International Journal of Botany Studies
ISSN: 2455-541X; Impact Factor: RJIF 5.12
Received: 03-08-2020; Accepted: 18-08-2020: Published: 04-09-2020
www.botanyjournals.com
Volume 5; Issue 5; 2020; Page No. 19-23

Ethnobotanical study of herbal medicinal plants of Billawar region, Jammu and Kashmir, India

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Abstract
The present study was conducted in some regions of Billawar, Union Territory of Jammu and Kashmir, India. The local peoples of the region used ethnobotanical plants for the treatment of various ailments. Documentation of such knowledge is required in view of the day by day disappearing knowledge in new generations. Therefore, the field survey was conducted at different sites of Billawar namely, Dewal, Bhaddu, Sukrala and Koti from March to June 2020. During this study, a total of 31 species of herbal medicinal plants belonging to 26 families and 30 genera were reported used traditionally by the inhabitants to cure different diseases and ailments like headache, toothache, epilepsy, gastric problem, skin disorders earache, pneumonia, jaundice, etc. Therefore, in the present study an attempt has been made to document some locally available herbal plants utilized traditionally by the local people of this region. Study would help in developing a wide range database of the plants used in household remedies, strengthening the health care system in the villages and also in conserving traditional knowledge for future.

Keywords: Ethnobotany, herbal medicinal plants, traditional knowledge, Billawar, J&K

Introduction
The term ethnobotany was first coined by John William Hershberger in 1895. According to him ethnobotany is the study of plants used by the primitive and aboriginal people. Ethnomedicine refers to the study of traditional medical practice that is concerned with health care seeking process and healing practices. The ethno medical approach is useful for the study of indigenous therapeutic agents because it allows researcher to understand the treatment patterns. The knowledge use of medicinally important plants and practices is passed verbally from one generation to another [1] and because of this tradition there is fear that indigenous knowledge about traditional medicine is slowly lost [2]. Documentation of such traditional knowledge will lead to its conservation and facilitate future research on medicinal plant safety to confirm traditional use [3] and the destructive changes in the knowledge of medicinal plants during transmission between generations [4]. Although, modern medicine has been superior over traditional medicine but traditional practice of herbal medicines has often maintained their popularity for historical and cultural reasons. Ethnobotanical studies have become increasingly highly valuable in the development of healthcare system in different areas of the world [5]. India is the important resource of medicinal plants in the global level and due to this wealth of herbal medicinal uses it is commonly known as the "Botanical Garden" of the world [6].
Billawar region of Jammu and Kashmir Union Territory is rich in biodiversity and people of Billawar have a high medicinal reverence on plants from the ancient time. The population of this place lives in villages and is economically poor and the inhabitants of this area are dependent on plant resources for medicine, fuel, food, fodder, fiber, timber. Due to lack of modern medical facilities, they use plants to get rid of different ailments. Therefore, the present study has been carried out to identify and documented the locally available herbal medicinal plants and their uses in different ailments.

Study area and methodology
The Billawar region of district Kathua in Jammu and Kashmir Union Territory is located at 32.613° N, 75.604° E and it has an average elevation of 844m asl (2,769 ft). The field study was carried out in different villages of Billawar namely Bhaddu, Dewal, Koti and Sukrala from March to June 2020 for collection of information on ethnomedicinal herbal plant species used by the locals in the study area. Information was gathered by conducting interviews and group discussions were made with the informants in Pahari or Dogri language for their ease. The information collected included common diseases, local name of plant species, habit, wild/cultivated, plant part used, ethnomedicinal use, method of preparation and mode of administration.

Identification of Medicinal
The ethnomedicinal herbal plants were identified through the group discussion with Hakims and Vaids having special traditional knowledge and with the help of available literature of district Kathua and the flora of Jammu and Kashmir [7, 8]. Identified herbal medicinal plants were confirmed by consulting the local herbaria and herbaria of different standards keys.

