

Ethnomedicinal Plants Used by Pahari Community of Shikharpa Village, Lalitpur, Nepal

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Abstract

The ethnomedicinal plants used by Pahari community of Shikharpa village of Lalitpur district are documented. The data were collected using a range of participatory tools including the informants from different age group, gender and occupation and inventory method followed by group discussion. A total of 48 medicinal plants (MPs) from 47 genera and 33 families are documented that are used to cure different ailments in human beings and domesticated animals. Among 48 MPs, herbs are the most commonly used followed by shrubs, trees and a parasitic plant. The commonly used part/s to cure the ailments is leaves followed by whole plant, twig, root and fruit, bark, rhizome, seed and tuber and flower. The form of use is external as application on infected part or internally as therapeutic dose. Out of the 48 MPs, 12 MPs are high valued MPs, 17 MPs are moderately valued MPs and remaining 19 are low valued MPs. Based on the informants' response on curing the diseases, 13 MPs are reported as highly effective, 26 MPs moderately effective and 9 MPs effective. The knowledge about the ethnomedicinal plants in the study area is transferred from generation to generation orally without any documentation till now. Such traditional knowledge needs to be documented before it gets lost and further scientific research on such plants needs to be conducted for drug development in future.

Keywords: Ailments, Indigenous knowledge, Medicinal plants, Traditional medicine

Introduction

Ethnomedicine is the traditional medicinal practices of the ethnic communities that are still practiced in many parts of the world. The usages of the plants in curing the human ailments have been well documented in many traditional systems of medicine such as Ayurveda, Unani and Siddha (Srivastava, 2018). Ethnomedicinal plants are used to cure or prevent different ailments or as the dietary supplements for human beings and domesticated animals. Plants are in fact the primary health care resource in many communities around the world (Bannerman et al., 1983). The ethnic communities have significant customary knowledge on utilization of plant and plant parts and there is a long tradition of transferring this indigenous knowledge from generation to generation (Acharya & Acharya, 2009).

The indigenous traditional medicine (TM) is the sum of total knowledge and practices that is used in diagnosing, preventing and eliminating physical, mental and social diseases and handed down orally or in writing from generation to generation

(World Health Organization [WHO], 2019). In some developing countries, the native healers are the sole or main health providers for millions of people living in rural areas and demand for traditional and complementary medicine as well as the popularity is becoming high worldwide (WHO, 2013a). The traditional medicinal practices are now being recognized worldwide due to the support and formulation and innovation of various modern medicines (Acharya, 2012; Acharya & Acharya, 2009; Umair et al., 2017). At least 6,500 species of plants are used alone as the home remedies for various ailments in Asia alone (Karki & Williams, 1999).

Traditional treatments are the care that is close to home, accessible, affordable and culturally accepted and trusted by large number of people (WHO, 2013b). Regarding the number of medicinal plants used in TM, at least 28,187 plant species are recorded as being of medicinal use (Allkin et al., 2017). Indigenous and local communities are using and practicing locally available medicinal plants (MPs) with the advice of the local healers and sometimes

without consulting the local healers as the knowledge had been passed on them orally from their ancestors. Indigenous therapies and ethnopharmacological uses have been recognized as the tools in the search for new sources of pharmaceuticals and the basis for modern therapeutic medicine (Kunwar et al., 2013).

Nepal is also well known for the ethnomedicinal plants used by different ethnic communities from the time immemorial. The number of MPs present in the country is still not clear and the data differs with different literatures. According to Chaudhary (1998) approximately 1000 wild plant species are used in traditional medicinal practices. At least 1463 species of plants are used as herbal medicine by people in Nepal (Ministry of Forests and Soil Conservation [MoFSC], 2006).

However, Baral and Kurmi (2006) have compiled and described 1792 species of plants with medicinal value including lichens and fungi. The Medicinal and Aromatic Plant Database of Nepal (MAPDON), which was based on Nepalese Plant Database (NPD) have revealed a total of 1950 species practiced in the households from generations (Ghimire, 2008). Rokaya et al. (2010) documented 161 plant species used in human and veterinary ailments from Humla district. Department of Plant resources (DPR), Government of Nepal has already identified and prioritized 33 MPs for research and development (Department of Plant Resources [DPR], 2006; DPR, 2017). Regarding the dependency of people on TM, almost 60% of the world population and 80% of the population from developing countries rely on TM (Shrestha & Dhillon, 2003).

People of Nepal have traditional medical practice as an integral part of their culture. More over in Nepal, 50% of rural households are reported to derive their income from collection and trade of those MPs (Edward, 1996). Despite the importance of indigenous traditional medicinal knowledge, most of them are still remained as non-codified. Though not included in the official system of health care, estimated number of traditional practitioners in Nepal is 400,000 whose services have been highly utilized by communities, especially in remote and rural areas and some of them are practicing from

23 generations in the family (Koirala & Khaniya, 2009). Even the locally available MPs are often used by people without consulting the local healers as the knowledge had been passed on them orally or practiced in the household from generation to generation. Presently the regional and global demands for herbal medicines are increasing due to their effectiveness without side effects. It is reported that about 65% of patients who used the local therapy are satisfied with such treatment (Manandhar, 2002). More over the documentation of indigenous knowledge also play a key role for the conservation and utilization of biological resources (Muthu et al., 2006).

