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MEDICINAL PLANTS USED IN THE TREATMENT OF GASTROINTESTINAL DISORDERS IN RUPANDEHI DISTRICT, WESTERN NEPAL

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ABSTRACT

Medicinal plants used for the cure of various diseases since time immemorial. The majority of population of developing countries also used traditional medicine because of poverty and no side effect. Ethnobotany survey was undertaken to collect information from traditional healers on the use of medicinal plants in the treatment of gastrointestinal disorders such as indigestion, lack of hunger, stomach pain, dysentery, diarrhea, constipation, and piles in western Nepal during different season of March 2020 to November 2020. The indigenous knowledge of local traditional healers having practical knowledge of plants in medicine was interviewed in 10 villages of Rupandehi district of western Nepal and native plants used for medicinal purposes were collected through questionnaire and personal interviews during fieldtrips. A total of 34 plant species belonging to 33 genera, and 27 families are documented in this study. The medicinal plants used in the treatment of gastrointestinal disorders by people are listed with botanical name (in binomial form), family, local names, habits, and parts used. This study showed that many people in the studied areas of Rupandehi district still continue to depend on the medicinal plants at least for the treatment of primary healthcare.

Keywords: gastrointestinal disorders - medicinal plants – Rupandehi - traditional healers - western Nepal.

INTRODUCTION

Man depended on plants not only for food, but also to cure his various diseases since time immemorial. Medicinal plants have been unique sources of medicines and constituted the most common human use of biodiversity (Hamilton, 2004). Most common gastrointestinal disorders are indigestion, lack of hunger, stomach pain, dysentery and diarrhoea, constipation, and piles. The causes for the gastrointestinal disorders vary based on the age of the person, locality, and the mode of life style. The common causes are contaminated food and water supplies, nutritional factors and also pathogens like bacteria, viruses, protozoan parasites and helminths. Nearly 80% of the world populations living in the developing countries rely almost exclusively on traditional medicine (WHO, 1993, Ranbir Chandra et al., 2007, Kumar and Chandrashekar, 2011) because they have minor or no side effects (Jordan et al., 2010). Human beings used plants for treatment purposes according to accumulated experience of centuries until the development of modern medicine. However, this knowledge and transmission is in danger because transmission between older and younger generation is not always assured.

The majority (1.5 billion) of the population of developing countries uses traditional medicine either because the people cannot afford synthetic medicine or because traditional medicine is more acceptable. Just like the allopathic medicine system, the traditional herbal system uses special combination of plant to treat diseases. In China, the uses of traditional medicine are relied upon for non-toxicity and most Chinese avoid the allopathic or other system (Singh & Khan, 1990). Plants have diverse combination of chemicals that can produce different results on different organisms. Approximately 119 pure chemical substances extracted from higher plants are used in medicine throughout the world, which is used for the treatment of various diseases. The development of synthetic chemical industry in the recent past gave boost to the allopathic medicine (Farnsworth & Morris, 1976). Traditional knowledge should therefore, be documented in systematic way if the communities themselves choose to do so, at their own initiative. Among the different diseases reported in rural and urban areas of Rupandehi district, the gastrointestinal disorders is the common one. These gastrointestinal disorders are treated by herbal product.

In Nepali traditional medicine, 125 caste or ethnic communities speaking approximately 123 different languages (CBS, 2012) use more than 2300 plant species (Rokaya et al., 2012).

Many ethno-pharmacological studies have been conducted in Nepal (for example, Joshi & Edington, 1990; Mahato 1998; Joshi & Joshi, 2000; Rajbhandari, 2001; Manandhar, 2002; Devkota & Karmacharya, 2003; Panthi & Chaudhary 2003; Rai, 2003; Shrestha et al., 2004; Baral&Kurmi, 2006; Dangol, 2008; Ghimire & Bastakoti, 2009; Joshi & Singh, 2010; Singh et al., 2011 a, b, c, 2012, 2013, 2017), however, many parts of the country and communities remain unexplored.

MATERIALS AND METHODS

Study area

Rupandehi is botanically rich district in western Nepal which is situated in between 830 27'.955" to 830 28'.255" E longitudes and 270 40'.016" to 270 40'.252" N latitudes and covers an area of 1360 km2 (D.D.C., Rupandehi, 2007). The district is bounded by hilly districts (Palpa and Arghakhanchi) in North, by Mahrajganj district of Uttar Pradesh (India) in South, by Nawalparasi district in East and by Kapilvastu district in West (Fig. 1). Rupandehi district has a humid tropical climate with maximum temperature beyond 400 C during summer (May-June) and below 100 C during winter (December- January) and annual rainfall is about 1250 mm. Geographically it is divided into Chure region (14.5%); Bhabar region (0.6%) and Terai region (84.9%).

