



Ethnomedicinal study of home garden species in Palpa District-Western Nepal

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Abstract: Medicinal plants, being a fundamental treatment system since ancient times, are abundantly found in our locality. Though these plants are immensely important, documentation of home garden medicinal plants is not done properly and the majority of people are ignorant of the medicinal use of these locally accessible plants. The main objective of the study was the documentation of valuable species, their ethnomedicinal importance and plant parts used for the treatment of different ailments. This study was conducted in Rampur municipality, Palpa district during May-June 2021. Households (30) having home-gardens near residential areas were surveyed and highlighted 56 species of medicinal plants belonging to 35 families categorized as herb, shrub, tree, climbers and grass. Reported medicinal plants were valued for the treatment of different 92 ailments such as diabetes, epilepsy, fever, asthma, ulcers, bronchitis, syphilis, kidney stone, urinary insufficiency and many others. The most preferred plant part for treatments is leaf followed by fruit and root. Some of these species like oxalis (Amilo Jhar) is considered as weed and removed from fields. Due to developmental activities and inadequate knowledge about medicinal plants, the abundancy of these species is quickly dwindling and protection of those species should be prioritized by every sector.

Keywords: Medicinal plant; Ethnobotany; Treatment; Ailments

INTRODUCTION

Since the early period of human civilization, plant resources have been considered as an integral part of human community (Jima and Megersa, 2018). The use of plant and plant resources holds a long history in Nepal (Acharya and Acharya, 2009), reporting their importance in meeting their daily needs and alleviating human suffering (Kunwar et al., 2009;



Timilsina et al., 2020). In traditional medical systems of healing counting Ayurveda, Tibetan and Unani, and folk medicine (Gewali, 2008), medicinal plants have been used as the main novel components (Magar et al., 2020). Different qualities of medicinal plants are discovered through extensive self-experiments that took millennia to establish (Adhikari et al., 2019). The ethnic communities have immense knowledge about traditional uses on utilization of plant and plant parts (Kandel et al., 2020; Miya et al., 2021), verbally passed down over generations (Gubhaju and Ghimire, 2010) and the legacy is still on. For the benefit of society, ethnobotany plays a major role in the study of traditional medicine, documentation and use of the knowledge about plants linked with nature (Acharya, 2012).

Nepal is a country characterized by huge range of variations in altitude, topography and climate, as a result, brings richness in useful medicinal plants (Bhatt, 2019). Over 2500 medicinal and aromatic plants are recorded in Nepal (Baral and Kurmi 2006; Ghimire et al., 2008; Rokaya et al., 2010; Kunwar et al., 2020), among them, over 1600 species estimated being used in traditional medicinal practices (Shrestha et al., 2000; Ghimire, 2008). In the hilly region of Nepal, about 215 plant species are used to treat 139 types of diseases (Miya et al., 2020). According to WHO, in developing countries, 80% of the residents rely on traditional medicine for their basic health care (Kurmi and Baral, 2004) even in cities where modern health services are accessible and specialized (Abebe, 2019). Only 17% of urban inhabitants in Nepal have access to allopathic treatment, with the remainder relying on the traditional medical system (CBS, 2007; Uprety et al., 2010; UNEP, 2012). There has been a significant rise for medicinal plants in the market for use in conventional medicine as well as modern and complementary medicine over last decades (Lee et al., 2008; Gahatraj et al., 2020) as it is affordable, efficient to cure ailments and comparatively safe with hardly any or no side effects (Mukul et al., 2007).

Collection and trade of medicinal plants is practiced by rural people and it has significant roles in national economy too (Lamichhane et al., 2021; Miya, 2021). Different medicinal plants are served by home gardens, being cultivated with a mixture of different perennial and annual species which are managed by the landowner or people residing in that home (Mekonen et al., 2015). Information on the ethnomedicinal plants of the Palpa district is handful but the work related to medicinal plants in the home garden near the residential area has not yet been carried out in detail. Therefore, the distribution of the plants should be known before further study (Gautam et al., 2020). Hence, the present study aims to explore and document the ethnomedicinal uses of home garden plant resources.

