

## **SURVEY ON USAGE OF MEDICINAL PLANTS: A CASE FROM CHITWAN DISTRICT OF NEPAL**

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### **ABSTRACT**

The aim of this study was to know the commonly available medicinal plants and to document their usages. Study was carried out around periphery of 'Gyaneswor Community Forest' of Bharatpur-16 of Chitwan district of Nepal. Altogether, forty household were selected by random sampling, and key informant interview was carried out with community forest personnel's and leading farmers. Most of the respondents of Bharatpur-16 were found to be dependent on medicinal plants for their primary health care. Because of no side effect, easy availability and cost effectiveness of medicinal plants, most people were found satisfied using it. However, the use of and preference for medicinal plant was found limited to minor diseases only. The findings of this study revealed that there are many medicinal plants in our periphery that can be used as an alternative for allopathic medicines, but they need to be systematically managed and conserved.

**Keywords:** Allopathic; Ayurvedic; Cultivation; Community forest; Medicine; Processing

### **INTRODUCTION**

Nepal consists of vast biological diversity. It is ranked as 31<sup>st</sup> richest country in the world, in terms of biodiversity and 10th richest country in the Asia region (MoAD, 2017). Despite of its small coverage area in world map, the unique and rich geography, ecology and climatic condition is attributed due to the wide altitudinal range that measures from about 60 m in plains to 8848 m to the top of the world. MoAD (2017) reported that Nepal is blessed with 12 of 867 global terrestrial eco-regions, eight climatic zones (ranging from tropical to nival) and a total of 118 ecosystems. Similarly, National herbarium and plant laboratories, Kathmandu document 1, 50,000 specimens of plants.

Among which, large number of plants were regarded to have pharmacologically active ingredients. About 700 of the total plant species reported constitutes medicinal properties, of which 238 plants species have been chemically tested for their medicinal importance.

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Several authors gave different report about the medicinal plants available in Nepal. Pandey (1961) for the first time reported 73 medicinal and aromatic plants (MAPs). Then, Department of Medicinal Plants (DMP, 1970) reported 483 species; Malla and Shakya (1984) mentioned 630 species, Manandhar (2002) reported 1002 species, Shrestha et al. (2002) reported 1614 species, Baral and Kurmi (2006) reported 1792 species, Ghimire et al. (2008) revealed a total of 1950 species and recently Rokaya et al. (2012) report 1792 to 2331 plants as potential medicinal and aromatic plant among 6653 species of angiosperm plant.

The commonly available plants are considered to have high value in terms of medicinal and pharmacological importance. The World Health Organization (WHO) (2002) mentioned that about 25% of modern medicines are developed from plants sources used traditionally. World Health Organization recorded approximately over 21,000 plant species for their medicinal uses throughout the world. Also, WHO (2011) estimate that 65-80% of population from developing countries uses medicinal and aromatic plants as remedies. Similarly, the trend of using commonly available plants for minor diseases is a usual practice in Nepal. In some part of Nepal, peoples are also found to be fully dependent on plants products for major diseases and health problems like snake bite, diabetes, stone and other. Manandhar(2002) reported that medicinal plants are responsible for maintaining the health of 70-80% population of Nepal. Also, MoAD(2017) revealed that rural people in Nepal use at least 1,463 species of herbal medicinal plants.

Chitwan, an inner valley of Province No. 3 is one of the potential areas for establishment of native tropical medicinal and aromatic plants. Shukla (2015) and Malla (1994), reported that the geo-physical and ecological factors of Chitwan district is suitable for the development of rich and varied vegetation and it accommodate, most of the tropical medicinal plant species. Community forest is becoming the best conservation strategy for the vivid bio-diversity. Therefore, a survey study was carried out around the periphery of the 'Gyneshwor Community Forest' of Bharatpur-16 to find out the commonly available medicinal plant and their usage in daily life of people living there.

