (Np)**	R02061	0.01	100	Bark	Massage	Paste	The bark paste is applied to get relief from muscle pain, joint pain and sprain.
Bauhinia variegata L. **Fabaceae / T**	**Koiralo (Np) Ambu (Ta)**	R021139	0.15	100	Flower	Oral	Cooked	Pickle of boiled flower is useful during gastrointestinal disorders.
Butea buteiformis (Voigt) Mabb. **Fabaceae / T**	**Bhujetro (Np)**	R021145	0.02	100	Bark	Oral	Juice	Bark juice given in fever.
Desmodium confertum DC. **Fabaceae / H**	**Raktmul (Np)**	R021144	0.05	100	Whole plant	Oral	Decoction	The plant decoction is useful in diarrhoea and dysentery.
Desmodium microphyllum (Thunb.) DC**.** **Fabaceae / H**	**Blutekanike (Np)**	R021146	0.05	100	Whole plant	Topical	Paste	The paste of plant is applied in wounds.
Glycyrrhiza glabra L. **Fabaceae / S**	**Jethimadhu (Np)**	N/A	0.09	100	Stem	Oral	Raw	Small pieces of dry or fresh stem is chewed to get relief from common cold and sore throat.
*****_Lablab purpureus_ (L.) Sweet**.** **Fabaceae / C**	**Tatesimi (Np)**	R021148	0.07	100	Leaves	Topical	Juice	The leaves are squeezed and Juice is applied in skin problems.
Acacia catechu (L. f.) P.J.H. Hurter & Mabb. **Fabaceae / T**	**Khayer (Np)**	R021106	0.09	56.25	Bark, wood	Oral	Decoction / paste	Bark paste is used to treat toothache and in muscular sprain. Wood decoction is useful in Stomach pain.
Trigonella foenum-graecum L. **Fabaceae / H**	**Methi (Np, Ta)**	N/A	0.05	66.67	Seeds	Oral	Infusion	Seeds infusion is taken in stomachache and high blood pressure.
Mucuna pruriens (L.) DC. **Fabaceae / C**	**Kauso (Np)**	R020150	0.02	100	Twigs	Oral	Juice	Juice is useful during sore throat and common cold.
Quercus lanata Sm. **Fagaceae / T**	**Baanjh (Np)**	R020151	0.24	97.88	Bark	Topical, oral	Infusion	Bark infusion is applied on or drunk for sprains and abdominal cramps.
Swertia chirata Buch.-Ham. ex C.B. Clarke **Gentianaceae / H**	**Chiraito (Np)**	R020152	0.12	65.22	Whole plant	Oral	Juice	Plant juice is given to treat cold, cough, headache and jaundice.
Hypericum cordifolium Choisy **Hypericaceae / S**	**Jangali jai (Np) Nimki (Ta)**	R020153	0.1	100	Leaves	Oral	Decoction / raw	Raw Leaves or boiled juice is taken several times in a day to get relief from tonsillitis and throat pain
Juglans regia L. **Juglandaceae / T**	**Okhar (Np)**	R021173	0.03	100	Bark	Oral	Raw	Bark is chewed in toothache.