MATERIALS & METHODS

Study area: The study area, Rampur Municipality ward number-7, selected for the study lies in Palpa District, Western hilly Nepal at latitude 27° 51' 52.00" N latitude 83° 52' 42.00" E in Lumbini Province of Nepal (Figure1). It ranges from 300 m to 2000 m elevation above mean sea level and covers an area of 1373 km². It is bounded to the north by Syangja District, to the northeast by Tanahun District, and to the east by Nawalparasi District. According to census 2011, Palpa is populated by 261180 citizens. Magars are the main inhabitants in the district along with other ethnic groups of Brahmins, Chhetri, Kami, Newar and Sarki. The Bio-climate of Palpa is tropical to sub-tropical while most of the area



lies under the subtropical region (CBS, 2012). Most of the area of Rampur lies in valley while some include low elevation hills of valley contributing to species differentiation. Major dominant species in sloppy region are *Pinus roxburghii*, *Schima-Castonopsis* and *Shorea robusta* (Shrestha, 1985) whilst valley areas are dominated by fodder species: *Ficus sps*, *Morus alba*, *Bauhinia variegata* and *Garuga sps*. Medicinal plants such as *Mimosa pudica*, *Tinospora cordifolia*, *Syzygium operculatus*, *Psidium guajava*, *Oxalis corniculata*, *Phyllanthus emblica L*, *Aegle marmelos*, *Ocimum tenuiflorum*, etc are prominently found.

