A case study of medicinal plants and their usage by the local community of Dilasaini Gaunpalika, Baitadi district, Nepal

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INTRODUCTION

Nepal is naturally and biologically enriched with diversification. Nepal is ranked 25th and 11th position in biodiversity richness in the world and Asia respectively. Nepal occupies about 0.1% of the global area, but harbor 3.2% and 1.1% of the world’s known flora and fauna. A total of 118 different ecosystems have been identified in Nepal (MoAD, 2017). From Nepal over 300 taxa of MAPs are traded with a total amount of 10,770 tonnes value worth of USD 60.09 million (Ghimire et al., 2016). The geographically important areas of Nepal include Nawalparasi, Chitwan, Bardiya, Kaski, Syangja, Illam, Lamjung, Humla, Jumla, Manang, Mustang, Solukhumbu, Nuwakot (MoAD, 2017).

The use of medicinal plants for the purpose of curing human diseases and disorders has had a long history. Popular observation on the use and efficiency of medicinal plants significantly contribute to the disclosure of their therapeutic properties, so that they are frequently prescribed, even if their chemical constituents are not always completely known (Maciel et al., 2002). Various national, as well as international research organizations, are involved in order to evaluate and authenticate the medicinal and scientific value of plants (Manandhar, 2002). Over the centuries, the knowledge of their medicinal value and healing properties has been transmitted within and among human communities (Silva et al., 2010). The tribal communities, significantly the women are involved in the continuation, preservation as well as the promotion of the local crop species, collecting and using the forest-based plants in daily dietary and...
Medicinal plants available in different niches are reported by several researchers. Pandey (1961) reported 73 medicinal plants for the first time in Nepal. 143 species of commercial MAPS were assessed from the gradient of Himalayas (Bhattarai and Ghimire, 2006), 51 species were reported from Palpa district which was climbing plants (Singh and Kumar, 2017). Medicinal plant reported from different districts of Nepal; 161 species were reported to use by Tamang community in Makwanpur district (Luitel et al., 2014), Tharu community of Rupandehi district used 45 species of 32 families and 41 genera (Acharya and Acharya, 2009), Magar community of Gulmi district used 161 species of plant for medicinal purpose (Acharya, 2012), 64 plant species were reported from Jhapa district used by Meche people (Rai, 2004), 105 vascular plants of medicinal importance was reported from Terhathum district (Rai, 2003). Nepal is considered to be reservoirs of medicinal plants and trade history from 2005 to 2014 showed an increase of, 27.49 million in 2005 to USD 60.09 million in 2014 (mean for the last 10 years being USD 39.34 million (Ghimire et al., 2016). IUCN has banned 11 species of medicinal plants on their export, collection, and transportation as they are threatened species (IUCN, 2000). Baitadi district is one of the under-developed districts in province 7 as well in the country. Peoples are found to be highly dependent on traditional medicines. Thus, the plant species used by them and their usage in the daily life of people living there have been focused on the study. The main objective of the study is to study the attitude of people’s perception towards the medicinal plants and the diversity of species used by the peoples found locally in the home gardens and fields.

MATERIALS AND METHODS

Study area

Dilasaini gaunpalika, Baitadi is a hilly district, falls in the province no. 7 of Nepal touching Jhulaghat, India to its border of Nepal. Gokuleshwar village is at an altitude of 800-950 masl (Figure 1). Two wards were selected for study viz. Ward no. 5 and ward no. 6. Dilasaini gaunpalika consists of a diversity of plants and among them, the plants used for the medicinal purpose by the peoples are found to be very limited. Thus, the plants used by the peoples were surveyed along with primary information and other information associated with the use of medicinal plants.