Elsholtzia blanda (Benth.) Benth. **Lamiaceae / H**	**Bansilam (Np)**	R021178	0.02	100	Leaves	Topical, nasal	Paste	The leaves paste is put in outer surface of nose or leaves juice is directly put on nose during nose block or sinusitis.
Hyptis suaveolens (L.) Poit. **Lamiaceae / S**	**Bantulasi (Np)** **Pipla (Ta)**	R02179	0.28	70.91	Leaves	Topical, nasal	Juice	The plant Juice is useful in common cold and sinusitis. The juice is directly put in nose as nasal drops. The juice is used in cuts and wounds.
Mentha spicata L. **Lamiaceae / H**	**Babari (Np)** **Nasur (Ta)**	R02178	0.3	100	Twigs	Oral	Juice / raw	The plant twigs are taken as pickle or plant juice is useful in nausea, diarrhoea, dysentery, vomiting and gastritis.
***Ocimum tenuiflorum* Burm. f. **Lamiaceae / S**	**Tulasi (Np, Ta)**	R02177	0.7	100	Twigs	Oral	Decoction	The twigs decoction is useful in common cold and fever.
Pogostemon benghalensis (Burm. f.) Kuntze **Lamiaceae / S**	**Rudilo (Np)**	R02176	0.15	100	Leaves	Oral, nasal	Decoction / juice	The decoction of leaves is useful in common cold and bronchial problems. The paste is put in forehead during common cold of child.
Cinnamomum tamala (Buch.-Ham.) T. Nees & Nees **Lauraceae / T**	**Tejpat (Np)** **Lephra (Ta)**	R02175	0.5	75.25	Leaves, bark	Oral	Decoction	The decoction of bark and leaves are used in the treatment of Dysentery, stomachache, indigestion and common cold.
Litsea citrata Blume. **Lauraceae / T**	**Siltimur (Np)** **Saprumu (Ta)**	R02174	0.17	52.95	Fruits	Oral, Topical	Infusion / Paste	The fruit paste in applied in boils. The infusion is taken as anthelmintic. Seed infusion with little salt and turmeric powder in stomach pain.
Scurrula parasitica L. **Loranthaceae / S**	**Ainjeru (Np)**	R02173	0.03	100	Leaves	Topical	Paste	Leaf paste is applied to cure wounds.
Lycopodium clavatum L. **Lycopodiaceae / C**	**Jhyau (Np)** **Shyabal (Ta)**	R02172	0.01	100	Strobilus	Topical	Paste	The paste of strobilus is applied on cuts and wounds and boils.
Lygodium japonicum (Thunb.) Sw. **Lygodiaceae / C**	**Janailahara (Np)**	R02171	0.03	100	Leaves	Topical	Paste	The leaves paste is applied on cuts and wounds and boils.
Woodfordia fruticosa (L.) Kurz **Lythraceae / T**	**Dhairo (Np)**	R02169	0.01	100	Flowers	Oral	Raw	The flower is taken during indigestion and dysentery.

Osbeckia stellata Buch.-Ham. ex Ker Gawl. **Melastomataceae / S**	**Rato Chulesi (Np) Mase (Ta)**	R02170	0.06	100	Leaves	Topical	Paste	Leaf paste is applied in cuts and wounds.
Azadirachta indica Juss. **Meliaceae / T**	**Neem (Np) Neemkad (Ta)**	R02168	0.58	72.42	Stem	Oral	Infusion	Stem infusion is given as anthelmintic and used as toothbrush during toothache. It is useful to lower high blood pressure and blood purification.
Cissampelos pareir L. **Menispermaceae / C**	**Batulepate (Np)**	R02167	0.08	81.25	Whole plant	Oral	Infusion	The plant infusion is useful during common cold and urinary inflammation.
*Stephania glandulifer*Miers **Menispermaceae / C**	**Gundarigano (Np) Tang gugi (Ta)**	R02166	0.09	100	Tuber	Oral, topical	Paste / raw	The peeled pieces of rhizome are taken in in gastrointestinal disorders. Rhizome paste is applied in wound for fast recovery.
Tinospora sinensi (Lour.) Merr. **Menispermaceae / C**	**Gurjo (Np, Ta)**	R02066	0.34	88.06	Stem	Oral	Infusion	Stem infusion is useful to lower the blood sugar level. It is also useful in fever and common cold..
Ficus benghalensis L. **Moraceae / T**	**Bar (Np, Ta)**	R02065	0.05	50	Latex	Topical	Juice / latex	Milky latex is applied in muscular pain and toothache.
Ficus lacor Buch. -Ham. **Moraceae / T**	**Kavro (Np) Pelka (Np)**	R02064	0.02	100	Latex	Topical	Juice / latex	Latex is put in boils.
Ficus reliogosa L. **Moraceae / T**	**Peepal**	R02180	0.06	100	Bark, leaves	Topical	Latex / paste	Latex or bark paste is used to treat cut and wound.
Morus australis L. **Moraceae / T**	**Kimbu (Np, Ta)**	R02165	0.04	71.43	Fruits	Oral	Raw	The fruits useful to get relies from fever and sore throat.
Myrica esculenta Buch. -Ham. ex D. Don **Myricaceae / T**	**Kaphal (Np) Karbasi (Ta)**	R02164	0.02	100	Bark, seed	Topical, oral	Powder / raw	The bark powder paste is applied in muscular swelling and sprain to get relief from pain. Seeds are eaten raw to stop diarrhoea.
Myristica fragrans Houtt. **Myristicaceae / T**	**Jaiphal (Np, Ta)**	N/A	0.09	77.78	Fruits	Oral	Decoction	Fruits decoction is useful in diarrhoea and body ache.
***** *Pisidium guajava* L. **Myrtaceae / T**	**Amba (Np)**	R02162	0.05	60	Leaves	Oral, topical	Paste / raw	Leaf juice is used to cure dysentery. Leaf buds are chewed to cure toothache. Leaf paste is applied for cuts and wounds..