Fig 1: Map of the study area showing study site with the red circle (source: www.mapofindia)

Results and discussion

During the study, a total of 31 species of herbal plants belonging to 30 genera and 26 families were identified from the region and were used as effective remedies by the local people in their day to day life cure ailments (Table 1). The highest numbers of medicinal plants were recorded in two families' viz. Asteraceae (five species) and Ranunculaceae (2 species) while all other families have one species each i.e., Acanthaceae, Acoraceae, Acyranthaceae, Amarenthaceae, Araliaceae, Balsaminaceae, Solanaceae, Brassicaceae, Caesalpinaceae, Fabaceae, Primulaceae, Urticaceae, Violaceae, Chenopodiaceae, Commelinaceae, Euphorbiaceae, Lamiaceae, Gentianaceae, Nyctaginaceae, Oxalidaceae, Plantaginaceae, Polygoniaceae etc (Fig. 2).

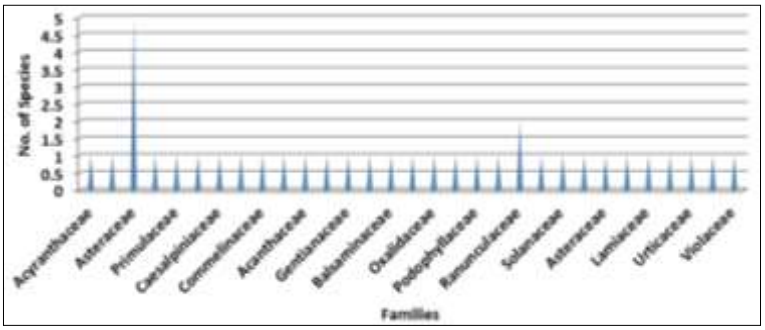

Fig 2: Number of medicinal plant species under different families

On the basis of the plant parts used, it was observed that different plant parts such as leaves, root, berries and leaves, aerial parts, latex, latex and roots, leaves and flowers, rhizomes, root and flowers, leaves and fruits are used. Leaves (36%) are more dominant among all other plant parts followed by whole plants (29%), roots (7%), aerial parts (7%), while all other plant parts (3% each) to cure various ailments (Table 1 and Fig. 3).

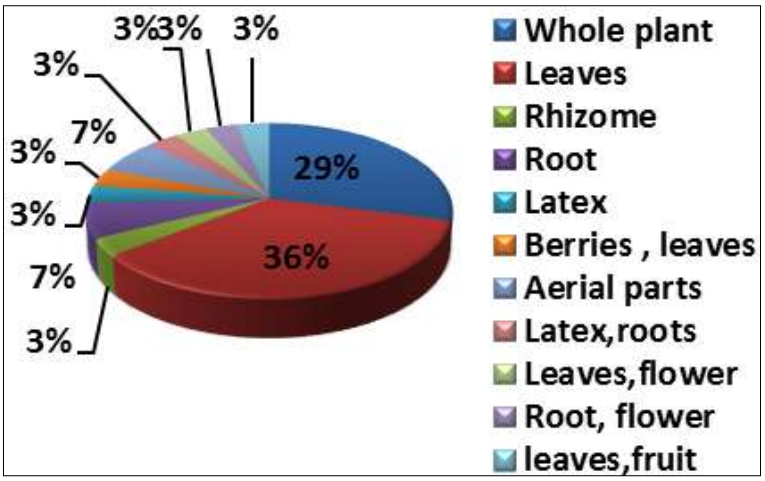

Fig 3: Percentage of plant parts used for medicinal purposes

Most of the combinations for remedies were prepared from a single species; however, some applications were always prepared with a mixture of plants.

Medicines were used in different forms including, paste, decoction, juice and infusion, latex, extracts. In our study paste was found dominant followed by decoction, extracts, juice, infusion, and latex. The medicine is administrated through following routes such as oral, external application and both oral and external. External oral route is more dominant among other (39%) followed by oral (35%) and external (26%) (Table 1 and Fig. 4).