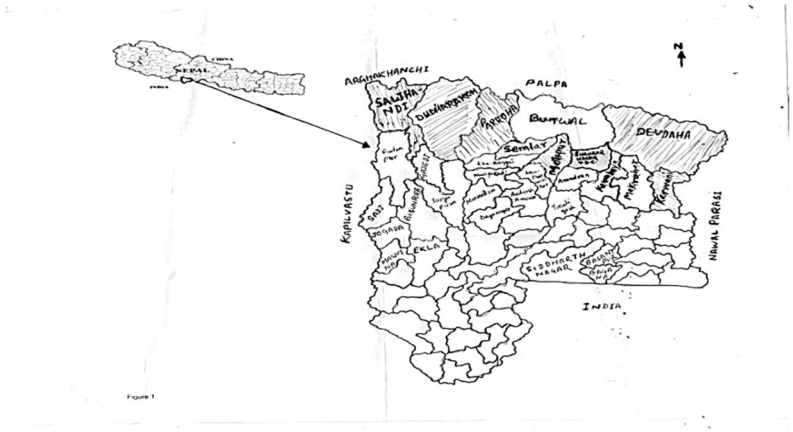

Figure 1: Map of Nepal showing study area

The climatic condition of the district is tropical type and Sal (Shorea robusta) forest is dominated along with others. The total population of the district was 7, 08,419

(CBS 2012). The Tharu and Magar are the ethnic societies of the study area. They live in association with Chhetri, Thakuri, Brahmin, Gurung, Damai, Yadav, Kami, Kurmi, Teli, Majhi, and others.

Local traditional healers

Local traditional healers such as Tharus and Magars, having practical knowledge of plants in medicine, were interviewed in 10 villages of the district during March 2020 to November 2020. During the course of the study, three field trips were carried out in the study area. Method of selecting informants depends upon the distribution of local people having folk knowledge. They were requested to collect specimens of that plants they know or to show the plants species on site. These informants were traditional healers themselves or had tradition of healing in their families and had knowledge of the medicinal use of plants. The wealth of medicinal plant knowledge between the Tharu and Magars of this district is based on beliefs and observations. This knowledge has been transmitted orally from generation to generation, however it seems that it is vanishing from the modern society since younger people of Tharu and Magars communities are not interested to carry on this tradition.

Interview with traditional healers

Adopting the methods of Martin (1995) ethnomedicinal data were collected through general conservation with the informants. The questionnaires were used to have information on medicinal plants with their local names, habit, wild or cultivated, availability, parts used, mode of preparation, and use. A total of 20 informants comprising 17 males and 3 females were identified between the ages of 31 to 72. They were selected based on their knowledge of medicinal plants either for self-medication or for treating others. Informants were asked to come to field and show the plants with local name, the species mentioned by the informants were taxonomically identified.

Preservation of plant specimens

The collected plant specimens were brought to the laboratory and processed for herbarium specimen preparation (Rao and Sharma, 1990; and Woodland, 1997) and identified with the help of available floras and other potential literatures (Hara et al., 1978; Hara and Williams, 1979; Hara et al., 1982; Polunin and Stainton, 1984; Stainton, 1988; Noltie, 1994; Rajbhandari, 2001; and Manandhar, 2002) and submitted in the department of Botany, Butwal Multiple Campus, Tribhuvan University Nepal for future

references. The botanical identities of collected specimens were confirmed by Professors Dr. J. P. Tewari and Dr. Akhilesh Kumar, Taxonomists of M. L. K. P. G. College, Dr. R. M. L. Avadh University, Faizabad, Uttar Pradesh, India and Dayalbagh Educational Institute, (Deemed University), Agra, India. Plant names were checked according to International Plant Names Index (2008).

The collected specimens were arranged alphabetically with their scientific and local names, families, plant parts used and the ailments treated are summarized in Table 1. The details of the ailments cured the methods of preparation and treatment is further described.