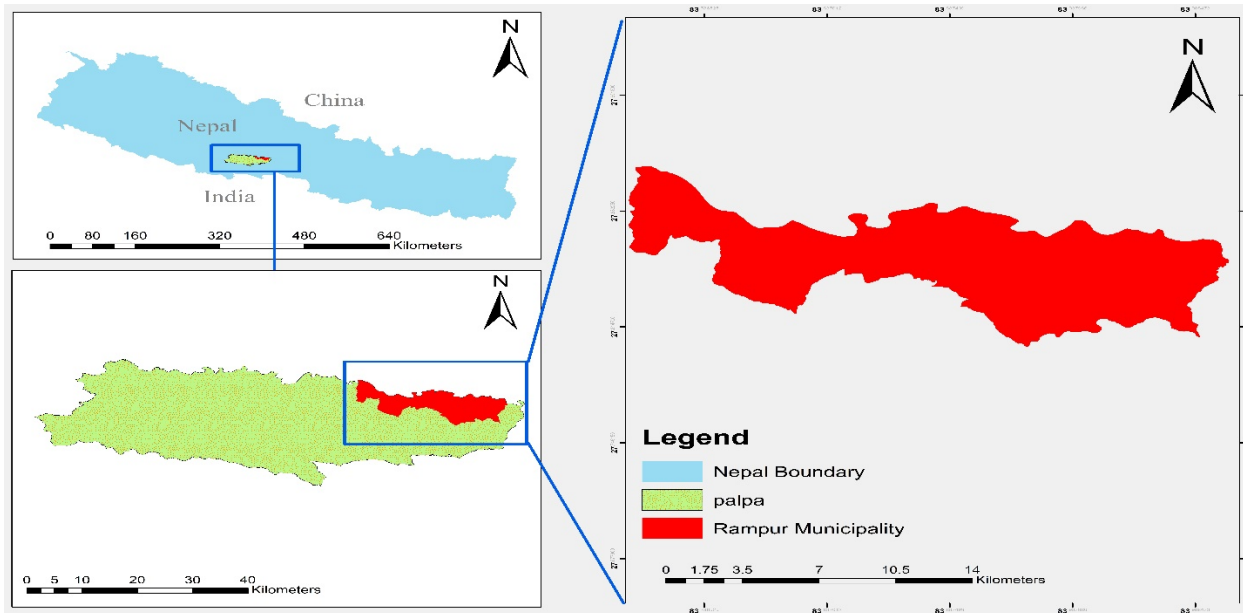


Figure: 1. Location map of the study area

Data collection and analysis: The study area was surveyed during May and June months of 2021. During the survey, 30 houses having a home garden in the residential area, latitude $27^{\circ} 51' 52.00''$ N latitude $83^{\circ} 52' 42.00''$ E were visited and listed 56 species as medicinal plants. Majority of the plants were identified in the field by informants, whereas further identification was done using standard literature (Polunin and Stainton, 1984; Polunin et al., 1987; Press et al., 2000; Manandhar, 2002; Rajbhandari and Rai, 2017). Online portals like Google scholar and research gate were searched to collect published research and review articles (Gautam and Khatri, 2021). The assembled data were analytically interpreted with simple tables, bar graph and line graph.

RESULTS & DISCUSSION

A total of 56 plant species were enumerated having medicinal values belonging to 35 families, from Rampur municipality. Out of total medicinal plant species recorded from the study area, Asteraceae was found to be the largest family comprising 4 species. The other species belong to families: Rutaceae (3 species), Menispermaceae (3 species), Myrtaceae (3

species), Moraceae (3 species), Lamiaceae (3 species), Zingiberaceae (3 species), Poaceae (2 species), Amaranthaceae (2 species), Apocynaceae (2 species), Amaryllidaceae (2 species),



Euphorbiaceae (2 species), Solanaceae (2 species), Zingiberaceae (2 species) and one species each belong to Acanthaceae, Asparagaceae, Asphodelaceae, Acoraceae, Bromeliaceae, Caricaceae, Cannanaceae, Cucurbitaceae, Crassulaceae, Cyperaceae, Fabaceae, Lythraceae, Lauraceae, Musaceae, Meliaceae, Mimosideae, Nyctaginaceae, Oleaceae, Oxalidaceae and Phyllanthaceae (Figure 2). The plant parts used along with their medicinal uses are mentioned in Table 1.

Table1: Names of plants with their ethnomedicinal uses and parts used.

S.N	Family	Botanical Name	Local Name	Life Form	Part Use	Uses	Reference
1	Apocynaceae	<i>Catharanthus roseus</i>	Ghadi Ful	Herb	Leaf, Root and Shoot	Used internally for the treatment of the loss of memory, raised blood sugar levels, hypertension, enteritis, diarrhea, cystitis, gastritis, also used to cure nose bleed, bleeding gums and mouth ulcer.	(Gajalakshmi et al., 2013).
2	Asteraceae	<i>Chromolaena odorata.</i>	Banmara	Shrub	Leaf	Treatment of wounds, diarrhea, stomachache, sore throat, skin infection, toothache, dysentery, coughs and colds.	(Omokhua et al., 2016)
3	Acanthaceae	<i>Justicia adhatoda</i>	Asuro	Shrub	Shoot	Used to cure cold, cough, fever, headache and sinusitis.	(Gubhaju and Ghimire, 2010)
4	Asparagaceae	<i>Asparagus officinalis</i>	Kurilo	Herb	Root	For the treatment of constipation, diarrhea, osteoporosis, obesity, diabetes, cardiovascular disease and rheumatism.	(Sharma et al., 2000)
5	Amartillidaceae	<i>Allium hypsistum</i>	Jimbu	Herb	Whole plant	Helpful in flu, cough, and stomach pain	(IUCN, 2000)
6	Asphodelaceae	<i>Aloe vera</i>	Ghiu kumara	Herb	Leaf	Fluid of leaf is used to treat different types of skin disease, wounds, diabetes, ulcers, cancer, coughs, headache, asthma, eye diseases, and jaundice.	(Rajeswari et al., 2012)
7	Asteraceae	<i>Artemisia vulgaris</i>	Titepati	Herb	Leaf	Used to cure bladder ailments, cramps, cold, epilepsy, hysteria, kidney stones, fever, asthma, rheumatism, scurvy and wounds.	(Akbar, 2020)
8	Acoraceae	<i>Acorus calamus</i>	Bojho	Herb	Root and Leaf	Treatment of digestive problems such as gas, colic, bloating, asthma, cough and bronchitis.	(Balakumbahan, 2010)
9	Amaranthaceae	<i>Achyranthes aspera</i>	Apamarga/d attiwan	Herb	Flower, Root and Leaf	Used for the treatment of common cold, stomatitis and leucorrhoea.	(Singh, 2015; Upadhaya, 2018)