Syzygium aromaticum (L.) Merr. & L. M. Perry **Myrtaceae / T**	**Lwang (Np, Ta)**	N/A	0.08	100	Fruits	Oral	Raw	Toothache, chewed
Syzygium cumini (L.) Skeels **Myrtaceae / T**	**Jamun (Np)** **Jabbu (Ta)**	RS02160	0.06	75	Bark, Fruits	Topical	Decoction	Decoction of bark is drunk to cure dysentery. Fruits are eaten to cure diabetes.
Nephrolepis cordifolia (L.) K. Presl **Nephrolepidaceae / H**	**Paniamala (Np)** **Kyuiamala (Ta)**	R021180	0.16	58.07	Tuber	Oral	Raw	The tuber is eaten raw and useful for gastrointestinal and urine inflammation.
Jasminum humile L. **Oleaceae / S**	**Sanojai (Np, Ta)**	R020181	0.42	90.48	Twigs	Oral	Raw	The young twigs are chewed during tonsillitis and fever.
Nyctanthes arbor-tristis L. **Oleaceae / T**	**Parijat**	R020183	0.07	100	Leaves	Oral	Infusion	The leaves infusion is useful to lower the blood sugar level.
Coelogyne cristata Lindl. **Orchidaceae / H**	**Chadgava (Np)**	R020182	0.03	100	Pseudo bulb	Topical	Paste	The paste of pseudo bulb is applied in boils.
Dendrobium densiflorum Lindl. **Orchidaceae / H**	**Sungava (Np, Ta)**	R021188	0.03	100	Pseudo bulb	Topical	Paste	The paste of plant is applied in boils.
Dactylorhiza hatagirea D. Don) **Orchidaceae / H**	**Panchaunle (Np)**	R021104	0.06	63.64	Rhizome	Oral	Powder	Rhizome powder with milk is taken to get relief from gastrointestinal disorder and also as tonic.
Oxalis corniculata L. **Oxalidaceae / H**	**Chariamilo (Np)** **Kyung mra (Ta)**	R021177	0.06	81.82	Leaves, tuber	Oral	Infusion / raw	The infusion or raw leaves or tubers are useful in gastrointestinal and urinary inflammation.
Oxalis latifolia Kunth. **Oxalidaceae / H**	**Thulochariamilo (Np)**	R021179	0.04	87.5	Leaves	Oral	Infusion / raw	Leaves are eaten raw or in infusion form to get rid of urinary problems and jaundice.
Glochidion velutinum Wight **Phyllanthaceae / T**	**Latikath (Np)**	RS02196	0.01	100	Fruits	Topical	Paste	The fruit paste is applied on boils.
*Phyllanthus amarus*Schumach. & Thonn. **Phyllanthaceae / H**	**Bhuiamala (Np)**	R02182	0.06	100	Leaves	Oral	Juice	Leaves juice is given to treat diarrhoea and dysentery
Phyllanthus emblica L. **Phyllanthaceae / T**	**Amala (Np) Amali (Ta)**	R021196	0.06	54.55	Fruits, bark	Oral	Raw	Fruits or bark is Chewed to get relief from common cold, tonsillitis and gastrointestinal disorders.
Phyllanthus parvifolius Buch.-Ham. ex D. Don **Phyllanthaceae / S**	**Khareto (Np)**	R02122	0.08	100	Leaves	Plastered	Paste	The leaf paste is mixed with *urtica dioica, Euphorbia hirta* and *Osyris wightiana* and applied in fractured.

