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Exploring the traditional strategies for conservation of endangered medicinal plants of Baramulla district of Kashmir division, India

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Abstract
Medicinal plants have been used to treat various diseases in Kashmir valley from ancient times. Various plant species are being used as medicine in one form or another. The knowledge of how to use these medicinal plants was transmitted from generation to generation. Due to modernization, traditional knowledge about the usage of medicinal herbs is draining day by day. A number of plant species have also become endangered as a result of anthropogenic and natural threats such as overgrazing, deforestation, road construction, overexploitation, soil erosion and huge visitor influxes. Indigenous knowledge serves as a foundation for decision-making at the grassroots level in rural communities about natural resource conservation. Considering that the majority of plant species have medicinal value, on which the majority of rural people rely, conservation of medicinal plants has a direct relationship to human health. To document the ethnobotany of rare, vulnerable, and endangered plants in the Baramulla District of Kashmir and to study the traditional conservation methods, a survey was carried out in the area. During the study, 27 plants were identified, along with their therapeutic use and traditional conservation methods. The study also recommends that traditional management practices be encouraged because they serve a dual role as an important conservation approach as well as a vital component of primary health care.

Keywords: indigenous knowledge, traditional conservation methods, medicinal herbs

Introduction

Since origin of human civilization, plants have been used as a source of medicine by all cultures. Initially, the plants were used in folk medicine, which was practiced by ancient man in a variety of locations around the world, including India, China, the Middle East, Africa, and South Africa, to treat a variety of ailments. Egyptians, Greeks, Romans, and Indians have all relied on the same plants, trees, and shrubs that have been used for thousands of years to treat their ailments (Yuan *et al*., 2016) [54]. Traditional medicinal plants utilized by ethnic tribes, as well as their practices, have shown to be important and successful criterion for the pharmaceutical industry while searching for new therapeutic agents in various fields of biomedicine. Medicinal plants are those plants that are regularly employed in the treatment and prevention of various ailments, even though if consumed in large quantity, most of these plants may be harmful (Mensah *et al*., 2019, Anselem, 2004) [37, 3]. These plants are either "wild plant species" or "domesticated plants species" (Cowley, 2002, Pieroni, 2017) [13, 44]. Medicinal and aromatic plants possess aromatic compounds mainly the oils, which are volatile at room temperature and the specific property (s) found among them act as a cure for several diseases. Traditionally these plants have been used as raw materials for extraction of essential oils, as well as source of spices and other natural products such as traditional herbal medicines, insect repellents, cosmetics, pharmaceuticals, biopesticides, other herbal products etc (Samarth *et al*., 2017) [47]. Since the origin of mankind, medicinal plants are used for the treatment of diseases and infection and are therefore used to treat various ailments in traditional medicine (Adachukwu & Yusuf, 2014) [1]. Style diseases, which are prevalent in modern culture, usage of medicinal plants can help to alleviate these issues. Moreover, several difficult diseases, such as vitality,diabetes and memory loss, can be properly treated with herbal therapy, which is often not achievable with allopathic treatments (Naithani & Kumar, 2017, Hamdani *et al*., 2020) [39, 20]. However, many mountainous and tribal parts of Kashmir's Himalayas lack information on the medicinal properties of plants (Jeelani *et al*., 2013) [24]. Plants have been used for medicinal purposes and human nourishment in India since the Vedic era. The Atharveda (1500-400 B.C.) and Rig-Veda (1500-400 B.C.) are the first to mention the medical usage of plants (Chauhan, 1999, Fayaz *et al*., 2019) [10, 18]. In India, there are approximately 17000 plant species, of which 7500 are recognized to have medicinal properties (Kumar *et al*., 2019) [33].

According to studies conducted by (Calixto, 2019) [8] and (Joy *et al*., 1998) [26], plant drugs account for up to 25% of total drugs in developed countries such as the United States, while they account for up to 80% in developing countries such as China and India. As a result, developing countries like India place a considerably higher value on medicinal plants than the rest of the world. India's medicinal and aromatic plant area is currently over 6, 34,000 hectares, with a production of 1031,000 MT (NHB Database, 2017) [55]. The Indian subcontinent is home to a vast array of medicinal plants employed by various indigenous health-care systems. Traditional medicine is crucial for the poor and marginalized elements of society, especially in rural places where modern medical facilities are not available, and medicinal plants are employed for medicinal purposes. Furthermore, both developed and developing countries have seen a significant

growth in interest in herbal medications and natural products (Mohiuddin, 2019) [38].