Research design and data collection

The total number of households in Dilasaini VDC is 497 (Source: Dilasaini gaunpalika). Sample size of 50 Households were selected from Dilasaini VDC on simple random basis as sampling frame size was determined (497). The sample size was adjusted to 10% as suggested by Ajayi et al. (2005) in social sciences research. A questionnaire survey was conducted and a random sampling survey was conducted to collect the information on the use of medicinal plants in Dilasaini gaunpalika. A random sampling survey was conducted and household respondents were interviewed. Also, a group discussion was conducted to gather information about the plant species used by them for the medicinal purpose along with their other uses. For identification of species and medicinal uses literature was cited (Kunwar et al., 2009; Kunwar et al., 2010; Rajbandari et al., 1995). Also, secondary information was obtained from the conference papers, bulletins and, websites.

Data analysis

MS Excel 2013 and IBM Statistical Package for the Social Sciences (SPSS) for descriptive analysis. Graphs are prepared through MS Excel 2013.

RESULTS AND DISCUSSION

Socio-economic characteristics

A total of 50 households were selected randomly for the study out of which 50% were males and 50% were females, aged between 14 to 78. The literacy rate of the area was 80% and 20% were found to be illiterate. Agriculture as the primary occupation is found to be of 86% respondents and 14% were found to be involved in agriculture as a part time job. None of the respondents were found to get training on the use and protection of medicinal plants (Field survey, 2019).

Usage of medicinal plants

All of the respondents were found to be involved in the usage of medicinal plants. The easy availability of medicinal plants got an advantage for the use. 94% of the respondents were found to use medicinal plants occasionally whereas 6% were found to use it regularly. Not all of the respondents were found to have a positive response regarding satisfaction gained from it. About 92% of the respondents are satisfied by the use of it whereas 8% of them are not satisfied with the use of it, Figure 2 (Field survey, 2019).

Marketing and preference of medicinal plants

Only 2% of the respondent was found to be involved in the marketing of medicinal plants whereas 98% do not involve in it.

Figure 1. Map of Baitadi district.
The response regarding the preference to medicinal plants over processed medicine was found to be 94% and 6% of them are attracted to processed medicine. A cross tab result regarding the preference to medicinal plants towards age showed a result which is presented in the Figure 3.

The respondents were found to use for major diseases only (Figure 4).

Diversity of medicinal plants investigated with their related information
Medicinal plants documented in the study were found to be used for curing of 40 ailments. The majority of the plant species were found to have ma multipurpose use for both medicinal and other various culinary uses. The majority of plant species were found to be used for skin infection, diarrhea, fever, common cold, cough, cuts and burns, asthma. However, diseases like heart pain, spleen enlargement, tumor, cancer, ulcer, astringent, fungal infection, weakness, eye inflammation, dandruff, jaundice, piles, gastritis were found to be cured by a few species. The details of the medicinal plant with their medicinal uses documented from the study are as shown in Table 1.

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Medicinal plants assessed in the study were found to have multipurpose use including ornamental and food value. About 34 species were reported which was continuously used from generation to generation for the curing of 41 ailments. A similar use of plants for the medicinal purpose was reported by Kunwar et al. (2010) in far-west Nepal. The author reported 48 species of medicinal plants used for curing various ailments like asthma, tumor, diabetes, cold and cough, joint pain, gastritis and many more. The multipurpose use of medicinal plants was reported by Rokaya et al. (2010) with their culinary and ornamental uses. The author also reported that the medicinal plants were used chiefly for ophthalmic and gastrointestinal ailment. Similarly, Joshi et al. (2019) reported 44 medicinal plants for treating 62 ailments from Gyaneshwor community forest of Chitwan, moreover, Uprety et al. (2010) documented 56 species used for 60 medicinal formulations.