10	Araceae	<i>Colocasia esculenta</i>	Karkalo	Herb	Leaf	Used for the treatment of diarrhea, neurological disorders, asthma, internal hemorrhage, skin disorder and arthritis.	(Prajapati et al., 2011)
11	Amaranthaceae	<i>Amaranthus viridis</i>	Lude sag	Herb	Whole plant	Treatment of respiratory and eye problem, asthma, eczema, rashes, pain and fever	(Reyad-ul-Ferdous et al., 2015)
12	Asteraceae	<i>Ageratum houstonianum</i>	Nilo Gande jhar	Herb	Leaf	Used in cuts and wounds to stop bleeding	(Dani and Tiwari, 2018)
13	Amaryllidaceae	<i>Allium sativum</i>	Lasun	Herb	Leaf and Bulb	Effective during the case of fever, cough and blood pressure	(Upadhaya, 2018)
14	Apocynaceae	<i>Calotropis gigantea</i>	Aank	Shrub	Fluid and Stem	Used to cure headache, sprains, conjunctivitis and dried stem is smoked to treat sinusitis.	(Gubhaju and Ghimire, 2010)
15	Asteraceae	<i>Acmella oleracea</i>	Maratti	Herb	Flower	Used to ease toothache pain, treat stomatitis and help during gastristics.	(Nunez, 2020)
16	Bromeliaceae	<i>Ananas comosus</i>	Bhui katahar	Shrub	Fruit	Used to reduce gastric complications and skin complications	(Wali, 2019)
17	Caricaceae	<i>Carica papaya</i>	Mewa	Shrub	Leaf, Fruit and Fluid	Medicine for dyspepsia, hyperacidity, dysentery and constipation, dengue fever	(Bhowmik et al., 2013)
18	Cannabaceae	<i>Cannabis sativa</i>	Ganja	Herb	Leaf and Flower	Treatment of pain, insomnia, depression, asthma and loss of appetite.	(Müller-Vahl, 2015)
19	Cucurbitaceae	<i>Momordica charantia</i>	Tite karelo	Climber	Fruit	Treatment of eye-related diseases, blood diseases, biliousness, anemia, syphilis, asthma, ulcers, bronchitis, rheumatism, diabetes and spleen troubles.	(Kumar and Bhowmik, 2010)
20	Capparaceae	<i>Crateva unilocularis</i>	Sibligan	Tree	Shoot, Root and leaf	leaves decoction are used in urinary infection.	(IUCN, 2000)
21	Crassulaceae	<i>Bryophyllum pinnatum</i>	Ajammbari	Herb	Leaves	Used for the treatment of insufficiency of urinary system and kidney stone	(Yadav et al., 2016)
22	Cyperaceae	<i>Cyperus esculentus</i>	Mothe	Herb	Root and leaf	Red nose and wound treatment	(Dangol et al., 2014; Chetri et al., 2018)
23	Euphorbiaceae	<i>Phyllanthus emblica</i>	Amala	Tree	Bark and fruit	Used to treat diarrhea, gastritis and reduce the burning sensation of chili.	(Yadav et al., 2017)
24	Euphorbiaceae	<i>Euphorbia royleana</i>	Seudi	Shrub	Fluid	Used to cure anorexia, marasmus, gastritis and also applied on sprains.	(Gubhaju and Ghimire, 2010)