## METHODOLOGY

### Study area

An ethno-botanical survey was carried out in Bharatpur-16, of Chitwan district. Chitwan is an inner valley region that lies in the longitudes of 83°54' 45'' to 84°48'15''E and latitudes of 27°21'45'' to 27°52' 30''N (Google Earth, 2018). Elevation of the district ranges from 244m to 1945m(DDC, 2014 ). It is considered to be one of the potential districts to grow medicinal plant. The geo-physical and ecological factors of Chitwan are suitable for the development of rich and varied vegetation and it accommodate, most of the tropical medicinal plant species(Shukla, 2015; Malla, 1994). Our study area, Bharatpur-16, Brahampur is

located in northwest part of Chitwan district. It is 8 km away from Narayanghat, the main market hub of the district. A community forest namely 'Gyneshwor Samudayik Ban' is situated in the study area which covers a total area of 280 hectare (Munteanu, 2010). The forest is enriched with different kind of pharmaceutically important medicinal plants like Kurilo (*Asparagus racemosus*) Wild. The community forest provides the user group an opportunity to collect the high value medicinal plants from forest at high time to utilize them for various purpose such as to treat the disease, etc.

### **Research Design**

Survey was carried out during Jan-Feb, 2018 in Gyneshwor Community Forest periphery. About forty community forest user households around the forest periphery were selected randomly and a scheduled interview was carried out. Key informant survey (KIS) was carried out with the personnel of community forest and leading medicinal plant cultivator/farmer. Similarly, for secondary data collection several online open access peer reviewed national and international journals, reports, conference proceedings, related website and technical bulletins were reviewed. Also the publication of District Agriculture Development Office Chitwan (DADO), District Forest Office (DFO) Chitwan, and other local INGO and NGOs were studied. The obtained data were entered in the Microsoft Excel 2010 and IBM Statistical Package for the Social Sciences (SPSS) for descriptive analysis. Graphs are generated through both SPSS and Microsoft-Excel 2007.

## **RESULTS AND FINDINGS**

On the basis of information collected, the followings findings and discussion are presented in different table, diagrams, figures and graphs and interpreted them accordingly:

### **Demographic features**

A total of 40 informants (18 males and 22 females) aged between 24 to 75 were interviewed in which 45% respondent were male and 55% were female. The average age of informants was 46 year old. Illiteracy rate was found 37.5% and the literacy rate was 67.5%. Studies showed that majority of peoples in the community periphery were involved in agriculture, with total of 75% farmers, 17.5% service holder and 7.5% entrepreneur. About 85% of the population was found to grow medicinal plants in their kitchen garden and 87.5% population was involved in collection and marketing of medicinal plants from the community forest (Field Survey, 2018).

### **Preference for Medicinal Plant**

Majority of respondent (90%) preferred medicinal plant for the treatment of disease over processed medicine. However, all of them were not found to be involved in preparing medicines for treatment of diseases and disorders. Only 77.5% population have prepared medicine using medicinal plant for curing cuts, burns and diseases,

while 22.5% population had never used medicinal plant for preparing medicine (Figure-2).

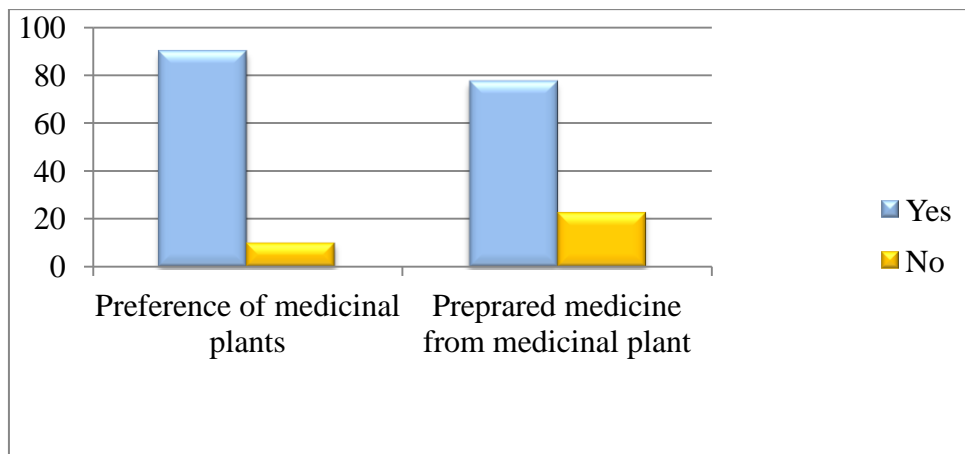


Figure 2. Respondent Preference for Medicinal Plant

#### Preference for Ayurvedic Medicines (Allopathic Medicine)

For minor diseases, like common cold, minor allergies, burns, cuts, cough and others 82.5% population preferred to use Ayurvedic medicines and the rest 17.5% population preferred to use allopathic medicine. However, for treatment of major diseases like cancer, stone, diabetes only 10% preferred to use Ayurvedic medicine and 90% population preferred to use allopathic medicine (Fig. 3).