Pahari community is one of the main ethnic community residing in the Shikharpa village and are using the locally available plants to cure the different ailments of human being and domesticated animals from the long time. But because of climate change, over exploitation and lack of insight of knowledge and conservation of MPs, plant populations and diversity seems to be eroding. Moreover, due to modernization of the society, most of the people were dependent on the allopathic medicine and most of the ethno-medicinal data are limited on the elderly people only and thus rang the alarming bell to codify the traditional ethnomedicinal knowledge of the area. Thus main aim of the present study is to document the ethnomedicinal plants used by the indigenous people of Pahari community of Shikharpa village and evaluate the high value MPs and effective MPs used by them.

Materials and Methods

Study area

The study was conducted in the Shikharpa village of Godawari Municipality in southern part of Lalitpur district, Nepal, located at 27.57356°N and 85.33875°E (Figure 1). The village with the altitude of 1,362 m above the sea level is inhabited by many indigenous communities such as Pahari, Tamang, Brahmin etc. However the majority of the total population are Pahari communities. The climate of the area is sub-tropical type and remains rather cool with heavy precipitation during monsoon.

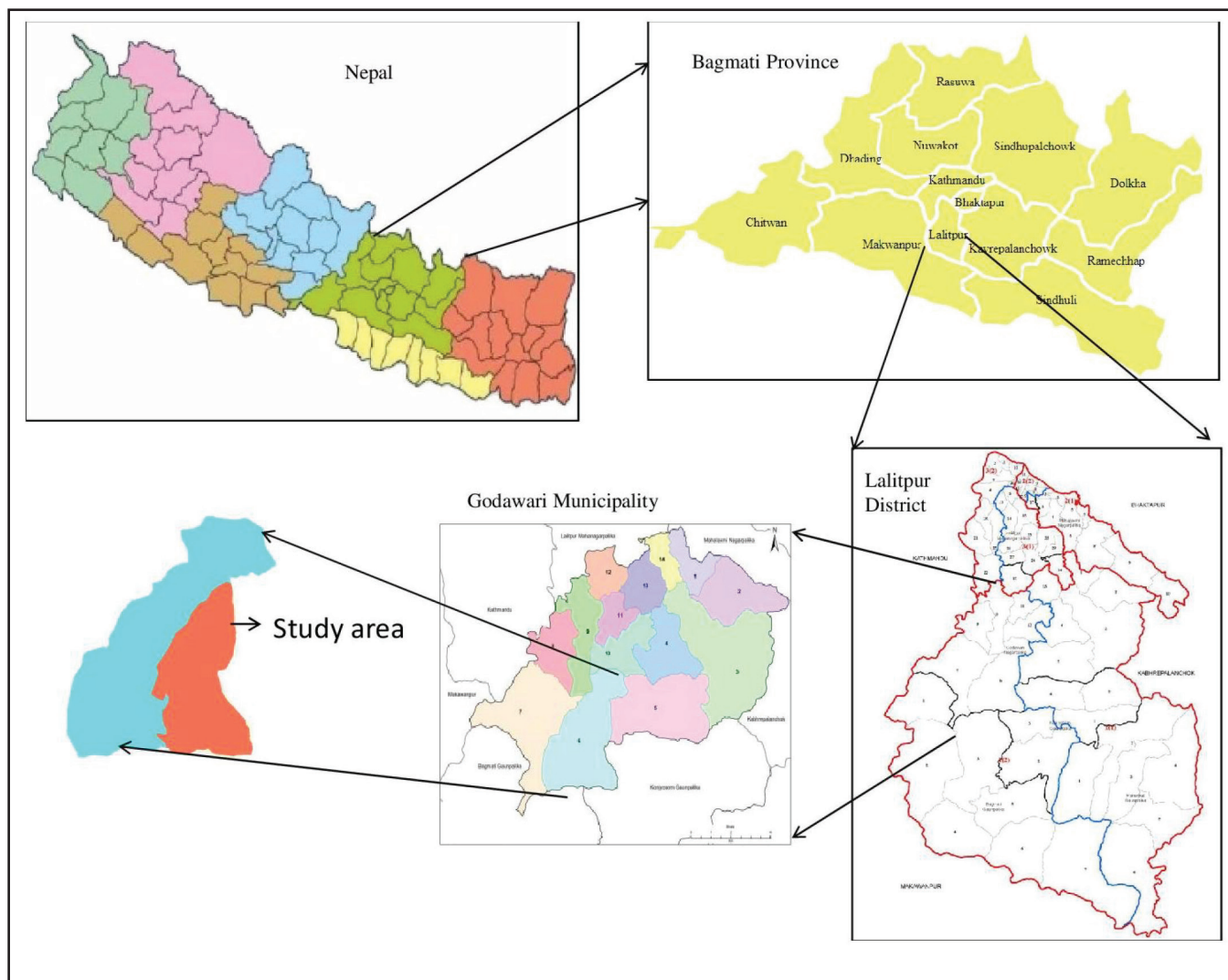


Figure 1: Map of the study area (Shirkhapa Village)

Research methodology

The data was collected using participatory methods that include participation of informants with different age group, gender and occupation and inventory method followed by group discussion. A questionnaire was developed to gather the information. Prior to the data collection, the objectives and importance of the study was shared with the informants and the verbal informant consensus was taken.

A total of 50 informants with the age groups from below 20 years to above 50 years (10 each from five group viz. below 20 (15-20 yrs), 21-30 yrs, 31- 40 yrs, 41-50 yrs and above 51 yrs) were interviewed. The informants included the indigenous healers

and Jhakries and indigenous people who have the knowledge of MPs and using and recommending the same to the locals. The inventory method that included the collection of information while visiting and collecting the plant species was also implemented. More over the information was also gathered by the group discussion as well. The valid names of the specimens and author citations were authenticated from <http://www.catalogueoflife.org>. The collected voucher specimens were deposited at the Department of Botany, Patan Multiple Campus, Patan Dhokha, Lalitpur, Nepal.