Pinus wallichiana A.B. Jacks. **Pinaceae / T**	**Gobresallo (Np) Thangsing (Ta)**	R020198	0.13	100	Resin	Topical	Paste	Resin is applied on boils.
Plantago erosa Wall. **Plantaginaceae / H**	**Isabgol jhar (Np)**	R020100	0.13	100	Leaves	Oral	Infusion	Leaf infusion is taken to cure constipation.
***Cymbopogon citratis* (DC. ex. Nees) Stapf. **Poaceae / H**	**lemon grass (Np, Ta)**	R02098	0.15	74.08	Leaves	Oral	Infusion	Leaf infusion is taken to treat cold, cough, headache and fever.
Cynodon dactylon (L.) Pers. **Poaceae / H**	**Dubo (Np) Narkabang (Ta)**	R02089	0.27	79.55	Whole plant	Oral, juice	Infusion	The plant juice is applied in cuts and wounds to stop bleeding. The plant infusion is taken in jaundice and fever.
***Phalaris arundinacea* L. **Poaceae / H**	**Setodubo (Np) Dalkandaba (Ta)**	R02077	0.06	100	Leaves	Topical	Paste	Leaf paste in skin problem or daad.
***Saccharum officinarum* L**. **Poaceae / H**	**Sugarcane (Np) Usyup (Ta)**	R02144	0.12	100	Stem	Oral	Juice	Stem juice is useful in jaundice and indigestion.
Thysanolaeneae latifolia (Roxb. ex Hornem.) Honda **Poaceae**	**Amriso (Np) Sarji (Ta)**	R020158	0.03	100	Root	Oral	Infusion	The root infusion is useful to cure fever.
***Zea mays*L. **Poaceae / H**	**Makai (Np) Magai (Ta)**	N/A	0.03	100	Seeds	Topical	Paste	The paste of embryo part is applied in wound, boil.
Imperata cylindrica (L.) P. Beau **Poaceae / H**	**Sirughas (Np) Grangsu (Np)**	R020149	0.02	100	Root	Oral	Juice	Root juice given in diarrhoea and dysentery.
Rumex nepalensis Spreng. **Polygonaceae / H**	**Halhale (Np) Halihali (Ta)**	R020142	0.05	100	Leaves	Topical	Juice	Leaf juice is used to stop bleeding from cuts and wounds.
Persicaria nepalensis (Meisn.) H. Gross **Polygonaceae / H**	**Ratnaulo (Np)**	R020141	0.09	100	Whole plant	Topical	Paste	The plant paste is applied in muscular sprain
Maesa chisia Buch.-Ham. ex D. Don **Primulaceae / T**	**Bilaune (Np, Ta)**	R020140	0.02	100	Bark	Oral	Decoction	Root decoction is taken as insecticidal.
Cheilanthes albomarginata C.B. Clarke **Pteridaceae / H**	**Kansinka (Np) Nabenysinga (Ta)**	R021140	0.04	75	Leaves	Topical, aural	Juice	The juice of plant is applied in wound infection and ear piercing infection.
Clematis buchananiana DC. **Ranunculaceae / C**	**Jungelahara, swasthaniphool (Np)**	R021176	0.04	100	Leaves	Oral	Infusion	The leaves infusion is taken during common cold.