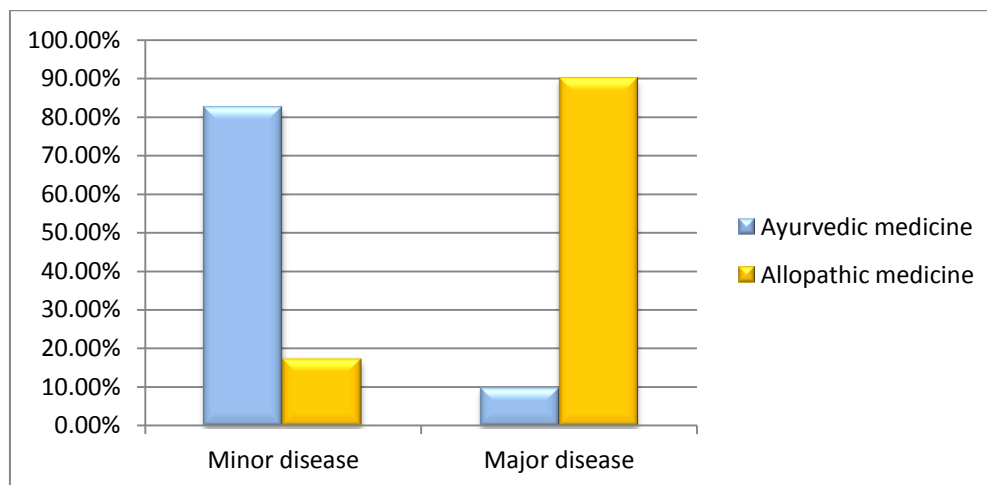


Figure 3. Percentage of respondent preferring ayurvedic medicine over allopathic medicine for major and minor diseases

### Taxonomic Diversity in the community and Plants Used for medicine

Forty-four medicinal plant species belonging to 29 families were found to be used by the local community. Among which 14 plant species were used to treat stomach disorders like stomachache, diarrhea, dysentery, constipation and others, 9 plant species were used for wound healing, 8 plant species were used for treatment of cold, 7 plant species were found to be used for cough, 3 plant species were found to be used for fever. Similarly, 4 plant species were used to recover diabetes, 3 plant species were used to maintain blood pressure, 3 species were used for treating stone, 3 plant species were used as blood purifier, 3 plant species were used for menstrual problem, 2 species were used for improving lactation of females after pregnancy, 2 species for toothache and 1 species was found to be used for treating cancer.

### Satisfaction Gained by using Medicinal Plants

The medicinal plant users were found satisfied with its effect to a great extent. Majority of respondent about 62.5% reported a complete healing effect of medicinal plant for treatment of minor disease. However, 35% of the respondent felt moderate healing effect and 2.5% respondent felt appreciable effect of medicinal plant for curing minor diseases (Figure 4). Similarly, for major diseases, 20% of the respondent reported to feel a moderate healing effect with the use of medicinal plants. About 32.5% population was found to feel appreciable healing effect and 47.5% population was found to feel negligible healing effect. Almost the entire respondent about 97.5% said that they never noticed any side effect of medicinal plants. However, only 2.5% of respondent reported to the side effect of medicinal plant (Figure 5). Respondent told that a medicinal plant, locally called Dahikamala (*Rhustypkina* L.) was found to lower the blood pressure, if taken in excess amount.