25	Fabaceae	<i>Senna tora</i>	Tapre	Herb	Seed and leaf	Used for cardiac disorder, skin diseases, leprosy, bronchitis, liver disorder, cough, eye diseases and haemorrhoids.	(Meena et al., 2010)
26	Lythraceae	<i>Punica granatum</i>	Anar/Darim	Tree	Fruit and bark	Used for diarrhea, dysentery, gall bladder diseases, intestinal parasites, diabetes, breast cancer.	(Shaygannia et al., 2016)
27	Lamiaceae	<i>Ocimum tenuiflorum</i>	Tulsi	Herb	Whole plant	Helpful in fever, stress, common cold, coughs, sore throat, headache, respiratory disorder, mouth infections, skin disorders and eye disorders	(Kumar et al, 2010)
28	Lauraceae	<i>Cinnamomum tamala</i>	Tej patta	Tree	Bark and leaf	Used for the treatment of fever, bad odor of mouth, nausea and vomiting.	(Upadhaya, 2018; IUCN, 2000)
29	Lamiaceae	<i>Mentha arvensis</i>	Pudina	Herb	Whole plant	Used in stomach pain, insomnia and also as a cooling agent.	(Gubhaju and Ghimire, 2010)
30	Lamiaceae	<i>Pogostemon benghalensis</i>	Rudilo	Herb	Leaf and Shoot	Snakebite, malaria, dysentery, skin diseases, cough, pneumonia, cold and diarrhea	(Dahiya et al., 2020)
31	Musaceae	<i>Musa spp.</i>	Kera	Herb	Fruits	Used for treating diarrhea, dysentery and diabetes	(Upadhaya, 2018)
32	Myrtaceae	<i>Psidium guajava</i>	Amba/Belauti	Tree	Bark and Leaf	Dysentery, control vomiting,	(Upadhaya, 2018; Acharya, 2010)
33	Menispermaceae	<i>Cissampelos pareira</i>	Chillo badal pate	Climber	Leaf and stem	Used for the treatment of ulcer, asthma, wound, fever, cholera, snakebite, diarrhea, inflammation, malaria, rabies, rheumatism and blood purification.	(Kumari et al., 2021)
34	Meliaceae	<i>Azadirachta indica</i>	Neem	Tree	Leaf and bark	Asthma, diarrhea, fever, avian influenza, dengue and cough.	(Roy and Bhattacharyya, 2020)
35	Mimosoideae	<i>Mimosa pudica</i>	Lajawati jhar	Herb	Whole plant	Piles, diarrhea, dysentery, leprosy, asthma, vaginal and uterine complaints, leukoderma, toothache, burning sensation, fatigue and blood diseases.	(Joseph et al., 2018)
36	Menispermaceae	<i>Tinospora cordifolia</i>	Gurjo	Climber	Stem	Used in chronic diarrhea, chronic dysentery, fever and urinary troubles.	(IUCN, 2000)
37	Myrtaceae	<i>Syzygium nervosum</i>	Kyamuno	Tree	Leaf	Smoked to treat running nose.	Gubhaju and Ghimire, (2010)
38	Myrtaceae	<i>Syzygium cumini</i>	Jamun	Tree	Bark, Seed and fruit	Fever, diarrhea, mouth diseases, dysentery, blood impurities, sore throat,	(Kritikar and Basu, 1935; Poudel et al.,