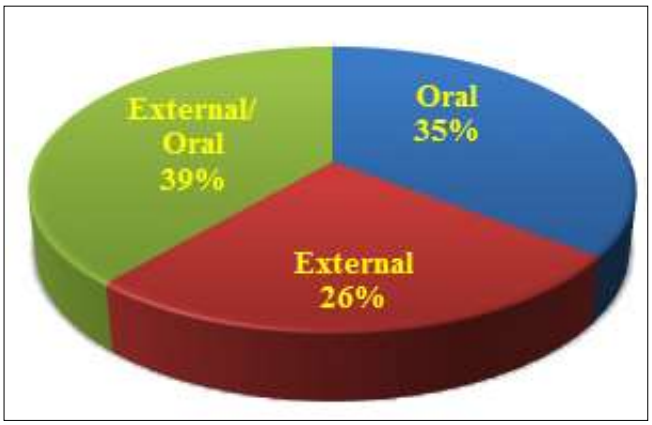

Fig 4: Route of utilization of medicinal herbs

The people of the area always collected plants that were fresh and best in all respects i.e., disease free for the preparation of indigenous medicines. Further results of the study also show that the people of Billawar region used these plants through different modes of preparation for curing various ailments such as rheumatism, urinary disorders, jaundice, indigestion, cough, general body weakness, gaseous bloat, fever, cold, headache, hair fall, warts, skin infections, piles, toothache, etc. The results of the present study also reveal that (75%) of folk medicinal knowledge comes from people above the age of 60 years, while (25%) of it comes from people between the age of 30 to 50 years. The tribal peoples i.e. Muslim, Gujar, Bakrwal, Gaddi, and Dogra Community of Billawar were consulted regarding the importance and traditional knowledge of medicinal plants because they have a great knowledge. The present study is rich in medicinal plant resources which are mostly herb species and play a vital role in treating various diseases.

The medicinal plants are drastically decreasing due to various reasons such as increased marketing pressure, lack of job opportunities, increased population of the area, roads construction, industrialization, habitat fragmentation, deforestation, over-grazing by animals, climate change etc. Therefore, conservation strategy and action plan should be formulated and implemented effectively in order to save this high value diminishing resource. For sustainable and conservation of these plant species it would be better to involve the local people through creating awareness among them.

Table 1: List of herbal medicinal plants of Billawar region Jammu and Kashmir

Botanical Name	Family	Local Name	Habit	Plant parts used	Route	Methods of preparation and medicinal uses
Dicliptera bupleuroides	Acanthaceae	Kalu Ghu	Herb	Whole plant	O	Plant used as tonic debility
Acorus calamus L.	Acoraceae	Bareyan	Herb	Rhizome	O	Locals eat rhizome underground part for curing stomach ailments.
Achyranthes aspera L.	Acyranthaceae	Puthkanda	Herb	Whole plant,	E/O	Root is chewed tore live toothache. Paste of spike is applied topically as anti-venom against scorpion sting.
Amaranthus spinosus L	Amaranthaceae	Kandiari	Herb	leaves	O	Leaves are cooked as vegetable for laxative properties.
Hedera nepalensis	Araliaceae	Karera	Herb	Berries leaves	E/O	Ripe berries are eaten as aperients. Leaf decoction is used as hair wash to get rid of hair lice. Dry leaves used to stimulate sores.
Ageratum conyzoides L.	Asteraceae	Neeli Jadi	Herb	Leaves	E	Leaves extract is applied on cut or wound to stop bleeding.
Synedrella nodiflora L.	Asteraceae	Jari	Herb	Leaves	E	External application of leaf paste is styptic
Tagetes erecta L.	Asteraceae	Gutta	Herb	Leaves	E/O	Extract to finely leaves taken orally acts as aperients and cures piles. Leaf paste is styptic and also prevents toothache.
Taraxacum officinale	Asteraceae	Bathur, Phul	Herb	Leaves	O	Boiled leaves are used as pre and post pregnancy food for ladies. Leaves are cooked as vegetable and given to pregnant ladies at the time of delivery for reducing labor pains.
Tridax procumbens L.	Asteraceae	Kumra	Herb	Leaves	E	Topical application of leaf extract is styptic
Impatiens balsamina L.	Balsaminaceae	Teera	Herb	Leaves	E	Paste of leaves is anti phlogistic and soothes itching between the fingers of feet during monsoons
Coronopus didymus L.	Brassicaceae	Jangali Halian	Herb	Whole plant	E/O	Decoction of whole plant is taken orally to cure arthralgia. Plant paste is applied on joint dislocation
Senna tora L.	Caesalpiniaceae	Lokhi	Herb	Leaves	O	Used to curing skin disorders, Leaf decoction treats dyspepsia.
Chenopodium album L.	Chenopodiaceae	Bathu	Herb	Leaves	O	Leaves are rich source of Vitamin C, mildly laxative and relive stomach pain.
Commelina benghalensis	Commelinaceae	Shurra	Herb	Whole plant	O	Whole plant extract is used for refrigerant and laxative.
Euphorbia hirta L.	Euphorbiaceae	Dudli	Herb	Whole plant	E/O	Inflorescence of plant is eaten raw along with Piper nigrum to cure piles. Latex is used for the treatment of eyelid.
Medicago lupulina L.	Fabaceae	Sareri	Herb	Aerial parts	O	Plants have antimicrobial activity.

