



Ethnobotanical uses of locally available plants for respiratory diseases by fifteen ethnic groups of Nepal: A review

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Abstract: Nepal, a mountainous country having diversified topographic and climatic conditions, gives rise to a wide range of flora and fauna. Nepal, more than 2300 plant species are traditionally used by people belonging to different ethnic groups to cure various diseases. 126 ethnic groups, the study analyzes the ethnobotanical use of 15 ethnic groups from 29 districts including a total of 119 species belonging to 61 families. This study helps in the analysis of indigenous knowledge of plants used in the treatment of respiratory disorders by different ethnic groups of Nepal. Relevant information related to different ethnic groups and ethnobotanical uses was taken from secondary sources such as articles, newspapers, and various national and international portals. Among those 119 species, the composition of herbs, trees, shrubs, climber, and grasses were 48%, 27%, 20%, 4%, and 1% respectively, and frequently used plant part is root. These were mainly used in the treatment of respiratory diseases like pneumonia and asthma. More plant species were used to cure Asthma than Pneumonia. At present, some species are under serious threat due to habitat destruction and over-exploitation indicating the urgent need for documentation and conservation of the useful plants and their habitats. Different plant species can improve local economies through proper harvesting, adequate management, and development of modern techniques to maximize their use.

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Keywords: Ethnomedicine, Ethnic communities, Pneumonia, Asthma, Medicinal plants

INTRODUCTION

Ethnobotany is the study of a region's plants and their practical uses through the traditional knowledge of local culture and people (Kunwar and Bussmann, 2009). It is the practicable use of local flora for many aspects of life such as plants as medicines, foods, intoxicants, and clothing. As Nepal



has a wide variation in its climate and geography, it contains a disproportionately large variety of plants and creatures comparative with its size (Paudel et al., 2011). Being a relatively new field of study in Nepal, ethnobotany has taken its own way of development, depending on local traditions (Malla, 2009). It has become a vital and crucial area of research and development in research management, sustainable utilization, and conservation of biodiversity and socio-economic development. Hence, botanists, social scientists, anthropologists, and practitioners of indigenous medicines all over the world are engaged in the study of man-plant interactions in the natural environment (Biology Discussion, 2015). The ethnobotanical knowledge focuses on the cultivation and protection of those plant species to develop new sources for some plant products and agro-based industries for the upliftment of certain ethnic groups and their primary health care, (Bhatta, 1999; Biology Discussion, 2015) as 80-90% of the people who are residing in the rural areas directly or indirectly depend on various traditional medicines (Kunwar and Bussmann, 2009). In the world, 10-18% of all plant species are used medicinally, while in Nepal, people traditionally use more than 2300 plant species as medicine to cure various diseases and disorders like diarrhea, rheumatism, blood pressure, constipation, piles including infectious diseases, hypertension, etc. (Rokaya, 2012). In addition, they are regarded as the source of potentially therapeutic drugs for healing various kinds of diseases (Cox and Ballick, 1994). Moreover, the different ethnic groups of Nepal have a major role to preserve such a tradition of using plants for various purposes.

Enriched by the biodiversity, culture, and religion from east to west, Nepal has reported 126 castes/ethnic groups in the census 2011 (CBS, 2011). The majority of these groups depend on non-timber forest products as a part of their livelihood strategy (Rijal, 2008). The extent of plant use differs with location (Kunwar and Bussmann, 2008). In Nepal, very few ethnobotanical studies have been carried out and the activities on such studies in Nepal are in developing stages (Manandhar, 2002). Hence, the traditional uses of a large number of plants still wait for relevant documentation (Rijal, 2011). From ancient times various kinds of diseases are arising in the world, among which respiratory disorders are the oldest form of the disease. Respiratory diseases are types of diseases that affect the lungs and other parts of respiratory system which may be caused by smoking, tobacco or other form of pollutions. Respiratory diseases include asthma, pneumonia, COPD, lung cancer pulmonary fibrosis. With the advancement in technology and modern lifestyle, a large number of population is suffered by respiratory disorders, which is the leading cause of death and disability in the world. Pneumonia kills millions of people each year and is a leading cause of death among children under 5 years and about 334 people suffer from asthma. So prevention, control, and cure of these diseases must be on top priority in global decision making.