						bronchitis, inflammation skin, asthma, biliousness and ulcers. Bark power used to cure diabetes.	2021)
39	Moraceae	<i>Morus alba</i>	Kimbu/kafal	Tree	Fruit, roots and leaf	Used for the treatment of dizziness, insomnia, and also has a protective effect against liver and kidney disorders, atherosclerosis and inflammation	(Jiao et al., 2017)
40	Menispermaceae	<i>Tinospora sinensis</i>	Gujar gano	Climber	Tuber	Used to treat gastritis and acts as a cooling agent; improve immunity	(Gubhaju and Ghimire, 2010; Paudel et al., 2021)
41	Moraceae	<i>Artocarpus heterophyllus</i>	Katahar	Tree	Leaf, root and seed	Skin disease, diarrhea and dysentery	(Upadhaya, 2018)
42	Moraceae	<i>Ficus sarmentosa</i>	Bedulo	Tree	Bark, fluid and Root	Wound, fever, swollen joints, inflammations, ulcers, malaria, leprosy, diarrhea and headache	(Dimri et al., 2018)
43	Nyctaginaceae	<i>Mirabilis jalapa</i>	Malati full	Herb	Leaf and root	Used in amenorrhea and dysmenorrhea in women, treatment of hepatitis, soothe eye inflammation, syphilitic sores and reduce body pain.	(Saha et al., 2020)
44	Oleaceae	<i>Nyctanthes arbor-tristis</i>	Parijat	Tree	Flower, bark, leaf	Used to treat liver and biliary disorders, scabies, arthritis, piles, malaria, loss of appetite, chronic fever, rheumatism, snakebite and bronchitis	(Bhalakiya and Modi, 2019)
45	Oxalidaceae	<i>Oxalis corniculata</i>	Amilo jhar	Herb	Whole plant	Dysentery, cough, cold, diarrhea, fever, stomachache, worms, wounds. It is also used to treat scurvy diseases.	(Kirtikar and Basu, 1975; Shinwari and Khan, 2000; Poudel et al., 2021)
46	Poaceae	<i>Thysanolaena latifolia</i>	Amriso	Grass	Root	Used to treat boils, tonsillitis and helpful in abortion.	(Biplov et al., 2015)
47	Poaceae	<i>Imperata cylindrical</i>	Siru ghaans	Grass	Root	Diarrhea, dysentery, arthritis, cancer, diabetes, gonorrhoea and cardiac disorder.	(Datta and Banerjee, 1978)
48	Phyllanthaceae	<i>Phyllanthus amarus</i>	Amili chari	Herb	Whole plant	Used to treat genitourinary system, gastropathy, ophthalmopathy, intermittent fevers, intermittent fever, scabies, dysentery, ulcers and wounds.	(Gubhaju and Ghimire, 2010)
49	Rutaceae	<i>Zanthoxylum piperitum</i>	Timoor	Shrub	Seed and Leaf	Used to destroy parasitic worms. Fever, dyspepsia,	(IUCN Nepal, 2000)



						scabies, dental troubles loss of appetite.	
50	Rutaceae	<i>Citrus limon</i>	Kagati	Tree	Fruit	Used to treat scurvy, dysentery, diarrhea, sore throats, chest pain, common cold, fevers, rheumatism, high blood pressure and irregular menstruation,	(Szczykutowicz et al., 2020)
51	Rutaceae	<i>Aegle marmelos</i>	Bel	Tree	Fruit and leaf	Used to treat dysentery, neurological diseases, dyspepsia, vomiting, edema, and rheumatism.	(Chanda et al., 2008)
52	Solanaceae	<i>Datura metel</i>	Dhaturo	Herb	Flower and leaf	Arthritis, pain, asthma, fever, epilepsy, convulsions, catarrh, hysteria, skin diseases, heart diseases, rheumatism and bronchitis.	(Monira and Munan, 2012)
53	Solanaceae	<i>Capsicum annuum</i>	Jire kursani	Shrub	Fruit	Chronic fever, typhoid fever and seasickness	(De, 2003)
54	Zingiberaceae	<i>Zingiber officinale</i>	Adhuwa	Herb	Root	For curing heart problems, cough, cold, menstruation disorder, cancer, food poisoning, menstrual cramps, osteoarthritis, epilepsy, motion sickness, nausea and inflammation.	(Gupta and Sharma, 2014)
55	Zingiberaceae	<i>Curcuma longa</i>	Besar	Herb	Root	Rheumatoid arthritis, conjunctivitis, carcinoma, smallpox, chickenpox, urinary tract infections, wound healing and liver ailments	(Dixit et al., 1988)
56	Zingiberaceae	<i>Curcuma caesia</i>	Haledo/kalo besar	Herb	Tuber	Gastritis, anorexia and stomach pain.	(Krishnaraj et al., 2012)

Most of the plant species had multiple uses and they were used to treat different ailments. According to life form categories, among total medicinal plant species, 29 species (51.78%) belong to herb, 13 species (23.21%) to tree, 8 species (14.28%) to shrub, 4 species (7.14%) to climber and 2 species (3.57%) to grass. Almost all the plant parts were used to cure numerous diseases. The most frequently used plant part was leaf (26 species), followed by root (12 species), fruits (10 species), whole plant (7 species), bark (7 species), shoot, flower, fluid (4 species), stem (3 species), seed (4 species), tuber (2 species) and bulb (1 species) (Figure 3).