The utilisation of ethno-botanical information has aided health care around the world (Astutik *et al*., 2019, Jamshidi-Kia *et al*., 2018, Fabricant & Farnsworth, 2001) [5, 23, 17]. Ethnic groups all throughout the world have created their unique set of practices, including medicinal practices. The majority of traditional medicine is based on the use of plant extracts or principles (Lemonnier *et al*., 2017) [34]. According to the World Health Organization (WHO), traditional medicine is relied on by as much as 80% of the world's population for primary health care (Khan & Ahmad, 2019, Shakya, 2016) [31, 48]. All modern medicines are produced from medicinal plants, either directly or indirectly, generally by combining modern technology with traditional knowledge.

Scientists in India and worldwide have been studying medicinal plants from chemical, pharmacological, and therapeutic perspectives (Hynniewta & Kumar, 2008, Van Wyk & Wink, 2018) [22, 52]. However, compared to the amount of such possible plants, these three crucial integral ingredients for bringing about the real chemicals from such plants have only screened a few species for their active principles. Simultaneously, clinical examinations take a long time and are quite costly when analysing a large number of plants. In such cases, conventional knowledge is the finest source of preliminary screening information (Negi & Subramani, 2006, Baydoun *et al*., 2015) [40, 6]. Re-examining traditional medicine and practises is considerably easier in systems of medicine with well-documented philosophy and instructional content, such as Ayurveda or Unani, than in traditional medicine passed down by word of mouth from generation to generation (Ravishankar & Shukla, 2007) [46].

People in the Himalayan region have learned and practiced the medical use of plants growing nearby for treating various ailments for centuries through trial and error method. The ancient wisdom that is normally passed down orally has to be documented as soon as possible (Kaul, 1997, Gupta *et al*., 2014) [30, 19]. Kashmir's valley, which is famous for its beauty around the world, is also rich in herbal and floral resources. Since time immemorial, there has been a desire to learn about and admire the plants of Kashmir. A handful of botanists have visited Kashmir on rare occasions. R. R. Stewart and T.A. Rao of the BSI have been actively exploring various areas in recent years in order to create a comprehensive flora of the region. Only a few studies have been conducted in the previous half-century to document the ethno medicinal plant species that thrive in the region, particularly in the isolated and challenging terrains (Malik *et al*., 2011) [36]. In in Kalhana's Rajtarangini (1149-50 A.D.), the preservation of plants and plant products for therapeutic reasons is mentioned. 'Kashmiris turn virtually every plant to some use and attribute medicinal properties to every growing thing' writes Sir Walter Lawrence in his book 'Valley of Kashmir.'

Man has relied on medicinal plants for health and dietary needs since the dawn of time. Medicinal plants have a unique place in conservation because of the important cultural, livelihood, and economic functions they play in many people's lives (Kumar & Jnanesha, 2016) [32]. There has been a pattern of putting too much focus on the possibility for developing new pharmaceuticals while paying too little attention to their conservation efforts (Hamilton, 2004, Chen *et al*., 2019) [21, 11]. At the same time, the demand for the usage of medicinal plants is only growing even more in the recent times. The people who are living close to nature and their acquired knowledge should be made aware of the status of medicinal plants and empower and involve them to preserve the existing important medicinal plants of the area.

The majority of people in developing nations have had their medicinal plant needs supplied through uncontrolled collection of natural flora, particularly those found in forests (Amujoyegbe *et al*., 2012) [2]. Many species have become extinct, threatened or endangered as a result of overexploitation of their nature resources (Omobuwajo *et al*., 2008, Paul *et al*., 2015) [41, 43]. For decades, indiscriminate exploitation of medicinal plants has been the trend in developing countries, posing conservation challenges for these vital species. In addition, the rapid growth of populations in emerging nations has put undue pressure on frequently used medical plants and natural resources in general. Wild populations are being decimated as the demand for therapeutic plant products grows (Chen *et al*., 2016) [11].

Traditional medicine's long-term viability and the supply of plant materials for medication research are significantly reliant on concerted efforts to conserve these indigenous plants. Many remedies have been developed as a result of tropical forest people's knowledge, and there will be more in the future. This is reason enough for any and all programmes to be concerned with tropical forest conservation, development, and protection. Because human needs and issues are such an important part of any conservation effort, it is critical to implement systematic medical plant production in order to maintain biodiversity and safeguard threatened species (Pan *et al*., 2014) [42].