Data analysis

The data was analyzed by descriptive analysis and frequency calculation techniques from the MS

word and MS excel software. The habit, value and effectiveness of MPs used for curing the ailment were evaluated.

The MPs are categorized as high valued MPs (used to cure 5 or more ailments), moderately valued MPs (used to cure 3-4 ailments) and low valued MPs (used to cure 1-2 ailments). Based on informants response after using the MPs, the effectiveness of the MPs were rated as highly effective MPs (MPs with +++), moderately effective (MPs with ++) and effective MPs (MPs with +).

Results and Discussion

Altogether 48 ethnomedicinal plants from 47 genera and 33 families with different life forms such as herbs, shrubs, trees and parasitic are recorded from the study area (Table 1). Among the 48 MPs, herbs are the mostly used followed by shrubs, trees and a parasitic plant (Figure 2.). Shrestha and Joshi (1993) had reported the 51 species of medicinal plants (49 genera belonging to 31 families) from the Lele village of Lalitpur.

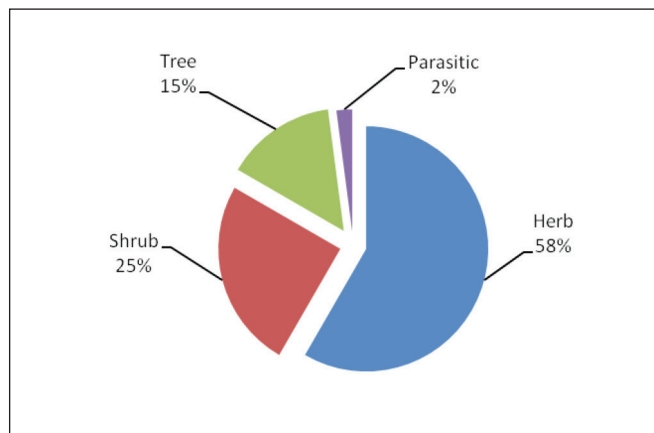


Figure 2: Different life forms of medicinal plants

Leaves are commonly used part followed by whole plant, twig, root and fruit, bark, rhizome, seed and tuber and flower (Figure 3). The plant part/s are used in different forms either as external application on the infected part or taken orally. Balami (2004) had reported 76 species of herbs, 34 species of shrubs and 9 species of trees that are used as ethnomedicinal plants by the Newar community of Pharping village of Kathmandu district. Although Bhattarai et al. (2006) had reported the most commonly used part

of ethnomedicinal plants from Manang as the flower but here in the study area, the leaves are the commonly used part.

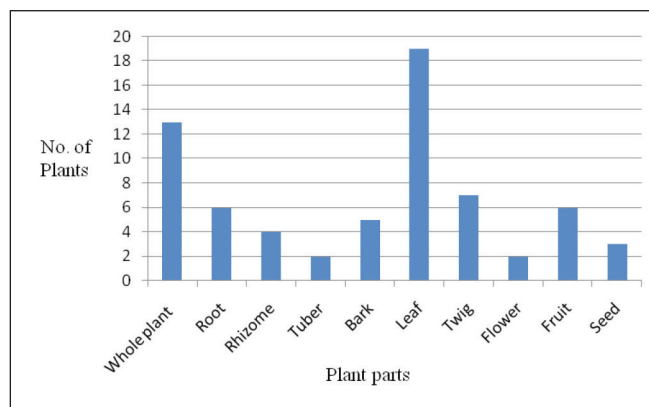


Figure 3: Number of medicinal plants according to the parts used

Out of the 48 MPs, 12 MPs are high valued MPs, 17 MPs are moderately valued MPs and remaining 19 are low valued MPs (Table 2) Based on the informants response on curing the diseases, 13 MPs are documented as highly effective, 26 MPs as moderately effective and 9 MPs as effective (Table 3). Although a bulk of literatures are available on the ethnomedicinal plants of different regions but effectiveness of the plants used are not documented usually.

Plant species such as *Acorus calamus*, *Asparagus racemosus*, *Bergenia ciliata*, *Valeriana jatamansi* and *Zanthoxylum armatum* which had been listed in MPs prioritized by Government of Nepal for economic development (DPR, 2006), are also documented from the study area.

The traditional empirical knowledge about the medicinal plants provides the putative information about the probable chemical constituent that is present within them. Traditional medicinal knowledge is developed from the long process of trial and error and thus this could guide search for drug development (Karunamoorthi et al., 2013). Plants with known medicinal uses are reported as the source of vital pharmaceutical drugs for treatment of many diseases (Allkin et al., 2017). In fact the medicinal plants discovered by the traditional societies are providing to be an important source of potentially therapeutic drugs (Cox & Balick, 1994).