Thalictrum foliolosum DC. **Ranunculaceae / H**	**Mirmire (Np)** **Okhati ghas (Ta)**	R021206	0.03	100	Whole plant	Aural	Juice	Plant juice is used as antiseptic while piercing the ear or other wound.
Prunus cerasoides Buch.-Ham. ex D. Don **Rosaceae / T**	**Paiyun (Np)**	R021203	0.02	75	Stem	Oral	Decoction	Stem is cooked and juice thus extracted is taken daily in case of sprains and backache.
***Prunus persica* L. **Batsch Rosaceae / T**	**Aaru (Np)**	R021202	0.05	100	Leaves	Aural	Juice	Leaf juice or squeezed leaf is put in between teeth to get rid of toothache.
Rubus ellipticus Sm. **Rosaceae / S**	**Ainselu (Np)** **Pulung (Ta)**	R021201	0.15	93.11	Root, twigs	Oral	Infusion	The infusion of young twigs or root is used to treat fever. The twig is useful during gastrointestinal disorders and toothache. .
Potentilla lineata Trer. **Rosaceae / H**	**Bajradanti (Np)**	R021200	0.14	92.6	Rhizome	Oral	Raw	Rhizome is chewed which is useful for fever and toothache.
Rubia manjith Roxb. ex Fleming **Rubiaceae / C**	**Majitho (Np)Yagre (Ta)**	R021223	0.15	100	Leaves	Topical	Juice	Leaf juice is applied on cuts and wounds.
***Citrus limon* L. **Rutaceae / T**	**Kagati (Np, Ta)**	R021222	0.29	87.94	Fruits	Oral, massage	Juice / raw	The raw fruit is used to treat common cold, cough and the juice is applied to remove dandruff.
***Citrus medica* L. **Rutaceae / T**	**Bimiro (Np)** **Mando (Ta)**	R020203	0.05	90	Fruits	Oral	Raw	Fruit is good for indigestion and blood purification.
Zanthoxylum armatum DC. **Rutaceae / T**	**Timur (Np)** **Prumu (Ta)**	R020129	0.42	100	Seeds	Oral	Decoction	Seed decoction is useful in stomach disorders and food poisoning.
Zanthoxylum acanthopodium DC. **Rutaceae / T**	**Boke timur (Np)**	R020123	0.04	100	Fruits	Oral	Decoction / raw	Toothache, Anthelmintic
Osyris wightiana Wall. ex Wight **Santalaceae / S**	**Nundhiki (Np)** **Dalkanda Ba (Ta)**	R020124	0.02	100	Bark	Plastered	Paste	The paste of bark with *Urtica dioica* and *Euphorbia hirta* and paste is used for plastered in fractured covered with Nepali paper.
Diploknema Butyracea (Roxb.) H.J. Lam **Sapotaceae / T**	**Chiuri (Np)**	R02120	0.13	100	Seeds	Topical	Paste	The paste of seeds is applied in skin fungal infections.
Houttuynia cordata Thunb. **Saururaceae / H**	**Gandhe (Np)** **Gyagarmra (Ta)**	R020157	0.02	100	Whole plant	Oral	Cooked	The plant is cooked and taken to get relief from body pain and fatigue.

Astilbe rivularis Buch. -Ham. ex D. Don **Saxifragaceae / S**	**Thulookhati (Np)**	R020159	0.06	72.73	Rhizome	Oral	Powder	Rhizome powder is taken as post-natal mother tonic and body ache tonic.
Bergenia ciliata Sternb. **Saxifragaceae / H**	**Pakhambed (Np) Danmanjyung (Ta)**	R020156	0.11	45.46	Rhizome	Oral	Raw	Rhizome extract is taken or rhizome pieces are chewed during gingivitis, kidney stone or fever.
Buddleja asiatica Loureiro **Scrophulariaceae / T**	**Bhimsenpati (Np) Phaborsing (Ta)**	R020155	0.04	57.15	Leaves	Topical, oral	Juice / paste	The paste of Young leaves with rhizome of *Curcuma longa* is applied externally in scabies and leaf juice is taken during pneumonia.
Smilax ovalifolia L. **Smilacaceae / C**	**Kukurdaino (Np)**	R021118	0.11	100	Shoots	Topical	Paste	The paste of shoots is applied in Cuts and wounds.
Datura metel L. **Solanaceae / S**	**Dhaturo (Np, Ta)**	R021121	0.02	100	Fruits	Massage	Paste	The fruit paste with mustard oil is used in massage when the body is feeling tired and pain. Fruit paste is put in toothache.
Solanum aculeatissimum Jacq. **Solanaceae / S**	**Kantakari (Np) Gramjyul (Ta)**	R021116	0.12	95.66	Fruits	Massage	Paste	Seed paste for is used to cure toothache and to get Silky hair.
Solanum americanum L. **Solanaceae / S**	**Kaligedi (Np)**	R021120	0.02	50	Fruits	Oral	Raw	It is widely used to treat constipation, urinary problems and loss of appetite.
Taxus wallichiana Zucc. **Taxaceae/T**	**Lauthsallo (Np)**	R021105	0.01	100	Stem	Oral	Decoction	Stem decoction is taken for gastritis.
Schima wallichii Choisy **Theaceae / T**	**Chilaune (Np) Kesing(Ta)**	R021106	0.11	100	Bark	Topical	Paste	Bark paste is applied to cure wounds.
Boehmeria macrophylla Hornem. **Urticaceae / S**	**Kamle (Ta)**	R021107	0.13	100	Leaves	Topical	Paste	leaf paste is applied in skin burns and cuts and wounds.
Girardinia diversifolia (Link) Friis **Urticaceae / S**	**Allo (Np) Pyajar (Ta)**	R020108	0.02	100	Twigs	Plastered	Paste	Plant paste is used to plastered the bone fracture or dislocation or muscular sprain.
Gonostegia hirta (Blume) Miq. **Urticaceae / H**	**Maslahari (Np)**	R020109	0.11	100	Root	Plastered	Paste	Root paste applied on muscular sprain to reduce pain.
Urtica dioica L. **Urticaceae / S**	**Sisnoo (Np) Polo (Ta)**	R020111	0.33	70.77	Twigs	Plastered, oral	Cooked / paste	Young twigs cooked and eaten as tonic, The paste of the plant with *Gonostegia hirta* and *Phyllanthus parvifolius* is used for bone fractured.
Viola pilosa Blume **Violaceae / H**	**Ghatteghans (Np)**	R020110	0.16	100	Whole plant	Topical, oral	Infusion / powder	The plant powder is embedded in locket and hang in children neck to get relief from nausea. The plant infusion is useful in the treatment of ulcer.