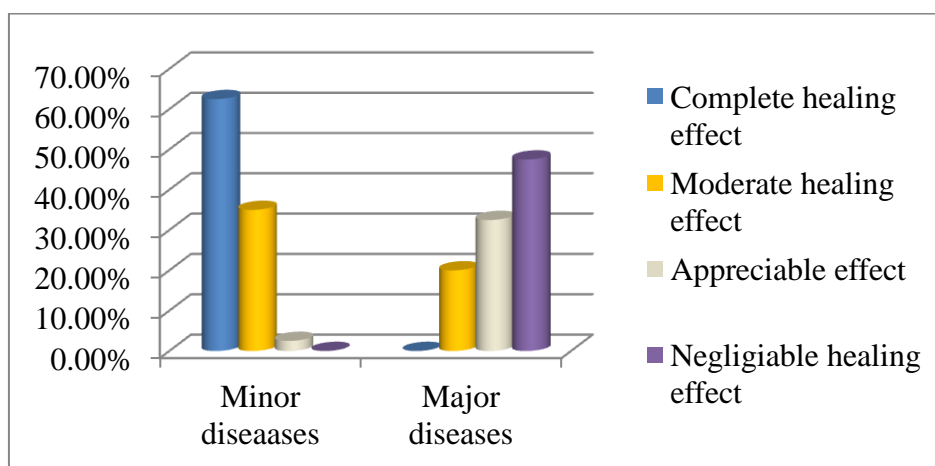


Fig. 4. Various category of healing effect among respondent

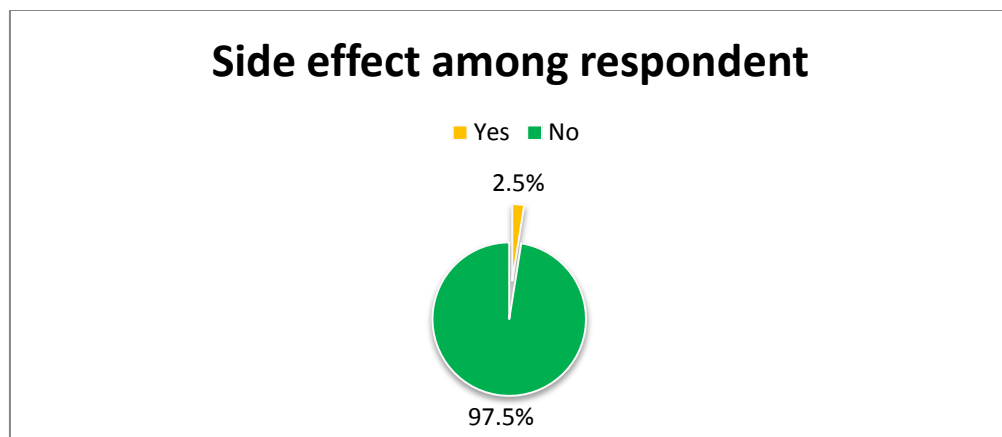


Figure 5. Percentage of Respondent Experiencing the Side Effect of Medicinal Plant  
The usages of commonly available medicinal plants are described in the table below:

Table 1. Commonly Cultivated Medicinal Plant in Study Area

S. N.	Common Name	Biological Name	Family	Used for	Used parts	Propagated by
01.	Besar (Turmeric)	<i>Curcuma longa</i> (L.)	Zingibeaceae	Rhizome powder is boiled with water for treating common cold. Paste is used in inflammation, wound healing	Rhizom e	Rhizome
02.	Tulsi	<i>Ocimum sanctum</i> (L.)	Lamiaceae	Leaf decoction used for cough and cold, respiratory disorders and reduces stress	Whole plant	Seed
03.	Neem	<i>Azadirachtain dica</i> A. Juss.	Meliaceae	Leaf bark decoction used to cure fever, leaf extract used for skin diseases and as botanical insecticide	Leaf, bark	Seed, Cutting
04.	Ghiukumari, Aloe	<i>Aloe vera</i> (L.)	Liliaceae	Leaf gel used to treat wounds and burns. Used as cosmetic	Leaf	Leaf, offset
05.	Sarpagandha , Snake plant	<i>Rauwolfiaserpentina</i> (L.) Benth ex Kurz	Apocynaceae	Treatment of high blood pressure. Root powder is applied on area of snake or insect bite. Root decoction used for uterine contraction	Roots, leaves	Seed, stem cutting, Root cutting
06.	Kurilo, Asparagus	<i>Asparagus racemosus</i> Willd.	Asparagaceae	Powdered root is considered as tonic. Consumption of roots supports milk production in females. Also considered beneficial for treating kidney stone	Root, tuber, stem, fruit	Seed, Cutting