With the advancement of research and study, people are generally aware of the harmful effects of allopathy and synthetic product which leads people to realize the importance of the natural way of life. From ancient times numbers of herbal remedies are being used in different parts of the world for the treatment of respiratory disorders. Large numbers of plants with medicinal importance are used to treat respiratory disorders which are transferred generation to generation particularly by the rural population and forest-dwelling ethnic communities. Use of locally available medicinal plants cheap and cost-effective. Sustainable utilization, management and conservation efforts to traditional knowledge of plants seem necessary, as uncontrolled, exploitative, and ignorance of young people towards traditional knowledge practices have brought some of Hal plants on the verge of extinction (Kunwar et al., 2013; Teka et al., 2020). Hence, this study analyses the indigenous knowledge of plants among the different ethnic communities of Nepal and its objective is to investigate the connection of ethnic groups with distinctive species of plants & explore the indigenous knowledge of those species to cure some respiratory diseases like asthma and pneumonia.



MATERIALS AND METHODS

Secondary data are the major sources of information on this study (Dhami et al., 2020). Only relevant information related to ethnobotanical use of locally available plants for respiratory disorder among the major 15 ethnic groups (Chepang, Darai, Gurung, Lepcha, Limbu, Magar, Majhi, Meche, Munda, Newar, Satar, Sherpa, Tamang, Thami, Tharu) of Nepal were taken into account for further analysis and discussions. Data were extracted from published national and international articles, national newspapers, and online portals (Timilsena et al., 2020). The Central Bureau of Statistics and National Population and Housing Census 2011 were considered as the reliable sources to extract the data related to different ethnic groups. All these data were organized and accumulated in sequential order, after consistent investigation; finally, a full review article was prepared.

RESULTS AND DISCUSSION

Among 126 ethnic groups of Nepal, this study analyses the Ethnobotanical use of major 15 ethnic groups (Table 1) from 29 districts of Nepal. The earliest studies we found were published in 1984 and the recent studies are published in 2020. Medicinal plants are important in primary health care systems in Nepal and thus most of the ethnic groups have been relying on it from the dawn of civilization for the treatment of different diseases and for their subsistence of livelihood. A total of 119 species belonging to 61 families (Table 2) is reported in the literature as being traditionally utilized in Nepal to treat various respiratory disorders. Most of the reported medicinal plant species belong to the family Araceae, Piperaceae, and Euphorbiaceae with 5 species in each family. The highest widespread life form is an herb (48%) followed by Tree (26%), Shrub (20%), Climber (5%), and Grass (1%). Similarly, the most frequently used plant part is Root (25%) followed by Bark (13%), Seed (12%), Whole plant (11%), Rhizome (11%), Flower (9%), Fruits (8%), Leaves (7%) and Others (4%) (Figure 1).

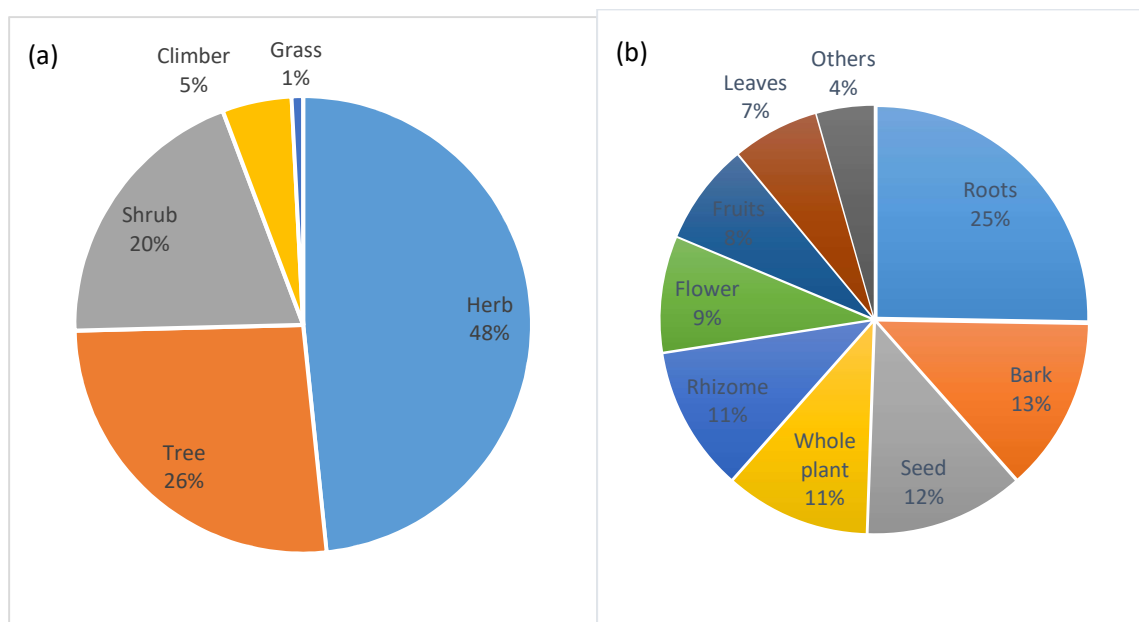


Figure 1. An overview of (a) life form and (b) plant parts used of different species to cure asthma and pneumonia