Table 1: Summary of plant names, family, local name and voucher number

S. No	Plants name, Family, local name & Voucher No.	Habit	Parts Used	Ailments Cured
1.	*Abutilon indicum* (L.) Sweet, Malvaceae, Atibala, AGS-101	Shrub	Whole plant	Decoction of whole plant is used against constipation
2.	*Acacianilotica* (L.) Delile, Mimosaceae, Babul, AGS-176	Tree	Bark & pod	Decoction of bark is used in diarrhea. Pods are grinded to make powder mixed with honey to treat dysentery.
3.	*Achyranthesaspera* L.,Amaranthaceae, Datiwan, AGS- 203	Herb	Whole Plant	Decoction of whole plant is used in stomach disorders. Juice of the plant is used in abdominal pain, dysentery and Bowel.
4.	*Albizia lebbeck*(L.) Benth. Mimosaceae, Siris, AGS- 49	Tree	Bark	Bark decoction is used to treat diarrhea.
5.	*Allium cepa* L. Liliaceae, Pyaz, AGS-38	Herb	Bulb	Equal amounts of onion bulb and mint extract are mixed and given to treat cholera.
6.	*Artemisia vulgaris* L., Asteraceae, Titepati, AGS-56	Herb	Leaf	Leaves are boiled and taken orally to expel intestinal worms.
7.	*Asparagus racemosus*Willd. Liliaceae, Kurilo/ Satawari, AGS-79	Herb	Tuber	Fresh tuber is taken orally to treat stomach problems.
8.	*Azadirachta indica* A. Juss. Meliaceae, Neem, AGS-43	Tree	Leaf	Decoction of leaves is taken for digestive and gastric problems.
9.	*Boerhaavia diffusa* L., Nyctaginaceae, Punarnawa, AGS-99	Herb	Root	Dried root powder taken with Luke warm water to treat gas troubles.

10.	*Carica papaya* L., Caricaceae, Mewa/ Papita, AGS-28	Shrub	Fruit	Ripe fruit pulp is taken to improve digestive disorders.
11.	*Carum copticum*(L.) Benth. & Hook. f. ex C. B. Clarke, Apiaceae, Ajwain, AGS- 37	Herb	Seed	Seed powder taken orally with Luke warm water to treat diarrhea, dysentery and vomiting.
12.	*Cassia fistula* L., Caesalpinaceae, Rajbrichha, AGS-21	Tree	Fruit	A piece of fruit containing 10-12 seeds is slightly grinded and boiled in 1 liter water and taken orally to treat dysentery.
13.	*Cinnamomum zeylanicum* Blume, Lauraceae, Dalchini, AGS-19	Tree	Bark	Bark powder and decoction is used in gastrointestinal disorders, vomiting, dysentery and diarrhea.
14.	*Coriandrum sativum* L., Apiaceae, Dhania, AGS- 199	Herb	Fruit	Fruit crushed and mixed with salt and taken orally as carminative and indigestion.
15.	*Curcuma longa* L., Zingiberaceae, Haldi/ Besar, AGS- 186	Herb	Rhizome	Rhizome powder is used in stomach cancer.
16.	*Cyperus rotundus*L., Cyperaceae, Mothe jhar, AGS- 173	Herb	Rhizome	Rhizome is effective in treatment of diarrhea and vomiting.
17.	*Eugenia jambolana* Lam. Myrtaceae, Jamuno, AGS- 205.	Tree	Seed	Grind the seeds and make powder which used to treat stomach problems.
18.	*Ficus racemosa*L., Moraceae, Dumri/ Gular, AGS- 48	Tree	Leaf	Fresh leaf juice is given with Luke warm water to treat gastrointestinal problems.
19.	*Ficus religiosa* L. Moraceae, Peepal, AGS-201	Tree	Bark	Bark ash is taken orally with Luke warm water to treat diarrhea.
20.	*Foenicumvulgare* Mill. Apiaceae, Saunf, AGS- 153.	Herb	Fruit	Equal amounts of fruits of fennel, coriander, dill seed (*Anethum sowa*) and sugar are mixed and grind together to make powder which used to treat indigestion and abdominal pain.
21.	*Holarrhenaantidysenterica*Roth., Apocynaceae, Ban Khirro/ Indrajau, AGS-68	Tree	Bark	Bark paste taken with salt to treat diarrhea and dysentery.
22.	*Madhuca indica* Gmelin, Sapotaceae, Mahua, AGS-88	Tree	Bark	Bark juice is used to treat ulcers.