Table 1: List of ethnomedicinal plants with their uses

S.N.	Name of Plants	Family	Nepali Name/ Local name	Col. No.	Life form	Parts used	Ethnomedicinal Uses
1.	<i>Achyranthes bidentata</i> Blume	Amaranthaceae	Datiwan/ Datiwan (दतिवन)	S4	Herb	WP	1. Decoction of the plant is diuretic. 2. Root juice is applied to treat toothaches and clean tooth and to increase the body temperature. 3. The grinded root applied on the head is supposed to make easy in labor during child birth (bethalagda). 4. About two teaspoons of ash of dried root and stem along with honey is taken in asthma and respiration problems. 5. Leaf juice is used to cure typhoid. 6. In animals, the fresh leaves are feed for expelling the placenta after birth of young ones.
2.	<i>Acorus calamus</i> L.	Acoraceae	Bojho/ Bojho (बोजो)	S34	Herb	Rz	1. Small pieces of rhizome is chewed or sucked to cure sore throat.
3.	<i>Ageratina adenophora</i> (Spreng.) R. King & H. Rob	Asteraceae	Kalo Banmara/ Kalamre (कालमरे)	S11	Herb	Lf, Tw	1. Three/four drops of leaf and twig juice are applied to heal cut and wounds and to stop bleeding.
4.	<i>Aloe vera</i> (L.) Burm. f.	Asphodelaceae	Ghyukumari/ Ghyukumari (घुकुमारी)	S40	Herb	Lf	1. Leaf pulp is used to get relief from burning sensation. 2. Leaf juice is used to control high blood pressure 3. Leaf juice is taken to lower down the body temperature. 4. Leaf pulp is applied on face to increase beauty. 5. About half glass of leaf juice is taken for 7 days to cure kidney stone.
5.	<i>Amaranthus viridis</i> L.	Amaranthaceae	Latte sag/ Bongun Mon (बोगु मो)	S38	Herb	Lf	1. Leaf juice or leaves as curry is used to get relief from constipation.
6.	<i>Artemisia indica</i> Willd.	Asteraceae	Tite Pate/Dhon Sono (ढो सोनो)	S1	Herb	Lf, Tw	1. Leaves are heated on hot ash, and then mild hot leaves with ash is placed on piece of cloth, and used as heating pad in dislocated bones. 2. Leaves are used to repel Mosquitoes. Leaves and twigs along with <i>Zanthoxylum armatum</i> is used as insecticides. 3. Leaf juice is use to remove bad smell of body. 4. In irritating nausea on children, plants along with <i>Hydrocotyle sibthorpioides</i> and <i>Valeriana jatamansi</i> are crushed and mixed with cow's urine and the mixture is used to bath the children.
7.	<i>Asparagus racemosus</i> Willd.	Asparagaceae	Satawari/ Bankurilo (बनकुरिलो)	S10	Herb	WP	1. The root is much valued tonic. 2. Root juice (about one glass twice a day) is taken to cure fever. 3. Root soup (about one glass a day) is given to breast feeding mother to increase lactation. 4. Fruit and basal part is taken as tonic. 5. Plant is also used in expelling the placenta of animal after delivery.

S.N.	Name of Plants	Family	Nepali Name/ Local name	Col. No.	Life form	Parts used	Ethnomedicinal Uses
8.	<i>Astilbe rivularis</i> Buch.-Ham. ex D. Don.	Saxifragaceae	Thulo Ookhati/Thulo Ookhati (ठूलो ओखती)	S25	Herb	Rz	1. Rhizome of plant along with <i>Cissampelos pareira</i> is crushed and juice obtained is mixed with mishri (sugar lumps) and taken in case of menstruation problem and over bleeding (aankhasne). 2. After delivery of child, juice is used by mother for recovery and as tonic.
9.	<i>Bergenia ciliata</i> (Haw.) Sternb.	Saxifragaceae	Paakhanabed/ Paakhanabed (पाखानबेद)	S2	Herb	WP	1. Juice of the whole plant (about half glass twice a day) is taken to treat urinary trouble. 2. Plant juice is useful in menstruation problems. 3. About half a liter of plant juice (four times a day) is given in gall stone & kidney stone. 4. Plant is used as tonic. 5. Plant is used as blood purifying herb. 6. Plant is also taken to remove toxic substances from body.
10.	<i>Bombax ceiba</i> L.	Malvaceae	Simal/Simal (सिमल)	S7	Tree	Fl	1. Paste of flower (about two teaspoons twice a day for 2-3 days) is given to treat diarrhea and dysentery. 2. Flower paste is used to cure all the stomach troubles.
11.	<i>Brassica rapa</i> L.	Brassicaceae	Tori/Too (टो)	S36	Herb	Sd	1. Seed oil about three/four drops is put in the ear to relieve earaches. 2. Seed oil is used to massage on muscles pain and joint pain. 3. Seed oil is used to cure dislocation of bones. 4. Seed oil is massaged to new born babies for better health and also to mother for speedy recovery after delivery. 5. <i>Trachyspermum ammi</i> (jwano) and Garlic is fried on seed oil and oil is applied on head and chest to cure cold, cough and common colds. 6. Salt mix with seed oil is rubbed in teeth and gums to treat toothache after delivery and due to cold environment.
12.	<i>Cannabis sativa</i> L.	Cannabaceae	Ganja/Gonwjin (गोंजी)	S41	Herb	Sd, Lf/ Tw	1. Aerial parts of plant are used as stimulant, digestive and body warming agent. 2. The plant is taken as appetizer. 3. Dry /fresh twigs (2/3) are given to cure diarrhea of domestic animal.
13.	<i>Capsicum annuum</i> L.	Solanaceae	Akabari khursani/ Jyanmara Khasani (ज्यानमारा मरती)	S37	Herb	Fr	1. About two fruit of plants in pickle is used for gastric problem. 2. It also acts as anti-cancer agent.
14.	<i>Centella asiatica</i> (L.) Urb.	Apiaceae	Ghodrtapre/ Chaula Jha (चाउलाभाँ)	S5	Herb	WP	1. Juice of whole plants (about one glass twice a day) is used to cure jaundice. 2. Plant juice is used to control high blood pressure. 3. Plant juice is taken to purify blood. 4. Plant is taken to increase the memory power.