CONCLUSION

From this study, it is concluded that Nepal is rich in ethnobotanical use. This paper has documented the medicinal plants used by major ethnic groups for the treatment of respiratory diseases. Among 15 ethnic groups, Darai & Thami are the least while Majhi & Chepang are the most researched ethnic communities regarding their ethnobotany. Various types of plants and their parts are used to cure respiratory diseases by these ethnic communities. Among them, the highest widespread life form is an herb (48%), and the most frequently used plant part is the root (25%). Despite the high potentiality of traditional medicine, ethnobotanical knowledge has been shrinking due to the lack of systematic transformation of conventional knowledge to the young generation. Therefore, high priority should be given for the documentation of traditional knowledge regarding the ethnobotanical uses of various medicinal plants belonging to the various ethnic communities and ensured their property rights.

CONFLICTS OF INTERESTS

The authors declare no conflict of interest.

Table 1: List of the 15 ethnic groups with their population % and major residing districts in Nepal

S. N.	Ethnic Groups	Percentage (%)	Residing Districts
1	Magar	7.12%	Rukum, Tanahu, Syangja, Palpa, Rolpa,
2	Tharu	6.56%	Kailali, Kanchanpur, Dang, Banke, Rupandehi, Kapilvastu, Chitwan,
3	Tamang	5.81%	Rasuwa, Makawanpur, Nuwakot, Dhading, Kavrepalanchowk and Sindhupalchowk
4	Newar	4.99%	Kathmandu, Lalitpur, Bhaktapur, Kaski and Chitwan
5	Gurung	1.97%	Manang, Mustang, Kaski, Lamjung, Gorkha, Parbat and Syangja
6	Limbu	1.46%	Sankhuwasabha, Taplejung, Terathum, Panchthar, Dhankuta and Ilam
7	Sherpa	0.43%	Solukhumbu, Dolakha, Sindhupalchok, Rasuwa and eastern Taplejung
8	Majhi	0.32%	Kavrepalanchowk, Ramechhap, Dolakha, Okaldhunga and Khotang
9	Chepang	0.26%	Makwanpur, Dhading, Chitwan, Gorkha, Tanahu and Lamjung
10	Satar	0.20%	Jhapa, Morang and Sunsari
11	Darai	0.06%	Chitwan, Tanahu, Gorkha, Palpa, Nawalparasi, Dhading and Makwanpur
12	Thami	0.05%	Dolakha & Sindhupalchok
13	Meche	0.02%	Jhapa
14	Lepcha	0.01%	Ilam and Jhapa
15	Munda	0.0088%	Jhapa, Morang and Sunsari

Table 2: Ethnobotanical use among different ethnic groups for respiratory disorders

Chepang						
Binomial Name	Local Name	Family	Life form	Parts Used	Uses	Source
<i>Acorus calamus</i>	Bojho	Araceae	H	Rhizome	Asthma	Tamang, 2018
<i>Azadirachta indica</i>	Neem	Meliaceae	T	Leaf	Asthma	
<i>Calotropis gigantea</i>	Aank	Asclepiadaceae	H	Latex	Asthma	
<i>Justicia adhatoda</i>	Asuro	Acanthaceae	S	Leaf	Asthma	
<i>Ocimum basilicum</i>	Babari	Lamiaceae	H	Leaf	Asthma	
<i>Tinospora sinensis</i>	Jundro lahara	Menispermaceae	C	Stem	Asthma	
<i>Zingiber officinale</i>	Aduwa	Zingiberaceae	H	Rhizome	Asthma	Rijal, 2011
<i>Centella asiatica</i>	Bhui jhar Ghodtapre	Apiaceae	H	Leaf	Asthma	
<i>Curculigo orchoides</i>	Bhakmat	Hypoxidaceae	H	Root	Asthma	
<i>Datura metel</i>	Kalo Dhaturu	Solanaceae	H	Seed	Asthma	