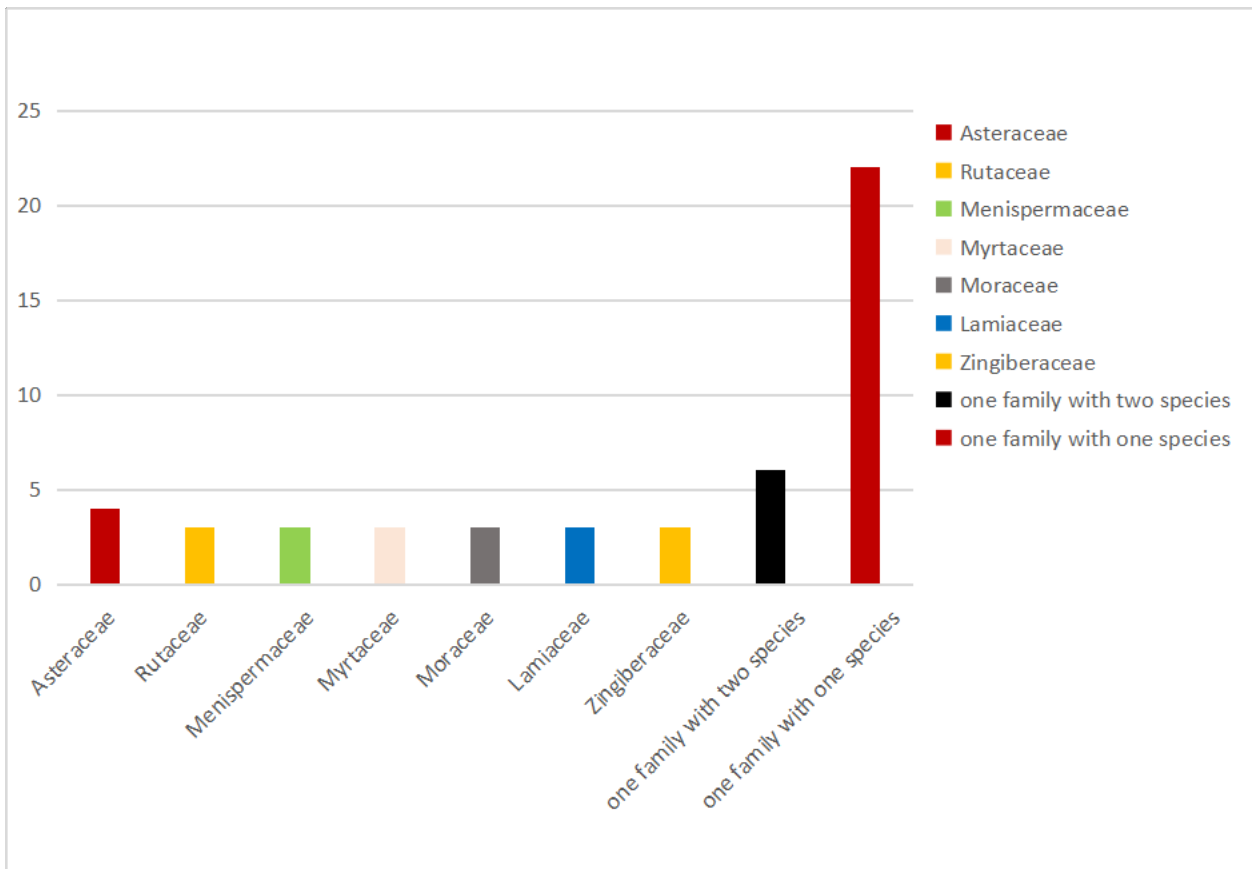


Figure: 2. Division of species based on their family

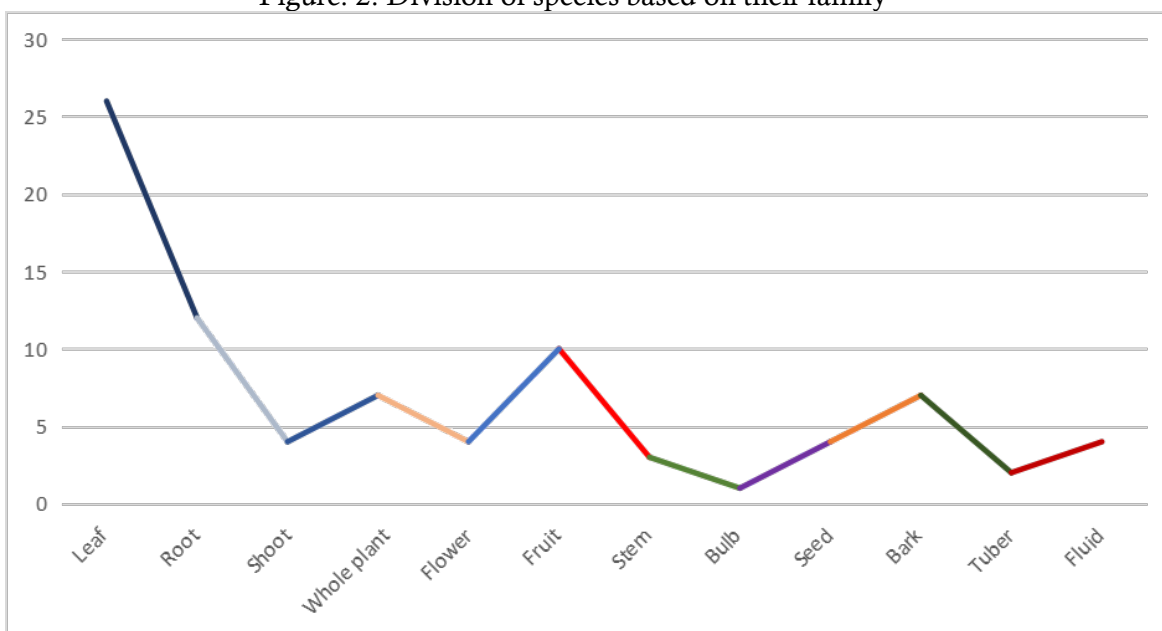


Figure: 3. Line graph showing plant parts used



CONCLUSION

The study area is enormously rich in medicinal plants. The plants have been cultivated to cure 92 types of diseases such as asthma, anxiety, tumors, coughs, allergies, cold, fever, headache, gastritis, anorexia, conjunctivitis, skin cancer, smallpox, chickenpox, stuffy nose, intestinal disorders and many others. To vindicate, the properties of the medicinal plants were compared with the relevant literature collected from the Palpa district. The old-aged people of this area have immense knowledge about collection and utilization and number of plant resources have been used for the treatment of various diseases. However, because of the availability of allopathic drugs, they do not rely only on a treatment system based on medicinal plants for all ailments. Nowadays, there is the facility of hospitals in both rural and urban areas and allopathic medicines are easily available. As a result, the knowledge of medicinal plants among young generation is declining. It is concluded that this study provides veritable data regarding the ethnomedicinal uses of home garden species and the asserted medicinal plants should be protected using applicable, relevant conservation measures and conduct further research in the district and municipality. The intention of medicinal plant identification and categorization is to enlighten and offer proper knowledge to common people and farmers, which will help to promote medicinal plant production. The development of notions linked to the use of medicinal plants improves pharmacists' and physicians' abilities to adapt to the difficulties that have arisen with the growth of professional services in the facilitation of man's existence.

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DECLARATION OF CONFLICT OF INTEREST

No conflict of interest to declare.

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