S. N.	Common Name	Biological Name	Family	Used for	Used parts	Propagated by
07.	Dhaniya, Cilantro	<i>Coriandrums ativum</i> (L.)	Umbelliferae	Leaves and seeds are used as appetizer. It stimulates digestion.	Whole plant	Seed
09.	Aduwa, Ginger	<i>Zingiberofficinale</i> Roscoe	Zingiberaceae	Rhizome water is used for cold, throat sore Used for stomach disorder	Rhizome	Rhizome
10.	Pipla, Long Pepper	<i>Piper longum</i> (L.)	Piperaceae	Powdered leaf along with honey is useful for cold, cough Infusion of root used for stomachache, bronchitis	Root, Leaf	Seed, stem cutting
11.	Amala, Indian gooseberry	<i>Phyllanthusof ficinialis</i> (L.)	Phyllanthaceae	Juice of fruit or fresh fruit is consumed to reduce blood sugar Barks and fruits are useful for diarrhea, dysentery	Fruit, Barks	Cutting
12.	Jira, Cumin	<i>Cuminuncyminum</i> (L.)	Umbelliferae	Cumin seed are used for diarrhea, colic disorder, bloating. It is used to start menstruation earlier.	Seed	Seed
13.	Tejpatta, Indian cassia	<i>Cinnamomum tamala</i> (Buch - Ham.) T. Nees& C.H. Eberm	Lauraceae	Powder of bark is mixed with honey for treating cough, asthma Paste of bark is applied over wound, inflammation	Leaves, Barks	Cutting, Seed
14.	Titepati	<i>Artemisia vulgaris</i> (L.)	Asteraceae	Stomach disorder , Leaf paste applied on wounds, cuts	Whole Plant	Seeds and basal cutting
15.	Datura	<i>Datura metal</i> (L.)	Solanaceae	Paste of roasted leaves are applied over wound Leaf smoke is used to treat asthma	Leaf, seed	Seed, Root cutting
16.	Bryophyllum	<i>Bryophyllum innatum</i> (Lam .) Oken	Crassulaceae	Decoction of leaves is used for kidney stone, stomachache Leaf juice applied for ear pain Extract of aerial part treat cancer Root used for blood pressure	Leaf, Root	Leaf
17.	Asare, Curry leaf	<i>Murrayakoen igii</i> (L.) Sprengel	Rutaceae	Juice of leaf is used to treat diarrhea Paste of leaf applied in hair helps hair growth Juice or paste of leaf is applied to cuts, burns, wound	Leaf	Seed, Stem cutting

S. N.	Common Name	Biological Name	Family	Used for	Used parts	Propagated by
18.	Methi, Fenugreek	<i>Trigonella foenum-graecum</i> (L.)	Fabaceae	Paste of fenugreek leaf is applied in hair to reduce dandruff Seeds are useful for diabetic patient They improve lactation after delivery	Leaf, Seed	Seed
19.	Pudina, Mint	<i>Mentha sp.</i> (L.)	Lamiaceae	Mint leaf are used for toothache Mint leaves are added to steam bath for relieving running nose	Leaf	Cutting

Table 2. Usage of Collected medicinal plants from the community forest

S.N.	MAPs collected	Scientific Name	Family	Uses	Used part	Propagated by
01.	Abhijalo	<i>Drymaria cordata</i> (L.)	Caryophyllaceae	To treat gastric trouble, Pneumonia	Whole plant, fresh leaves	Grow wild
02.	Chiraito	<i>Swertia chirayita</i> (Roxb. ex Fleming) Karsten	Gentianaceae	Increases metabolism, swiftly lowers fever and constipation.	All parts	Seed
03.	Dahikamala	<i>Rhustypina</i> (L.)	Anacardiaceae	Berries are used as astringent and blood purifier. Roots are used to treat boils.	Roots	Seed
04.	Gandhe	<i>Ageratum conyzoides</i> (L.)	Asteraceae	Aqueous extracts of leaves or whole plants are to treat colic, colds, fevers and diarrhea.	Whole plant	Grow wild
05.	GhodTapre	<i>Centella asiatica</i> (L.) Urban	Apiaceae	Used for fatigue, anxiety, improving memory and intelligence.	Whole plant	Grow locally and wild
06.	Lajjawatijhar	<i>Mimosa pudica</i> (L.)	Fabaceae	Root is used in treatment of dysentery, vaginal and uterine complaints, and skin diseases.	Root and leaves	Propagated by vegetative means
07.	Pahelolahara	<i>Clematis b Buchananiana</i> (de Candolle)	Ranunculaceae	Juice of the root is used in the cough and to cure peptic ulcer.	Roots	Cuttings
08.	Tulsi	<i>Ocimum sanctum</i> (L.)	Lamiaceae	Leaf decoction used for cough and cold, respiratory disorders and reduces stress.	Whole plant	Seed
09.	Ashwagandha	<i>Withania somnifera</i> (L.) Dunal	Solanaceae	It is used to lower blood pressure and to increase hemoglobin and hair melanin.	Roots	Seed
10.	Gurjo	<i>Tinospora cordifolia</i> (Thunb.) Miers	Menispermaceae	Used in different metabolic disorders and gases	Whole part	Cutting