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<i>Erythrina stricta</i>	Leksi/Falteo	Fabaceae	T	Bark	Pneumonia	
Darai						
<i>Solanum capsicoides</i>	Kantakaari	Solanaceae	S	Root	Asthma	Poudel & Singh, 2016
<i>Ocimum santum</i>	Tulsi	Lamiaceae	H	Leaf	Asthma	
Gurung						
<i>Abies spectabilis</i>	Gobre salla	Pinaceae	T	Leaves	Asthma	Malla et al., 2015
<i>Citrullus colocynthis</i>	Airalu, indreyani	Cucurbitaceae	H	Fruits	Pneumonia	Cobrun, 1984
<i>Cannabis sativa</i>	Bhang, ganja	Cannabaceae	S	Seeds	Asthma	Malla et al., 2015
<i>Calotropis procera</i>	Aank	Asclepiadaceae	T	Bark, Leaf	Asthma	
<i>Dolichos staintonii</i>	Jungalee bhatamas	Fabaceae	H	Seeds	Asthma	
<i>Eleusine indica</i>	Kodojhar, Dande	Poaceae	S	Roots	Asthma	
<i>Euphorbia hirta</i>	Dudhejhar, chimphar jhar	Euphorbiaceae	H	Whole plant	Asthma	
<i>Hypericum japonicum</i>	Kanike ghaas	Hypericaceae	S	Whole plants	Asthma	
<i>Justicia adhatoda</i>	Asuro	Acanthaceae	S	Leaves	Asthma	
<i>Myrica esculenta</i>	Kaphal	Myricaceae	T	Steam, bark	Asthma	
<i>Piper chaba</i>	Pippali	Piperaceae	H	Fruits	Asthma	
<i>Piper mullesua</i>	Sindri	Piperaceae	H	Fruits	Asthma	
<i>Semecarpus anacardium</i>	Bhalaayo, khurdan	Anacardiaceae	T	Fruits	Asthma	
Lepcha						
<i>Acacia pennata</i>	Arari	Fabaceae	T	Root	Pneumonia	Bhattarai, 2017
<i>Achyranthes aspera</i>	Apmarga/Muktek (L)	Amaranthaceae	H	Root	Pneumonia	
<i>Aegle marmelos</i>	Bel	Rutaceae	T	Root, fruit	Pneumonia	
<i>Cucumis sativus</i>	Kankro	Cucurbitaceae	C	Seed	Pneumonia	
<i>Dendrocalamus hamiltoni</i>	Choya bans	Gramineae	T	Buds	Pneumonia	
<i>Tagetes patula</i>	Sayapat/Takpurip (L)	Asteraceae	H	Inflorescence	Pneumonia	
<i>Mussaenda macrophylla</i>	Dhobini/tabaknyom (L)	Rubiaceae	S	Root	Pneumonia	
<i>Ocimum tenuiflorum</i>	Tulsi	Lamiaceae	H	Whole plant	Pneumonia	
<i>Oroxylum indicum</i>	Tatelo	Bigoniaceae	T	Stem, bark, flower, seed	Pneumonia	



<i>Swertia chirayita</i>	Arari	Gentianaceae	H	Whole plant	Pneumonia	
<i>Drymaria cordata</i>	Abhijalo / tamjungyo(L)	Caryophyllaceae	H	Leaf	Pneumonia	Tamang, 2014
Limbu						
<i>Achyranthes aspera</i>	Ulte kuro	Amaranthaceae	H	Root	Pneumonia	Limbu, 2013
<i>Achyranthes bidentata</i>	Dattiwan	Amaranthaceae	H	Root	Pneumonia	
<i>Aconitum</i> sps.	Phalebis	Ranunculaceae	H	Root	Asthma	
<i>Jasminum arborescens</i>	Chameli	Olaeaceae	S	Bud	Pneumonia	
<i>Jasminum humile</i> L.	Jai	Olaeaceae	S	Leaf	Pneumonia	
<i>Ranunculaceae</i>	Khanyu	Moraceae	T	Bud/ latex	Pneumonia	
<i>Tagetes patula</i>	Sayapatrphul	Asreraceae	H	Flower	Pneumonia /	
<i>Thysanolaena maxima</i>	Amliso	Poaceae	Tufted S	Root	Pneumonia	
<i>Viola</i> sps.	Dudhe lahara	Violaceae	H	Fruit	Pneumonia	
Magar						
<i>Amaranthus viridis</i>	Lunde	Amaranthaceae	H	Root	Children pneumonia	Sapkota, 2008
<i>Artemisia dubia</i>	Titepati	Compositae	H	Whole plants	Asthma	
<i>Cucumis sativus</i>	Kankro	Cucurbitaceae	C	Fruit, Seed	Chronic asthma	
<i>Demostachya bipinnata</i>	Kus	Poaceae	H	Whole plants	Asthma	
<i>Ficus religiosa</i>	Pipal	Moraceae	T	Bark	Asthma	
<i>Zanthoxylum armatum</i>	Timur	Rutaceae	S	Fruit	Asthma	
<i>Artemisia vulgaris</i>	Patik (M)	Compositae	H	Leaf	Asthma	Acharya, 2012
<i>Cinnamomum camphora</i>	Tiji (M)	Lauraceae	T	Leaf	Pneumonia, Asthma	
<i>Lobelia pyramidalis</i>	Eklebir	Campanulaceae	H	Flower, leaf, bark	Asthma	
<i>Mallotus philippensis</i>	Rohini (M)	Euphorbiaceae	T	Fruit, root	Asthma	
<i>Myrica esculenta</i>	Hande kaphal	Myriacaceae	T	Bark	Asthma	
<i>Ocimum tenuiflorum</i>	Ban tulasa	Labiatae	H	Whole plant	Asthma	
<i>Semicarpus anacardium</i>	Bhalayo	Anacardiaceae	T	Fruit	Asthma	