S.N.	Name of Plants	Family	Nepali Name/ Local name	Col. No.	Life form	Parts used	Ethnomedicinal Uses
15.	<i>Cirsium verutum</i> (D. Don.) Spreng.	Asteraceae	Thakal/Chongu (चौगु)	S6	Herb	Rt	5. Three to four drops of leaf juice are applied to stop nose bleeding. 1. Roots of plant along with roots of <i>Rubus ellipticus</i> , <i>Achyranthes bidentata</i> and <i>Cuscuta reflexa</i> is crushed and juice (about half glass three times a day) is taken to treat common fever. 2. The above juice is also used to cure typhoid. 3. Fresh root and young twig (after removing mature leaves and spines) is chewed in case of throat pain.
16.	<i>Cissampelos pareira</i> L.	Menispermaceae	Batulopaat/ Batulo paat (बाटुलो पात)	S9	Climber	WP	1. Plant along with root of <i>Astible rivularis</i> is crushed and juice with misri (sugar lumps) is used by women in case of menstruation problem and other gynecological disorder (aankhasne) and to recover after delivery. 2. Tuber of plant is crushed and paste is given to increase milk production of domestic animals.
17.	<i>Citrus medica</i> L.	Rutaceae	Bimira/Tushpon (दुसीपा)	S39	Tree	Rt, Fr	1. Filtered juice of roots (about one cup daily for three days) is used as anthelmintic. 2. Fruits help in digestion.
18.	<i>Curcuma longa</i> L.	Zingiberaceae	Besar/Hile Mon (हिले मो)	S47	Herb	Rz	1. Paste of rhizome is applied on insect bites. 2. Paste of rhizome is used to cure wounds and allergies. 3. Dried rhizome powder is boiled for about 2 minutes, cooled till lukewarm and then gargled to cure cough and colds. 4. Above decoction is also gargled to cure tonsillitis. 5. Dried rhizome powder is compulsorily used in curries to give the good colour. It has the antioxidant and anti-inflammatory properties and also boosts the immune system. 6. Paste of turmeric powder mixed with oil (about 10 gm.), called dhwaso locally, is applied and banded with a piece of cloth to cure fracture of legs of hens.
19.	<i>Cuscuta reflexa</i> Roxb.	Convolvulaceae	Aakashbeli/ Aakashbeli (आकाशबेली)	S3	Parasitic Herb	WP	1. Plant juice mixed with sugar is given to cure jaundice (about four teaspoons twice a day). 2. Plant is used to lower down the high blood pressure. 3. Plant is used to purify blood.
20.	<i>Cynodon dactylon</i> (L.) Pers.	Poaceae	Dubo/Shree jha (सीरि फा)	S8	Herb	WP	1. In case of nose bleeding, about one cup of juice of <i>Cynodon dactylon</i> and <i>Hydrocotyle sibthorpioides</i> mixed with mishri (sugar lumps) is given. 2. The juice is also given to cool the body when it gets too hot.
21.	<i>Cynoglossum zeylanicum</i> (Vahl) Thunb. ex Lehm	Boraginaceae	Kanike Kuro/ Jhinglijha	S22	Herb	Rt, Lf	1. Juice of root and leaves is applied on cuts and wounds. 2. A paste or the juice is also applied around a boil, leaving

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			(भौङ्गीबीजा)				the central part open to let the pus out to heal the boil faster.
22.	<i>Datura stramonium</i> L.	Solanaceae	Dhaturo/ Dhaturo (धतुरो)	S24	Herb	Sd	1. Grinded dried seeds mixed with honey are used to treat asthma. 2. Grinded dried seeds mixed with honey are also used to cure cough. 3. Dried seeds are smoked with oil over a fire, and the smoked through the mouth to treat toothaches.
23.	<i>Drymaria villosa</i> Cham. & Schtdl.	Caryophyllaceae	Abhijalo/ Abhijalo (अभिजालो)	S12	Herb	WP	1. In common cold and sinusitis dried leaves are smelled and 2-3 drops of juice are dropped in nose. 2. Juice of leaves after filtering carefully is dropped in eyes (about 2-3 drops) to cure white pupil (aakhan ma fulopame). But this practice is not done now a days and elders had reported such treatment many years before.
24.	<i>Gonostegia hirta</i> (Blume ex Hassk.) Miq.	Urticaceae	Masalahari/Pise Jha (पिसे भ्ना)	S13	Herb	Tu	1. Tuber is boiled in water and strained. The infusion obtained is boiled again with bark of <i>Osyris lanceolata</i> and root of <i>Urtica dioica</i> to get a gelatinous mass. The gelatinous mass is then applied on dislocated bone and covered with Nepali paper to set it.
25.	<i>Hydrocotyle sibthorpioides</i> Lam.	Araliaceae	Tike ghortapre/ Tike bramhi (टिके ब्राह्मी)	S15	Herb	WP	1. To cure weepy nature of children because of irritation (Runchelagnu), plant along with <i>Artemisia indica</i> and <i>Valeriana jatamansi</i> are crushed and mixed with cow's urine and the mixture is used to bath the children.
26.	<i>Jasminum humile</i> L.	Oleaceae	Jai phul/Jai Sono (जाई सोना)	S14	Shrub	Lf, Tw	1. Juice of twig and leaves (about 4-5 teaspoons) is given to cure fever. 2. The leaves are chewed to cure mouth sore. 3. Leaves (3-4) are also chewed to cure tonsil. 4. To lower down high blood pressure, leaf juice of about half glass is used daily.
27.	<i>Justicia adhatoda</i> L.	Acanthaceae	Asuro/Asuro (असुरो)	S31	Shrub	Lf, WP	1. Leaves are boiled and strained. This solution is used to cure malaria disease. 2. Above solution is also used to cure other serious fever.
28.	<i>Lindera neesiana</i> (Wall. ex Nees) Kurz	Lauraceae	Siltimur/ Siltimur (सिलटिमुर)	S23	Tree	Fr	1. Infusion of fruits (one glass) with little amount of salt and turmeric powder is used to treat gastric problems and gastritis. 2. Paste of fresh fruits is applied in infected area of abscess (called Sarki Khatera locally) 3. To avoid food poisoning in rainy season, especially in mushroom curry, seeds are used as antitoxic agent.
29.	<i>Lyonia ovalifolia</i> (Wall.) Drude	Ericaceae	Seto angerbishphul/ Pichhimon (पिचिं)	S33	Tree	Lf, Bk	1. Leaves and bark are crushed and paste is applied to treat scabies, itching and allergies on both human beings and domestic animals.