Medicinal plants are widely used to cure minor diseases like common cold, cough, fever, cuts and burns, swelling. Peoples attitude towards medicinal plants is high because of the low availability to hospital services and their faith towards medicinal plants. In our study, we found that people used medicinal plants for diseases like common cold, cough, diarrhea, dysentery, cuts& burns, skin infections, fungal infections, gastritis, pneumonia, asthma, bleeding gums, kidney stone, sinusitis, ulcer, earache, bowel pain and uterine contraction, purgatives, tumor, piles, ophthalmic disorder, bronchitis heart pain, and jaundice. Their ancestral preaching towards the use of medicinal plants was limited among family members. The use of medicinal plants towards major diseases is found to be low because of slow healing but also few people are attracted to it because of low or no side effects as compared to allelopathic medicine (Jawla et al., 2009). The proportion of the collection of the medicinal plant was high in forests followed by gardens and few are locally available in the market. The low land use in far west Nepal makes more reliable to collect medicinal plant from the field whose use is known (Kunwar et al., 2015). People’s high response for the use of the medicinal plant is also due to its easy availability and most of them are found around home gardens making them cost-effective (Joshi et al., 2019).
| S.N. | Local name | English name | Family | Plant species | Plant parts used | Medicinal uses |
|------|------------|--------------|--------|---------------|-----------------|----------------|
| 1.   | Chiuri     | Butter nut tree | Butyraceae | Diplodrema butyreceae (Roxb.) | bark | diarrhea, ulcer |
| 2.   | Bael       | Bengal quince | Rutaceae | Aegle marmelos (L.) Corrêa | bark, fruit | dyspepsia, fever, constipation |
| 3.   | Bhringraj  | False daisy   | Compositae | Edista prostrata (L.) | bark, leaves | fever, liver and urinary problem, wounds, skin diseases |
| 4.   | Bojho      | Sweet flag    | Acoraceae | Acorus calamus L. | root | sore throat, voice disorder, cough, carcinogenic |
| 5.   | Barro      | Belleric myrobolan | Combretaceae | Terminalia bellirica-(Gaertn.) Roxb. | fruit | pils, astringent, laxative |
| 6.   | Ban lasun  | Liliaceae     | Liliaceae | Lilium nepalense D.Don | Bulb | relieving pain in cardiac region |
| 7.   | Pahade amla| Indian gooseberry | Phyllanthaceae | Phyllanthus emblica L. | root, seeds | jaundice, asthma, bronchitis, laxative |
| 8.   | Alainchi   | Hill cardamom | Zingiberaceae | Amomum subulatum Roxb. | oil, rhizomes | lung diseases, reduce eye inflammation. |
| 9.   | Dhatura    | Devil's snare | Solanaceae | Datura stramonium L. | leaves, flowers, fruits | leaves; used in inflammation of smoke to cure asthma, flower juice; used to treat ear ache, fruit juice; curing dandruff, falling hairs. |
| 10.  | Ghiukumari | Aloe vera     | Asphodelaceae | Aloe vera (L.) Burm.f. | leaves | treat enlargement of spleen, wounds, tumor, ear diseases |
| 11.  | Harchur    | Devil's fuge  | Loranthaceae | Viscum album L. | stem | asthma, earache, seeds; emetic, purgative also cures hemicranias, weakness of limbs. |
| 12.  | Indrayani  | Cucurbitaceae | Trichosanthus tricuspidata Lour. | roots, seeds | Fruits: astringent, laxative fine powered form; used in carious teeth, bleeding gums, ulcer |
| 13.  | Harro      | Myrobolan     | Combretaceae | Terminalia chebula Retz. | fruits | Astringent, antiseptic, fever, cough, sinusitis |
| 14.  | Kaphal     | Bayberry      | Myricaceae | Myrica esculenta Buch.-Ham. ex D. Don | bark | dysentery, diarrhea, chronic fever |