S.N.	MAPs collected	Scientific Name	Family	Uses	Used part	Propagated by
11.	Jwano	<i>Trachyspermum mmi</i> Sprague	Apiaceae	Fruits are used to cure abdominal tumors, piles, lack of appetite.	Seeds	Seeds
12.	Kutiko	<i>Neopicrorhizascro phulariiflora</i> (Pennell) Hong	Scrophulariaceae	Used for indigestion, fever, jaundice, etc	Rhizome	Rhizome and Root
13.	Neem	<i>Azadirachta indica</i> A.Juss.	Meliaceae	Leaf bark decoction used to cure fever, leaf extract used for skin diseases and as botanical insecticide	Leaf, bark	Seed or cuttings
14.	Mint	<i>Mentha sp.</i> (L.)	Lamiaceae	Mint leaf are used for toothache Mint leaves are added to steam bath for relieving running nose	Leaf and stem	Cutting
15.	Hadchur	<i>Viscum album</i> (L.)	Viscaceae	To lower blood pressure and heart rate, and induce sleeping.	All parts of the plant	Vegetative or seed propagation
16.	Raktachandan	<i>Pterocarpus santalinus</i> (L.f.) Kuntze	Fabaceae	Heart-wood are for heart diseases, blood purifier, headache and skin diseases.	Heart wood	Seeds
17.	Rato Mushroom	<i>Amanita muscaria</i> (L.) Lam.	Amantiaceae	Against diarrhea	Whole plant	Spores
18.	Bhang	<i>Cannabis indica</i> (L.)	Cannabaceae	Useful in combating menstrual discomfort and reproductive problems.	Leaves	Seed
20.	Tejpatta/ Indian Cassia	<i>Cinnamomum tamala</i> (Buch.-Ham.) T.Nees & C.H.Eberm	Lauraceae	Powder of bark is mixed with honey for treating cough, asthma Paste of bark is applied over wound, inflammation	Leaves, Barks	Cutting, Seed
21.	Jamun	<i>Syzygium cumini</i> (L.) Skeels	Myrtaceae	Leaves are used for treatment of diabetes, and menstrual problems.	Fruits, Seeds, Leaves, bark	Air layering and softwood grafting
22.	Nerbanshe/ Nirmanse	<i>Delphinium denudatum</i> Wall	Ranunculaceae	Against sugar patients, stomach pain and it is good blood purifier.	Relieve Root, Seed	Seeds are propagating materials
23.	Chutro	<i>Berberis aristata</i> DC	Berberidaceae	Roots are used for remedy	Poisonous Roots, Fruits, Stem and Leaves	Seed
24.	Dalchini	<i>Cinnamomum verum</i> J.Presl	Lauraceae	Paste of this herb is used to reduce pain, inflammation and eye related disorders.	Bark, Leaves and berry fruit	Cuttings, Layering and by dividing the root ball
25.	Gheukumari	<i>Aloe vera</i> (L.) Burm.f.	Liliaceae	Leaf gel used to treat cut, wounds and burns Used as cosmetic	Leaf	Leaf, offset

S.N.	MAPs collected	Scientific Name	Family	Uses	Used part	Propagated by
26.	Kurilo	<i>Asparagus racemosus</i> Willd.	Asparagaceae	Powdered root is considered as tonic Consumption of roots supports milk production in females Also considered beneficial for treating kidney stone	Root, tuber, stem, fruit	Seed, Cutting
27.	Lude	-?????	-	Root is used in the form of juice, paste, decoction to treat intrinsic hemorrhage, diarrhea, hoarseness of voice, cough.	Root	-
28.	Pipla	<i>Piper longum</i> (L.)	Piperaceae	Powdered leaf along with honey is useful for cold, cough Infusion of root used for stomachache, bronchitis	Root, Leaf	Seed, stem cutting
29.	Sarpagandha	<i>Rauwolfia serpentina</i> (L.) Benth. ex Kurz	Apocynaceae	Treatment of high blood pressure Root powder is applied on area of snake or insect bite Root decoction used for uterine contraction	Roots, leaves	Seed, stem cutting, Root cutting
30.	Sotuwa	<i>Paris polyphylla</i> Sm.	Melanthiaceae	Used against any poisonous bite, burn, cut or injury.	Rhizome	Seed
31.	Rudhilo	<i>Pogostemon benghalensis</i> (Burm.f.) Kuntze	Lamiaceae	Leaves are used to clean wounds and promote their healing. Used for lactating cows	Leaf, Root	Found wild
32.	Harro	<i>Terminalia chebula</i> Retz	Combretaceae	Paste of fruits is used to clean wounds, to provide relief to eyelids in cases of conjunctivitis.	Bark, Fruit	Cutting
33.	Bojho	<i>Acorus calamus</i> Lin.	Acoraceae	Used for cold and cough, cure piles, loss of appetite, urinary stones, and to improve memory.	Rhizome, leaf	Rhizome