S.N.	Name of Plants	Family	Nepali Name/ Local name	Col. No.	Life form	Parts used	Ethnomedicinal Uses
			मा)				2. The leaf and bark paste is also useful to cure wounds. 3. Paste of leaves and bark is applied in suppuration of cloven hoof of cow/ox/buffalo.
30.	<i>Mahonia napaulensis</i> DC.	Berberidaceae	Jamane Mandro/ Jai Sono (जाई सोना)	S31	Shrub	Lf, Bk, Fr	1. Juice of leaf (about 6 teaspoons twice a day) is used to treat mouth ulcer. 2. Leaf juice is also used to cure throat pain and tonsil. 3. Leaf juice (about one glass of juice twice a day) is used to cure fever. 4. Infusion of fruits and bark (about half liter a day) is prescribed to lower down the high blood pressure.
31.	<i>Mentha × piperata</i> L.	Lamiaceae	Sajjwanbuti/ Visk Mon (भिक्स मा)	S35	Herb	Lf, Tw	1. The leaves/twigs are rubbed and smelled and applied on chest and head in cold and cough 2. The leaves/ twigs are rubbed and smelled in asthma. 3. The leaves/twigs are rubbed and smelled to cure sinusitis.
32.	<i>Mentha spicata</i> L.	Lamiaceae	Babari/Babari (बाबरी)	S42	Herb	Lf.	1. Leaves are chewed to cure boils on the tongue. 2. Leaves have digestive and stomachic properties. 3. Leaves are used to decrease body temperature.
33.	<i>Nephrolepis cordifolia</i> (L.) C. Presl	Nephrolepidaceae	Pani Amala/ Pani Amala (पानीअमला)	S26	Herb	Tu	1. Juice of tuber is taken to treat dehydration.
34.	<i>Nicotiana tabacum</i> L.	Solanaceae	Kachopaat/surti/ Kojhalo (कोभालो)	S43	Herb	Lf.	1. Leaves are sedative and narcotic. 2. Leaves are used as antiseptic. 3. Leaves are stimulant. 4. Crushed leaves are used as antidote in scorpion and lice bites. 5. Leaves are rubbed on the body of domestic animals in case of bruises and wounds. 6. Leaves are soaked in water and the obtained solution is sprayed on vegetables as insecticides.
35.	<i>Ocimum tenuiflorum</i> L.	Lamiaceae	Tulsi/Tulasi (तुलसी)	S50	Herb	Lf, Tw	1. A decoction of leaf/twig (about four teaspoons three times a day) is used to cure fever. 2. About three/four leaves are boiled in close vessels with one glass of water and the infusion obtained is given to treat throat pain. 3. Above infusion (1) is also used to cure common cold and cough. 4. It is taken as stimulant plant.
36.	<i>Osyris lanceolata</i> Hochst. & Steud.	Santalaceae	Nundhiki/ Chiyapati Mon (च्यापतीमा)	S32	Shrub	Bk	1. Bark is boiled in water and strained. The filtrate is again boiled with root of <i>Urtica dioica</i> to form a gelatinous mass and is applied on dislocated bone and cover with Nepali paper to set it.