Viola wallichiana Ging. ex DC. **Violaceae / H**		R021112	0.05	70	Root	Oral	Infusion	Root infusion is useful in fever and diarrhoea.
Cautleya spicata (Sm.) Baker ***Zingiberaceae* / H**	**Gagleto, banbesar (Np, Ta)**	R021113	0.03	100	Rhizome	Oral	Infusion	Rhizome infusion is taken during stomach disorders and constipation.
Curcuma longa L. **Zingiberaceae / H**	**Besar (Np, Ta)**	R021114	0.87	51.14	Rhizome	Topical, oral	Decoction / raw	The decoction with *Cuminum cyminum* seeds, *Zingiber officinale* and *Ocimum tenuiflorum* leaf is useful in common cold, sore throat, tonsillitis and stomach disorders. The paste is applied in wound, burn and muscular sprain.
Curcuma angustifolia Roxb. **Zingiberaceae / H**	**Kalo haledo (Np, Ta)**	R021115	0.03	100	Rhizome	Plaster	Paste	The rhizome paste is used to plaster the bone fracture and sprain.
Curcuma aromatica Salisb. **Zingiberaceae / H**	**Haledo (Np) Haldi (Ta)**	R021117	0.02	50	Rhizome	Oral, topical	Decoction / paste	The paste is applied in muscle swelling, burns. The decoction is given in fever and common cold.
Globba racemosa Sm. **Zingiberaceae / H**	**Panisaro (Np) Yahlaple (Ta)**	R020118	0.02	100	Root	Topical	Paste	The root paste applied on forehead to get relief from headache.
Zingiber officinale Roscoe **Zingiberaceae / H**	**Aduwa (Np, Ta)**	RS021119	0.35	100	Rhizome	Oral	Decoction	The rhizome decoction is useful in common cold and tonsillitis.

Note: Np= Nepali name, Ta= Tamang name, S= Shrub, H= Herb, T= Tree, C=Climber, * cultivated species

Informant Consensus Factor (ICF)