23.	*Melia azedarach*L., Meliaceae, Bakaino, AGS- 141	Tree	Leaf & Fruit	Leaf and fruit decoction is used to remove intestinal worms.
24.	*Mentha spicata* L., Lamiaceae, Pudina, AGS- 13	Herb	Leaf	Fresh leaves are boiled in water and taken orally to treat diarrhea.
25.	*Morus alba* L.,Moraceae, Kimbu, AGS- 108	Tree	Fruit	Ripen fruit used in diarrhea.
26.	*Oxalis corniculata* L., Oxalidaceae, Chariamilo, AGS-18.	Herb	Leaf	Fresh leaf juice use orally against stomach trouble.
27.	*Phyllanthus emblica*L., Phyllanthaceae, Amla, AGS- 27.	Tree	Fruit	Fruit Powder is taken orally with Luke warm water to treat diarrhea and dysentery.
28.	*Punicagranatum* L., Punicaceae, Anar/ Daarim, AGS- 23	Tree	Fruit	Dried outer covering of fruit is crushed and powder is taken orally with Luke warm water to treat diarrhea.
29.	*Saccharum officinarum* L., Poaceae, Ukhu, AGS-33	Shrub	Stem	Stem extract is useful in indigestion.
30.	*Solanum nigrum* L., Solanaceae, Kali-Gedi, AGS-63	Herb	Fruit	Ripe fruit used in diarrhea and dysentery.
31.	*Terminaliachebula* Retz. Combretaceae, Harro, AGS- 148	Tree	Fruit	Dried fruit powder taken with Luke warm water to treat dysentery.
32.	*Tinospora cordifolia* Willd. Menispermaceae, Gurjo/ Guruch, AGS-128.	Climber	Whole Plant	Whole plant juice taken against stomach disorder.
33.	*Woodfordiafruticosa*(L.) Kurz, Lythraceae, Dhairo, AGS- 53.	Shrub	Flower	Dried flower powder is taken orally with Luke warm water to treat diarrhea, dysentery and ulcers.
34.	*Ziziphus jujuba* Mill. Rhamnaceae, Bayer, AGS- 73	Tree	Fruit	Roasted fruit eat for the treatment of stomach problems.

RESULT AND DISCUSSION

The investigations showed that a total of 34 plant species distributed in 33 genera and 27 unrelated angiosperm families are used to treat gastrointestinal disorders in and around the study areas.

As far as the number of species utilized, Apiaceae and Moraceae (3 species each), Liliaceae, Meliaceae, and Mimosaceae (2 species each) trailed by Amaranthaceae, Asteraceae, Apocynaceae, Caesalpinaceae, Caricaceae, Cyperaceae, Combretaceae, Lamiaceae, Lauraceae, Lythraceae, Malvaceae, Menispermaceae, Myrtaceae,Nyctaginaceae, Oxalidaceae, Phyllanthaceae, Poaceae, Punicaceae, Rhamnaceae, Sapotaceae, Solanaceae and Zingiberaceae (1 species each) (Figure 2).

The study areas have a rich variety of medicinal plants. The medicinal plants were principally trees (47%, 16 species) trailed by herbs (38%, 13 species), shrubs (12%, 4 species), and climber (3%, 1species) (Figure 3). Fruits were the palatable part in most of the cases trailed by leaves, bark, whole plant, rhizome, seed, flower, pod, bulb, stem, root and tuber (Figure 4).