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<i>Spindus mucorossi</i>	Jharlyang	Sapindaceae	T	Fruit	Asthma		
<i>Tinospora cardifolia</i>	Gurjegana	Menispermaceae	C	Stem	Asthma		
<i>Vitex negundo</i>	Simali	Valerianaceae	S	Leaf	Asthma		
<i>Datura stramonium</i>	Dhaturo	Solanaceae	S	Flower, seed, leaf	Asthma		
Majhi							
<i>Acorus calamus</i>	Bojho	Araceae	H	Root	Asthma	Shrivastab & Mandal, 2020; Tamang, 2018	
<i>Ficus benghalensis</i>	Bar	Moraceae	T	Leaf, bark, root	Asthma	Shrivastab & Mandal, 2020;	
<i>Zingiber officinale</i>	Aduwa	Zingiberaceae	H	Rhizome	Asthma		
<i>Ficus religiosa</i>	Pipal	Moraceae	T	Fruits	Asthma	Shrivastab & Mandal, 2020; Kapoor et al., 2011	
<i>Ficus semicordata</i>	Khanyeu	Moraceae	T	Bud, latex	Pneumonia	Shrivastab & Mandal, 2020; Limbu, 2013	
<i>Artemisia indica</i>	Titepati	Asteraceae	S	Leaves	Asthma	Malla, 2015	
<i>Calotropis gigantean</i>	Aank	Asclepiadaceae	S	Flower	Asthma		
<i>Cannatis sativa</i>	Bhang	Cannabaceae	H	Flower	Asthma		
<i>Euphorbia hirta</i>	Dudhejhar	Euphorbiaceae	H	Plant juice	Asthma		
<i>Garunga pinnata</i>	Ramsinghe	Burseraceae	T	Leaves	Asthma		
<i>Mimosa pudica</i>	Lajawati	Mimosaceae	H	Whole plant	Asthma		
<i>Piper Chaba</i>	Chabo	Piperaceae	H	Root, Fruit	Asthma		
<i>Syzygium cumini</i>	Jamun	Myrtaceae	T	Stem bark	Asthma		
<i>Piper nigrum</i>	Marich	Piperaceae	S	Fruit	Asthma		Shrivastab & Mandal, 2020; Prakash & Majeed, 2000
<i>Piper longum</i>	Pipla	Piperaceae	H	Fruit	Asthma		Shrivastab & Mandal, 2020; Dahanukar et al., 1984
<i>Ficus racemosa</i>	Dumri	Moraceae	T	Bark	Asthma	Shrivastab & Mandal,	