In the study area, there were 13 distinct types of human ailment categories that were treated using herbal remedies. The ICF value for each ailment categories were calculated (Table 4). The result of the ICF showed that there was greater agreement in most of the categories with more than 0.84 ICF value. The respiratory, skin, musculoskeletal, cardiovascular, endocrine, metabolic and nutrition, urological, and ear had got highest value of ICF with more than 0.84. The least agreement between the informants was recorded in the general and unspecified, blood, blood forming and immune mechanism, digestive, neurological, pregnancy, childbearing and musculo-skeletal disorders with 0.77, 0.5, 0.26, 0.73, 0.75 and 0.5 ICF value respectively. The ICF value ranges between 0.24 to 0.97 with about 53% of values greater than 84 and about 76% of values greater than 0.70 indicating moderate to high consensus among the informants. Higher ICF values for different disease categories show that the informants are in general agreement on the use of plants to treat a certain ailment. This could be because the studied community is dominated by a single ethnic group (Tamang) and suggested that the ethnomedicinal uses of plants are currently in practice in the study area. The factor of informant consensus provides a measure of reliability for the given claim of evidence in the ethnomedicinal studies (Malla & Chhetri 2012). The higher level of consensus about the use of particular taxa for curing ailments indicates ethnomedicinal use of plants is in practice (Singh *et al.* 2012, Shrestha *et al.* 2014). But for digestive disorders in the study area, use of plants is varied among the informants with the ICF value of lowest (0.26). Hence some of ailment categories like digestive disorders, neurological, female genital, general and unspecified, pregnancy, childbearing and family planning and blood, blood forming organ and family planning had shown lower ICF value signifying less common use of medicinal plants for treating them. Lack of knowledge sharing in some of these important disease categories may be due to the attitude of traditional healers not to share their knowledge to outsiders (Shrestha *et al.* 2014, Rokaya *et al.* 2014). They strongly believed that the effectiveness of medicine would decrease if knowledge is shared and it would be the strong reason for the depletion of traditional knowledge (Rajbanshi & Thapa 2019). It might be also 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. The study shows that respiratory disorders had the highest ICF value (0.97). It may be as a result of the recent COVID-19 outbreak. In this study, the highest number of taxa were utilized to treat digestive system disorders (64 Spp.) and skin problems (54 Spp.). Some studies show the highest number of plant species was used in digestive system disorders among the Tamang community in different parts of Nepal (Luitel *et al.* 2014, Shrestha *et al.* 2014, Dhital *et al.* 2021). The significant number of taxa that were utilized to treat gastrointestinal disorders suggests that these disorders are more common in the study area. The higher prevalence of such disorder may be due to poor sanitation and malnutrition (Miftahussurur *et al.* 2015, Abbas *et al.* 2017) and is a common problem in almost all rural communities of Nepal (Rokaya *et al.* 2010).

Table 4. Informant consensus factor (ICF) value for different ailment categories

Disease categories	Use reports (Nur)	Number of taxa (Nt)	ICF
General and unspecified	155	37	0.77
Blood, blood forming organ and immune mechanism	3	2	0.5
Digestive	84	64	0.26
Ear	19	3	0.88
Cardiovascular	88	7	0.93
Musculoskeletal	326	21	0.94
Neurological	12	4	0.73
Respiratory	912	26	0.97
Skin	1083	54	0.95
Endocrine, metabolic and nutrition	54	9	0.84
Urological	124	16	0.88
Pregnancy, childbearing and family planning	5	2	0.75
Female genital	3	2	0.5

Relative frequency of citation (RFC)

The RFC value showed a wide range varying from 0.01 to 0. 87. The most commonly mentioned medicinal plant species was *Curcuma longa* (176 citations, 0.87 RFC), which was primarily used for the treatment of cuts and wounds, burns, common cold and cough. The use of single medicinal plants for multiple diseases increase the value of medicinal plants (Thapa *et al.* 2020). The other most cited species were *Aloe vera* (165 citations, 0.82 RFC), followed by *Ocimum tenuiflorum* (143 citations, 0.70 RFC), *Artemesia indica* (165 citations, 0.66 RFC), *Azadirachta indica* (116 citations, 0.58 RFC) and *Cuscuta reflexa* (115 citations, 0.57 RFC) used for the treatment of multiple disorders. The high use value of these species may be attributed to recent Covid-19 pandemic, easy availability, common distribution, and widespread information about their therapeutic uses within the community. The high RFC values for the ethnomedicinal plant species suggested their regular use and widespread awareness among the local communities (Bhatt & Kunwar 2022). The study of Singh *et al.* (2012) have also found that *Curcuma longa and Azadirachta indica* were most frequently and popularly used medicinal plants in the Rupandehi district, west Nepal. The RFC value of all the reported species is shown in Appendix 1.