Gentiana kupoo	Gentianaceae	Neel Kanthu	Herb	Roots	O	Decoction of roots is used for stomach ache, tonic and urinary infection.
Thymus serphyllum L.	Lamiaceae	Ban Ajwain	Herb	Whole plant	E/O	Whole plant decoction cures urinary troubles, and releases kidney stone. Leaf is crushed to make paste applied on cuts, and wounds.
Boerhavia diffusa L.	Nyctaginaceae	Iit Sit	Herb	Root	O	Decoction of root is used in jaundice.
Oxalis corniculata L.	Oxalidaceae	Nikki Ammi	Herb	Whole plant	E/O	The Chewing of fresh leaves check toothache and halitosis. Plant extract act as blood purifier
Plantago major	Plantaginaceae	Ishabagol	Herb	Whole plant	E/O	Leaf paste is styptic and is applied on cuts and wounds. Seed decoction cures gastric and peptic ulcers, dysentery, and diarrhea.
Rumex hastatus	Polygoniaceae	Baddi ammi	Herb	leaves	E	Leaf paste is applied on cuts wounds and burns as antiphlogistic.
Podophyllum hexandrum	Podophyllaceae	Bankakdi	Herb	Latex, roots	E	The Latex applied on warts to remove them. The root paste is applied on cut wounds for quick healing.
Anagalis arvensis L	Primulaceae	Kokoon	Herb	Leaves	E	Topical application of leaf extracts on the scalp check hair lice.
Ranunculus laetus Wall.	Ranunculaceae	Darrili	Herb	Latex	E	Latex is applied at the site of alopecia to promote hair growth.
Ranunculus muricatus	Ranunculaceae	Korkhand	Herb	Aerial parts	E/O	Whole plant decoction is taken orally as a cure for periodic fever, asthma, and arthralgia. Leaf paste is styptic and is applied on cuts wounds and abscess as antiphlogistic
Verbascum thapsus L.	Scrophulariaceae	Giddar Tamakoo	Herb	Leaves, flower,	E/O	Flowers are kept in water over night and this infusion is taken orally to cure cough, asthma, bronchitis, pneumonia. Leaf paste is styptic.
Solanum nigrum L	Solanaceae	Kaayankothi	Herb	leaves, fruit	E/O	Leaf paste is applied on ulcers and wound. Fruit as tonic for overcoming anemia.
Urtica dioica L.	Urticaceae	Saddar	Herb	Whole plant	E/O	Leaf paste is styptic and is also applied on the scalp before hair wash to get rid of dandruff. Leave decoction is taken orally for curing urinary tract infections.
Viola odorata L.	Violaceae	Banaksha	Herb	Flower, root	O	Flower and root decoction checks cough, cold and bronchitis. Petals are made in the form of a syrup which is used against throat infections

Plate 1: Some of the important medicinal herbs of the study area

Conclusion

Medicinal plants against different ailments play a significant role in meeting the primary health care needs of the rural communities of Billawar region. This region is rich in medicinal plant species and the people have also deeply rooted traditional knowledge of these medicinal plants. The medicinal plants are drastically decreasing due to various reasons such as increased marketing pressure, lack of job

opportunities, increased population of the area, roads construction, industrialization, habitat fragmentation, deforestation over-grazing by animals, climate change etc. Therefore, an early need arises to study and document the available information in detail for a wider application in future. Besides, the information could prove a fruitful source for pharmacologists, phytochemists, botanists and to those interested in the development of alternative therapies. In the present study of medicinal plants, research and conservation efforts should be focused on these resources of the area so that in future the coming generation could benefit from these precious plants that are a real gift to mankind. Therefore, this knowledge of important herbal medicines could prove beneficial in phyto-pharmacological research for the discovery of new threauptic drugs in the future [9].

Acknowledgement
The authors are thankful to the local communities (Tribal people, Hakims, Vaids) for their kind support for providing information on traditional use of medicinal plants of the study area.

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