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37.	<i>Prunus persica</i> (L.) Stokes	Rosaceae	Aaru/Besimon (बेसी मों)	S45	Tree	Lf	1. Juice of leaves is used as anthelmintic. 2. Paste of leaves is applied in suppuration of cloven hoof of animals. 3. Paste of leaves is also applied on wounds of animals.
38.	<i>Psidium guajava</i> L.	Myrtaceae	Amba/Aamasi (आमसी)	S48	Tree	Bk, Lf, Fr	1. Bark of tree is crushed and boiled and juice (about four teaspoons three times a day) is given to treat diarrhea and dysentery. 2. Juice of leaves and paste of unripe fruit is given to treat dysentery. 3. Young leaves are chewed to treat fever 4. Young leaves are chewed to cure headache.
39.	<i>Rhododendron arboretum</i> Sm.	Ericaceae	Lali Gurans/Ton Sono (ढौं सोना)	S30	Tree	Lf, Bk, Fl	1. Five to seven petals are chewed (three times a day) to cure bloody dysentery. 2. Juice of bark (about three teaspoons twice a day) is taken in case of diarrhea and dysentery. 3. If a fish bone or awn (as a splinter) of wheat or grains incidentally gets stuck in the throat, people eat the dry petals to extract the bone/ splinter. 4. Leaves are boiled and the vapors are inhaled to relieve cough and colds. 5. Flower is boiled and infusion of about one glass a day is prescribed to treat throat pain and trouble.
40.	<i>Rubus ellipticus</i> Sm.	Rosaceae	Ainselu/Faspon (फास्पो)	S16	Shrub	Tw, Rt	1. Root and bark infusion is used to cure typhoid fever. 2. Infusion of bark and root along with root of <i>Achyranthes bidentata</i> , juice of <i>Cuscuta reflexa</i> (about half liter three times a day) is used to cure typhoid and fever. 3. Infusion is also used to cure throat pain. 4. Plant is also taken as a tonic.
41.	<i>Rumex nepalensis</i> Spreng.	Polygonaceae	Halhale/Halhale (हलहले)	S28	Herb	Rt	1. Root paste is use to heal cut and wounds and to stop cut bleeding. 2. Root paste is used in cracked heels and cheeks. 3. Root juice is used to treat stomachache.
42.	<i>Saccharum officinarum</i> L.	Poaceae	Ukhu/Ton Mon (ढौं मों)	S47	Herb	Lf, St	1. Juice of stem (about one glass three times a day) is given to treat jaundice. 2. Stem juice is also taken as tonic. 3. Stem juice taken as blood purifying agent. 4. The leaves (7/8) leaves are given to domestic animals for expelling placenta after delivery.
43.	<i>Thysanolaena latifolia</i> (Roxb. ex Hornem.) Honda	Poaceae	Amriso/Tuphen Mon (ढुफेंमों)	S46	Shrub	Rt, Lf	1. Paste of root (about one teaspoon twice a day) is used to cure muscular pain (Hawalageko). 3. Leaves are given to domestic animals for expelling placenta after delivery.

S.N.	Name of Plants	Family	Nepali Name/ Local name	Col. No.	Life form	Parts used	Ethnomedicinal Uses
44.	<i>Urtica dioica</i> L.	Urticaceae	Sisnu/Nhagi (सिसु/नहागी)	S18	Herb	WP	1. Twigs and flower are used as curry to balance blood pressure. 2. Twigs taken as curry to control sugar level. 3. Curry is also taken to control body temperature. 4. Plants are taken as tonic. 5. Root is boiled in water and strained and again boiled with bark of <i>Osyris lanceolata</i> and tuber of <i>Gonostegia hirta</i> to form a gelatinous mass. The gelatinous mass is then applied over dislocated bone and covered with Nepali paper to set the bone.
45.	<i>Valeriana jatamansi</i> Jones	Valerianaceae	Sugandhawal/ Cham Jha (सुगन्धवाल/चमज्हा)	S17	Herb	WP	1. The plant along with <i>Artemisia indica</i> and <i>Hydrocotyle sibthorpioides</i> are crushed and mixed with cow's urine and the mixture is used to bath the children to cure the weepy nature on children caused by irritation (Runchelagnu).
46.	<i>Zantedeschia aethiopica</i> (L.) Spreng.	Araceae	Darsan Pipal/ Darsan Pipal (दरशन पिपल)	S26	Herb	WP	1. Sticky product from stem is used to treat dog /snake bites.
47.	<i>Zanthoxylum armatum</i> DC.	Rutaceae	Timur/Timsi (टिमुर/टिम्सी)	S20	Shrub	Fr, Lf	1. Infusion of 3-4 fruits is used for gastric and stomach trouble. 2. Fruits act as digestive agent. 3. It is also used to decrease high blood pressure. 4. Fruits are used to increase appetite. 5. Rubbing 3/4 leaves in leg and hands helps to repel Leeches.
48.	<i>Zingiber officinale</i> Roscoe	Zingiberaceae	Aduwa/Palcha (आदुवा/पाल्चा)	S29	Herb	Rz	1. Rhizome juice mixed with honey is taken to cure cough. 2. Powder of dry rhizome (about 25 gm) with honey is given to treat dysentery. 3. The rhizome along with <i>Curcuma longa</i> (turmeric), <i>Ocimum tenuiflorum</i> (Tulsi) and <i>Trachyspermum ammi</i> (carom/jwano) are crushed and boiled with little amount of salt. The decoction obtained (about one glass twice a day) is taken in common cold. 4. Above decoction (3) is also taken to cure tonsil and throat pain. 5. Rhizome is also used in soup to warm up the body in cold season.

Note: Col. No. = Collection number; WP = Whole plant; Rt = Root; Rz = Rhizome; Tu = Tuber; St = Stem; Bk = Bark; Lf = Leaf; Tw = Twig; Fl = Flower; Fr = Fruit; Sd = Seed