						2020; Ahmed & Urooj, 2010
Meche						
<i>Abrus precatorius</i>	Titihar	Leguminosae	C	Seed	Asthma	Rai, 2004
<i>Achyranthes aspera</i>	Samulthamarga.	Amaranthaceae	H	Root	Pneumonia	
<i>Hydrocotyle sibthorpioides</i>	Manemumi	Araliaceae		Leaf	Asthma	
<i>Ocimum gratissimum</i>	Ramtulsi	Lamiaceae	H	Leaf extract	Asthma	
<i>Oroxylum indicum</i>	Totalabimfang	Bignoniaceae	H	Endosperms of two seed	Pneumonia	
<i>Piper longum</i>	Chhimpri-gupai	Piperaceae	H	Root	Pneumonia in adults	
<i>Rauvolfia serpentina</i>	Kharokha	Apocynaceae	Under S	Young shoot	Pneumonia in early stage.	
<i>Tugetes erecta</i>	Demal-bhiwar	Asteraceae	H	Leaf	Pneumonia	
Munda						
<i>Oroxylum indicum</i>	Tatelo	Bignoniaceae	T	Seed	Pneumonia	Ghimire, 2016
<i>Cynodon dactylon</i>	Dubo	Graminae	G	Whole plant	Pneumonia	
<i>Ocimum tenuiflorum</i>	Tulasi	Labiatae	H	Leaf	Cough & Pneumonia	
Newar						
<i>Acoris calamus</i>	Bojho	Araceae	H	Rhizome	Asthma	Ranjitkar, 2005
<i>Aegle marmelos</i>	Bya, Bel	Rutaceae	T	Fruit pulp	Respiratory problems	
<i>Bombax cieba</i>	Simal, Sin bashi	Bombocaceae	T	Flower	Pneumonia	
<i>Justicia adhatoda</i>	Aalcha, Ashuro	Acanthaceae	S	Leaf	Asthma	
<i>Thysanolaena maxima</i>	Tuphima, Kucho	Poaceae	S	Root	Pneumonia	Shrestha & Joshi, 1993
Satar						
<i>Cynodon dactylon</i>	Dubho	Graminae	H	Aerial parts	Pneumonia	Raut, et al., 2018
<i>Mimosa pudicia</i>	Lajjawati jhar	Leguminosae	H	Roots	Asthma	
<i>Piper nigrum</i>	Marich	Piperaceae	H	Fruits	Asthma	
<i>Psidium guajava</i>	Amba	Myrtaceae	T	Leaves	Pneumonia	
<i>Zingiber officinalae</i>	Aduwa	Zingiberaceae	H	Rhizome	Asthma	



Sherpa						
<i>Acorus calamus</i>	Bojho	Araceae	H	Rhizome	Asthma	Chaudhary, 2002
<i>Carex filicina</i>	Harkata ghans	Cyperaceae	H	Root	Pneumonia	
<i>Drymaria diandra</i>	Abhijalo	Caryophyllaceae	H	Leaf	Pneumonia	
<i>Rubus ellipticus</i>	Ainselu	Rosaceae	S	Fruit	Pneumonia	
<i>Melia azedarach</i>	Bakaino	Meliaceae	T	Fruit	Pneumonia	
<i>Mimosa rubicaulis</i>	Arari	Fabaceae	S	Root	Pneumonia	
Tamang						
<i>Artemisia indica</i>	Chandre	Asteraceae	H	Leaves , young shoots	Asthma	Malla & Chettri, 2009
<i>Cannabis sativa</i>	Ganja/Ganja	Lauraceae	H	Leaves, Flower	Asthma	
<i>Dendrophthoe falcata</i>	Aijeru	Loranthaceae	T	Stem, Bark	Asthma	
<i>Swertia Chirayita</i>	Timda	Gentianaceae	H	Leaf	Asthma	
Thami						
<i>Drymaria cordata</i>	Abijalo	Caryophyllaceae	H	Leaves	Pneumonia	Bhattarai, 2018
Tharu						
<i>Achyranthus aspera</i>	Datiwan	Achyranthaceae	H	Whole part	Pneumonia.	Singh et al., 2011
<i>Boerhavia diffusa</i>	Punarnava	Nyctagenaceae	H	Leaf, shoots	Asthma	
<i>Euphorbia royleana</i>	Sihundisinghe	Euphorbiaceae	S	Leaf	Pneumonia	
<i>Justica adhatoda</i>	Asuro	Acanthaceae	H	Leaf	Asthma	
<i>Ricinus communis</i>	Ander	Euphorbiaceae	S	Leaf	Asthma	
<i>Semecarpus anacardium</i>	Bhela	Anacardiaceae	T	Fruit	Asthma	
<i>Tamarindus indica</i>	Imali	Mimosaceae	T	Root bark	Asthma	
<i>Zingiber officinale</i>	Adhuwa	Zingiberaceae	H	Rhizome	Asthma	

* H= Herb, S= Shrub, T= Tree, C= Climber, G= Grass

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