| 15.  | Panchaule  | Orchid        | Orchidaceae | Dasyka rhiza hatagirea (D.Don) Soö | used as sedatives in bowel pain, uterine contractions | |
| 16.  | Sarpagandha| Serpentine    | Apocynaceae | Rauwolfia serpentina (L.) Benth. ex Kurz | root | rhizome; used as anthelmintic, vermifuse, used as tonics |
| 17.  | Satuwa     | Melanthaceae  | Paris polyphylla var. alba H.Li & R.J.Mitchell | rhizome | Anti-pyretic; Cough Cold. |
| 18.  | Tulsi      | Holy basil    | Lamiaceae | Ocimum tenuiflorum L. | Leaves, seeds | Bank used in diarrhea, dysentery, sore throat, bronchitis, blood impurities, ulcer Seeds: diabetes, Fruit: carminative, diuretic. |
| 19.  | Jamun      | Black plum    | Myrtaceae | Syzygium cumini (L.) Skeels | Bark, seeds, fruits | Kidney stone |
| 20.  | Pattharchatta| Bryophyllum  | Crassulaceae | Kalanchoe pinnata (Lam.) Pers. | leaves | Cuts, wounds |
| 21.  | Gandhe jhar| Bluemink      | Compositae | Ageratum houstonianum Mill. | Leaves, flowers | Fever, common cold, skin infections, wounds, fungal infections, gums disorder |
| 22.  | Neem       | Neem          | Meliaceae | Azadirachta indica A.Juss. | Leaves, bark | Diarrhea, teeth pain |
| 23.  | Kola/ kera | Banana       | Musaceae | Musa paradisica L. | Leaves, fruits | Diarrhea |
| 24.  | Amba       | Guava         | Myrtaceae | Piliium guajava L. | Leaves, Fruits | Reduces fat |
| 25.  | Katgi      | Iemon         | Rutaceae | Ctris aurantifolia (Christm.) Swingle | fruits | Gastritis, jaundice, blood purifying, indigestion, asthma, skin diseases, leprosy |
| 26.  | Ghodtapre  | Asiatic pennywort | Apiaceae | Centella asiatica (L) Urb. | leaves | Skin infections |
| 27.  | Ambala     | Myrobalan     | Phyllanthaceae | Zanthoxylum L. | fruits | Cuts, burns |
| 28.  | Kurjo      | Silverfern    | Cyatheaceae | Alpinia deolbata C.Presl | fronds | Cuts, wounds, pneumonia, fever |
| 29.  | Sayapatri  | Marigold      | Compositae | Tagetes erecta L. | leaves | Painkiller, gastritis, improve appetite |
| 30.  | Bhang      | Mari juana    | Cannabaceae | Cannabis sativa L. | Seeds, leaves | Skin infections, fungal infections |
| 31.  | Peepal     | Moraceae      | Ficus religiosa L. | Burns, skin infections |
| 32.  | Aalu       | Potato        | Solanaceae | Solanum tuberosum L. | tuber | Common cold, Cough |
| 33.  | Adhuwa     | Ginger        | Zingiberaceae | Zingiber officinale Roscoe | Rhizome | Cough, common cold, chest pain |
Conclusion

Medicinal plants are the basics for the household treatment of minor and some of the major diseases. The study showed the direct relationship of households with the use of medicinal plants. By the use of medicinal plants, 92% of the respondents were satisfied. 76% of the collected medicinal plants from gardens and 22% from forests and 2% from others like ayurveda. A total of 33 medicinal plants were documented to cure 40 ailments. The majority of the medicinal plants collected were found to be used for diseases like fever, diarrhea, cuts and burns, gastritis, heart pain, chest pain, a painkiller. Also, the uses of medicinal plants were reported against diseases like ulcer, diabetes, laxative, dyspepsia, anxiety, gum bleeding, jaundice, pneumonia, asthma, cancer and so on. The use of a single medicinal plant for multiple diseases increases the value of medicinal plants and an effective strategy should be adopted for exploring the use of it. Also, the lack of training related to medicinal plants in the study area showed less knowledge on the conservation of plants and their effective use and propagation. Thus, the concerned government/ non-government body should take effective action for exploring the use of medicinal plants.

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