Table 2: List of plants according to their values

S.N.	Values	Species	Species No.
1.	High Valued MPs (HVMPs)	<i>Achyranthes bidentata</i> , <i>Aloe vera</i> , <i>Asparagus racemosus</i> , <i>Bergenia ciliata</i> , <i>Brassica rapa</i> , <i>Centella asiatica</i> , <i>Curcuma longa</i> , <i>Nicotiana tabacum</i> , <i>Rhododendron arboretum</i> , <i>Urtica dioica</i> , <i>Zanthoxylum armatum</i> and <i>Zingiber officinale</i>	12
2.	Moderately valued MPs (MVMPs)	<i>Artemisia indica</i> , <i>Cannabis sativa</i> , <i>Cirsium verutum</i> , <i>Cuscuta reflexa</i> , <i>Datura stramonium</i> , <i>Jasminum humile</i> , <i>Lindera neesiana</i> , <i>Lyonia ovalifolia</i> , <i>Mahonia napaulensis</i> , <i>Mentha × piperata</i> , <i>Mentha spicata</i> , <i>Ocimum tenuiflorum</i> , <i>Prunus persica</i> , <i>Psidium guajava</i> , <i>Rubus ellipticus</i> , <i>Rumex nepalensis</i> and <i>Saccharum officinarum</i>	17
3.	Low valued MPs (LVMPs)	<i>Acorus calamus</i> , <i>Ageratina adenophora</i> , <i>Amaranthus viridis</i> , <i>Astilbe rivularis</i> , <i>Bombax ceiba</i> , <i>Capsicum annuum</i> , <i>Cissampelos pareira</i> , <i>Citrus medica</i> , <i>Cynodon dactylon</i> , <i>Cynoglossum zeylanicum</i> , <i>Drymaria villosa</i> , <i>Gonostegia hirta</i> , <i>Hydrocotyle sibthorpioides</i> , <i>Justicia adhatoda</i> , <i>Nephrolepis cordifolia</i> , <i>Osyris lanceolata</i> , <i>Thysanolaena latifolia</i> , <i>Valeriana jatamansi</i> and <i>Zantedeschia aethiopica</i>	19

Note: HVMPs = Used for five or more diseases; MVMPs = used for three to four diseases; LVMPs = used for up to two diseases

Table 3: List of MPs with their effectiveness

S.N.	Effectiveness	Species name	Species No.
1.	Highly Effective (HE)	<i>Aloe vera</i> , <i>Asparagus racemosus</i> , <i>Astilbe rivularis</i> , <i>Bergenia ciliate</i> , <i>Bombax ceiba</i> , <i>Brassica rapa</i> , <i>Curcuma longa</i> , <i>Cuscuta reflexa</i> , <i>Drymaria villosa</i> , <i>Lyonia ovalifolia</i> , <i>Nicotiana tabacum</i> , <i>Thysanolaena latifolia</i> and <i>Urtica dioica</i>	13
2.	Moderately effective (ME)	<i>Achyranthes bidentata</i> , <i>Acorus calamus</i> , <i>Amaranthus viridis</i> , <i>Artemisia indica</i> , <i>Cannabis sativa</i> , <i>Capsicum annuum</i> , <i>Centella asiatica</i> , <i>Cissampelos pareira</i> , <i>Citrus medica</i> , <i>Cynoglossum zeylanicum</i> , <i>Gonostegia hirta</i> , <i>Jasminum humile</i> , <i>Justicia adhatoda</i> , <i>Lindera neesiana</i> , <i>Mahonia napaulensis</i> , <i>Mentha×piperata</i> , <i>Mentha spicata</i> , <i>Ocimum tenuiflorum</i> , <i>Prunus persica</i> , <i>Psidium guajava</i> , <i>Rhododendron arboretum</i> , <i>Saccharum officinarum</i> , <i>Valeriana jatamansi</i> , <i>Zantedeschia aethiopica</i> , <i>Zanthoxylum armatum</i> and <i>Zingiber officinale</i>	26
3.	Effective (E)	<i>Ageratina adenophora</i> , <i>Cirsium verutum</i> , <i>Cynodon dactylon</i> , <i>Datura stramonium</i> , <i>Hydrocotyle sibthorpioides</i> , <i>Nephrolepis cordifolia</i> , <i>Osyris lanceolata</i> , <i>Rubus ellipticus</i> and <i>Rumex nepalensis</i>	9

Conclusion

Altogether 48 medicinal plants from 47 genera and 33 families are documented as the ethnomedicinal plants to cure the different ailments of human beings and domesticated animals from the study area. Herbs are the commonly used life form of MPs followed by shrubs, trees and a parasitic plant. Leaves are the commonly used part for the treatment of diseases. Among the 48 MPs recorded, 12 MPs are high valued MPs that are used to cure five or more ailments, 17 MPs are moderately valued that are used

to cure 3-4 ailments and 19 MPs are low valued that are used to cure 1-2 ailments. Moreover, based on the informants response on the effectiveness of the MPs, 13 MPs are reported as highly effective, 26 MPs as moderately effective and 9 MPs as effective.

The present study thus documented the traditional knowledge about the medicinal usage of the plants from the study area. The knowledge about the ethnomedicinal plants in the study area is found to transfer orally from generation to generation. The younger generations in the study are not much

interested in traditional medicine and the treasure of knowledge is found to be gradually eroding. Sustainable uses of the MPs play the vital role in primary health care and biodiversity management and conservation and in the drug development as well. However such valuable traditional knowledge about the ethnomedicinal plants is found to be eroding in the village because of the less interest of the younger generation towards it. The present study on documentation of ethnomedicinal plants will help in disseminating the traditional medicinal practices as well as to search for novel compounds to cure different ailments. Moreover, Nepal being the signatory of WTO and MAPs sector is the one from which country can gain the relative advantage and make socioeconomic transformation of Nepal and Nepalese people through the production and commercialization of medicinal herbs. For this documentation of such traditional knowledge from different corners of the country is emphasized and will be beneficial.

Author Contributions

Both the authors are involved in concept development and research designing. Salina Nagarkoti reviewed the literature, collected and analyzed the data and prepared the manuscript. Sudha Joshi Shrestha guided, edited and reviewed the manuscript and as a corresponding author is the guarantor for this article.

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