## DISCUSSION

The user groups of community forest were found have good knowledge of medicinal plants and their usage. They used 44 medicinal plants for treating 62 ailments. A single plant was found to have multiple benefits. A similar result for the usages of medicinal plant was reported by Singh et al., (2012). The authors reported 66 medicinal plant species to treat various disorders, including gastro-intestinal disorder and dermatological disorders majorly in Rupandehi district. Similarly, Uprety et al. (2010) found 56 plant species in Rasuwa district, which were used for treating gastro-intestinal problems, fever and headache. Bhattarai et al., (2006) found 91 locally used medicinal plants which were used to treat 93 ailments in Manang district.

Mostly, the farmers and elderly people prepared medicine from medicinal plant. The respondent who were involved in job or business were less involved in the preparation of medicines from medicinal plant. They mostly used the allopathic medicines. However, most of the respondent, irrespective of their occupation preferred ayurvedic medicines for the treatment of minor diseases. Since the user groups have not noticed much side effect of medicines prepared from medicinal plants therefore, they use such plant instantly for treatment. Similar results were reported by Joshi et al. (2011). The authors reported that the use of medicinal plant was limited to minor health related problems like cuts, wounds, gastro-intestinal problems, fever, headache, cough and others in Macchegaun, Kathmandu.

Our finding revealed that the majority of the people preferred allopathic medicines for the treatment of major diseases. It is because of the slow acting effect of ayurvedic medicine. Only a few peoples prefer to use ayurvedic medicine even for the major disease. The respondent explained that they have experienced positive effect of ayurvedic medicine for curing major diseases. They believed that continuous use of medicinal plants in proper way can cure the so called medically incurable diseases like cancer. Unlike the processed medicine, the medicinal plants gave a natural healing without the worries of any side effect. Gewali (2008) also reported that the folk medicines have no or little side effects. Similarly, Koirala and Khaniya (2009) reported that though the effect of medicines prepared from medicinal plants is slow, but medicines do not have any side effects. Further, they reported that such medicines are proved to be successful in treatment of many major diseases like hepatitis (any type), multiple sclerosis, any type of arthritis, many cancerous diseases like breast cancer, prostate cancer, and also many cases of tumor and cysts, metastatic conditions, immunity, etc. In our finding, we found that peoples used the medicinal plants to cure cancer, kidney stone, uterine stone, asthma, piles, conjunctivitis, jaundice, pneumonia, poisonous bite and others (Table 1 and 2). Further, common availability of medicinal plants in their kitchen garden, field and community forest makes its use cost effective over the allopathic medicines. Koirala and Khaniya (2009) also reported that the effect of medicinal plant is not only observed in human health but also in better living standard and income. Harvesting and gathering of the medicinal and aromatic plants provide subsistence living income.

### CONCLUSION

The peoples living around the community forest periphery were found to use the medicinal plants for curing of minor and major diseases. Less side effect, easy availability and cost effectiveness of the medicinal plants make it a preference over allopathic medicines, for most of the rural household. Peoples were found to be satisfied by the effectiveness of medicinal plants. However, the usage of medicinal plants completely grounds on the indigenous knowledge and traditional beliefs of the peoples. Such knowledge differs from community to community and also with religion, culture and geography.

Therefore, a chemical screening and evaluation of such medicinal plants must be carried out so as to identify the bioactive compound for further preparation of drugs. It is suggested that providing training on cultivation and identification of the important medicinal and aromatic plants would be beneficial to commercialize, conserve and utilize the commonly available medicinal plants.

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