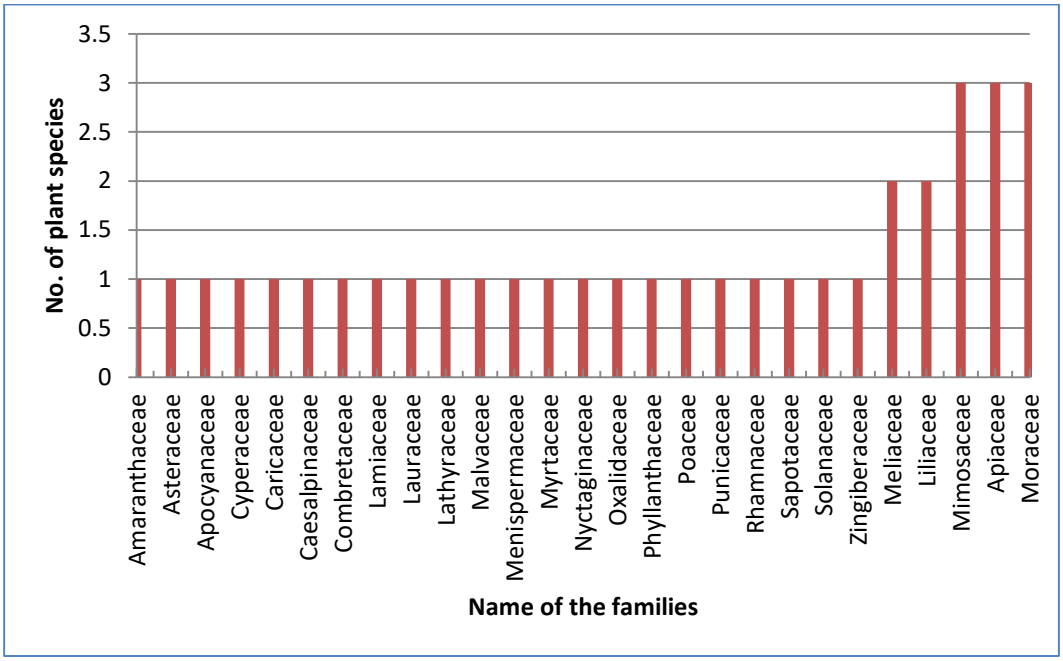

Figure 2: Number of families and plant species

The present studies have, however, shown that apart from the use of these plants for cure of gastrointestinal disorders, they have several other wide applications in the local treatment and management of many ailments like dermatological disorders, urinogenital disorders, respiratory tract infections, skeletomuscular disorders, etc. Indeed, on many

occasions, the study observed that the indigenous people value the plants more for their ethnomedicinal uses than others. The indigenous peoples of the study area have therefore developed various ways of harvesting, processing and administering preparations of these plants in the cure of different ailments related to the stomach.

Uncontrolled exploitation, due to increasing population and its attendance pressure on resources and the new wave of emphasis on natural products is threatening most of the species investigated. In addition to these, the loss of habitats due to pollution and environmental degradation further escalates the threats to these species.

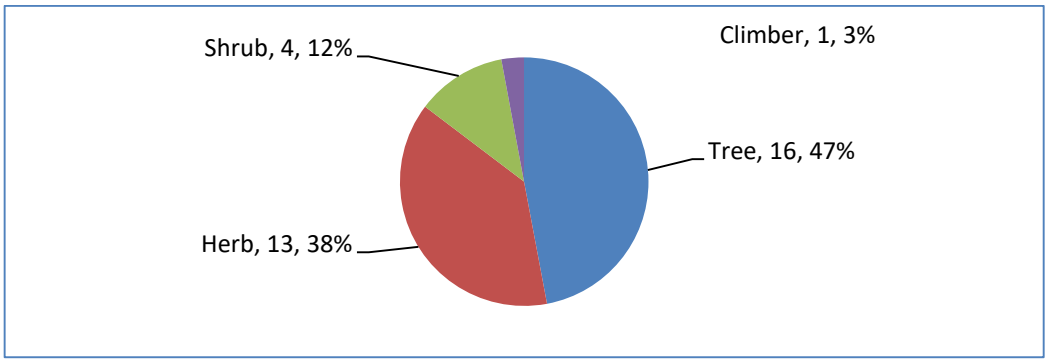

Figure 3: Habit of the plant species

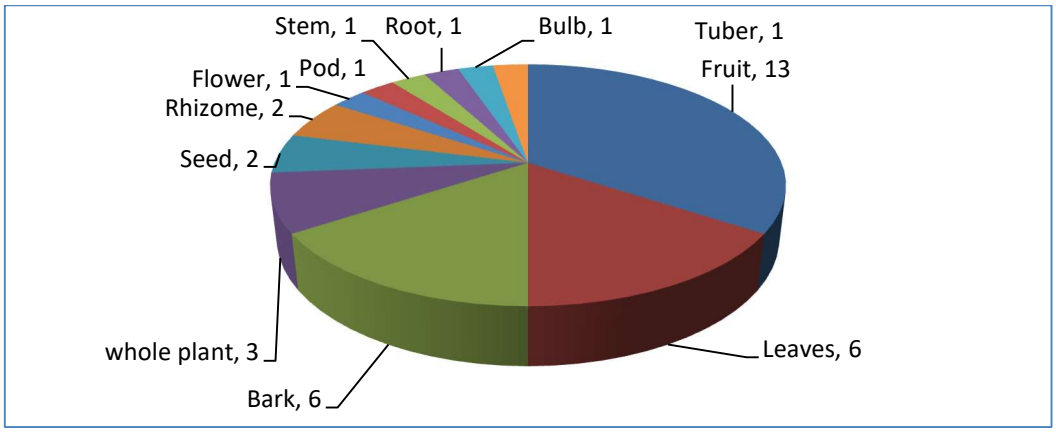

Figure 4: Plant parts used to cure gastrointestinal disorders

CONCLUSION

Medicinal plants still play an important role among Nepalese people. The present information on these medicinal plants may serve as the baseline data to initiate further research for the discovery of new compounds and the biological activities of these potential plant remedies. Further research on these plants may provide some important clues for the development of new drugs for the treatment of gastrointestinal disorders.

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