Fidelity level (FL)

The FL index indicates the plant species that are most frequently utilized in the study area to treat a certain disease category. Nine plant species out of the total 176 medicinal plant species were mentioned by more than 100 informants (Table 5). The major ailment was chosen based on the number of citations. The FL index ranged from 42.86% to 100%. The most preferred medicinal plant species was *Curcuma longa* which was used to treat cuts and wounds, burns and common cold (51.14%, 176 citations), followed by *Aloe vera* used to treat burns and high blood pressure (60.61%, 165 citations), *Ocimum tenuiflorum* used to treat fever and common cold (100%, 143 citations), *Artemisia indica* used to treat cuts and wounds (56.4%, 133 citations), *Azadirachta indica* used to treat body pain (72.42%, 116 citations), *Cuscuta reflexa* used to treat jaundice (78.27%, 115 citations), *Ageratina adenophora* used to treat cuts and wounds (100%, 105 citations), *Berberis asiatica* used to treat fever (92.24%, 103 citations) and *Cinnamomum tamala* used to treat common cold (75.25%, 101 citations). However, the importance of plants with low FL values should not be undervalued. The low score can indicate a lack of exchange of the traditional knowledge related to certain plant species (Srithi *et al.* 2009). For example, in the study area, only two informants mentioned the therapeutic application of chewing and swallowing the dry petals of *Rhododendron arboretum* to relieve the pain of lodged fish bones in the throat. The fact that there are only two citations for this therapeutic usage might be because the participants did not exchange information among themselves. The FL value of all the reported species are shown in Appendix 1.

Table 5. Fidelity level of most important plant species in the study area

Botanical name	**Disease categories**	**Fidelity level %**	**Total informants**
***Curcuma longa* L.**	Respiratory (90) / Digestive (9) / Skin (20) / Musculoskeletal (57)	51.14	176
***Aloe vera* (L.) Burm. f.**	Digestive (48) / Cardiovascular (17) / Skin (100)	60.61	165
***Ocimum tenuiflorum* Burm. f.**	Respiratory (143)	100	143
***Artemisia indica* Willd.**	Respiratory (36) / Musculoskeletal (22) / Skin (75)	56.4	133
***Azadirachta indica* A. Juss.**	Digestive (84) / Cardiovascular (30)/Blood, blood forming organ and immune mechanism (2)	72.42	116
***Cuscuta reflexa* Roxb.**	Digestive (90) /Skin (25)	78.27	115
***Ageratina adenophora* (Spreng.) R.M. King & H. Rob.**	Skin (105)	100	105
***Berberis asiatica* DC.**	General and unspecified (8) / Digestive (95)	92.24	103
***Cinnamomum tamala* (Buch. - Ham.) T. Nees & Nees**	Digestive (25) / Respiratory (76)	75.25	101
***Zanthoxylum armatum* DC.**	Digestive (85)	100	85
***Jasminum humile* L.**	Respiratory (76) / General and unspecified (8)	90.48	84

***Chenopodium album* L.**	Digestive (78) / Blood, blood forming and immune mechanism (1)	98.74	79
***Cuminum cyminum* L.**	Respiratory (75)	100	75
***Centella asiatica* (L.) Urb.**	Urological (31) / General and unspecified (11) / Endocrine, metabolic and nutrition (30)	43.06	72
***Zingiber oflicinale* Roscoe**	Respiratory (70)	100	70

Conclusion

The current study demonstrated that the Tamang ethnic population residing in the Konjyosom rural municipality of Lalitpur district, still holds on a wealth of traditional knowledge of medicinal plants, which is an important source for basic healthcare. This study documented 176 medicinal plant species to treat 67 human ailments among the Tamang community of the study area. The plant species such as *Curcuma longa, Aloe vera, Ocimum tenuiflorum, Artemesia indica, Azadirachta indica* were found to be most popular medicinal plant species among the locals. The usage of several species for the treatment of digestive and skin problems suggests that these conditions are more common in the region. The study revealed that traditional knowledge was more restricted to the elderly people and is now less common among young people owing to modernity and a lack of confidence in the local healing system. It raises the possibility of such knowledge becoming extinct in the community. The traditional medical system therefore should be acquired and preserved through correct documentation and plant species identification.

Declarations

List of abbreviations: Habit: H= Herb, S= Shrub, C= Climber, T= Tree, Ma= Marginal land, F= Forest, C= Cultivated, M= Market, Ta= Tamang name, Np= Nepali name

Ethics approval and consent to participate: All participants gave oral prior informed consent when provided with the questionnaire form to gather ethnomedicinal knowledge.

Consent for publication: Oral permission

Availability of data and materials: All data collected in the study has been presented and visualized in the manuscript.

Conflicts of interest: The authors declare to have no conflict of interest.

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Authors' contributions: IS and SJ conceptualized, designed the study, revised and finalized the manuscript; RSG collected and analyzed data, and prepared first draft of the manuscript.

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