Some of the studies on medicinal plants in the state of Jammu and Kashmir were undertaken during the last three decades. These studies were carried out to analyze the endemism, special distribution pattern, threat status, availability and quantity consumed by the local people that have actually pushed many medicinal plants into threatened categories. Excessive habitat degradation accounted for nearly all of human's influence on extinction and endangerment in the prehistoric record, and there are numerous actions in the modern world that play an even bigger role (Tali *et al*., 2015) [51]. Forest conversion and soil degradation can diminish medicinal plant availability while also affecting indigenous knowledge of medicinal plant use (Caniago & Stephen, 1998, Shanley & Luz, 2003) [9, 49]. There is still paucity of systematic studies and documentation of endangered medicinal plants of Baramulla district of Kashmir valley. The status of most of the medicinal plants of the area, with regard to their geographical distributions, is not known and so it is perceived that this study will augment the existing available knowledge of the area. Traditional communities still have a lot of knowledge about how to use them, yet very little of it has been recorded in a systematic manner.

Many of these medicinal plants are becoming increasingly vulnerable and threatened as a result of indiscriminate use over time and habitat fragmentation, and are also at risk of becoming genetically impoverished. Therefore, there is need to conserve and sustainably utilize medicinal and pharmaceutical resources for novel and fruitful applications (Chen *et al*., 2016) [11]. Despite the challenges posed by increased demand and widespread loss of plant-rich ecosystems, no systematic effort has been made to ensure that medicinal plants are preserved. As a result, many medicinal plants are in danger of becoming extinct or losing their

genetic diversity, although specific information is scarce. Only little of this information has been systematically documented (Rao, 2016) [45]. Although attempts have been made to enumerate and document the medicinal plants of Kashmir Valley over the last three decades, as evident from the available literature, the results are not specific to the Baramulla district. There is still a paucity of systematic studies till date with regard to the status of medicinal plants from Baramulla. The natural vegetation where most of the important medicinal plants are found, is disappearing or being altered at an alarming rate. No concerted attempts have been made to involve the traditional institutions of the area to work in synergy to preserve the precious orally passed on knowledge of the ethnic practices and concomitantly feasible ways and methods to preserve the endangered medicinal plants.

At the backdrop of these facts, present studies were undertaken to explore the important medicinal plants used by the local people living in hilly areas of Baramulla district of Kashmir Valley and find out the traditional ways used by local people to conserve these medicinal plants. Special focus was attributed to the dwindling of medicinal plants at an alarming rate, document the perceptions and indigenous knowledge of the people in relation to distribution, sources and uses of medicinal plants and concurrently make a concerted attempt to conserve them. The medicinal plants of the Baramulla region are on the verge of extinction due to natural and by large anthropogenic pressure. There is need to further investigate traditional medicinal plants in order to determine their functions as well as the active phytochemicals with medicinal properties. The knowledge will help to bridge the gap between modern medical and traditional medicine, allowing modern medicine to complement and/or augment traditional medicine.

Considering all the salient features mentioned above, the study and conservation of medicinal plant species has become increasingly urgent. The present study was conducted to ascertain the situation of medicinal plants to suggest a better strategy for the sustainable conservation, management and its potentials so that a future strategy can be delineated considering the overall prospect to cater the needs nationally as well as globally. Keeping all these attributes in mind, the present investigation was aimed at fulfilling the following objectives to list and prioritize the endangered medicinal plants and also to study the traditional methods for the conservation of endangered medicinal plants of Baramulla district of Kashmir Valley, India.

Material and Methods

Study area

Baramulla district is one of the 22 districts in the Indian Union Territory of Jammu and Kashmir. Baramulla city is the administrative headquarter of this district. The district covers an area of 4190 km^2. The district is situated at 34.1980° N Longitude and 74.3636° E Latitude. Baramulla District is sharing border with Budgam District to the East, Kupwara District to the North, Poonch District to the South.

Selection of study sites and survey

Various study sites scattered over hilly and kandi areas adjacent to forests of Baramulla district were selected for the present study. The study sites were selected on the basis of floristic pattern and population of the inhabitants. The uses of medicinal plants in various human and cattle ailments were obtained from rural physicians and medicine men. The distance from the forests was assumed to be an important factor that probably influences the use of medicinal plants. The selected areas/sites of the study area were visited during March 2020 to October 2020. Special efforts were made to visit the places rich in floristic wealth. The tribal and rural people utilize a number of medicinal plants; hence attention was paid to trace flora from these sites.

Methods of Data Collection

The investigation of the study sites was done during March to October months of 2020. During the field trip diagnostic features of the plants including occurrence, status, local name, medicinal uses, religious aspects and local conservational strategies were noted in the field book. Reports pertaining to the use of medicinal plants was collected from rural physicians, local herbal healers (Hakeems) and other knowledgeable people. During the visit, a thorough observation of their everyday activities in tribal communities, including participation in several of their social and religious rites, interpersonal contacts were made with members of the group. During the survey, local professional herbalists (Hakeems), Village elders and marketers were approached, brought into confidence and interviewed. The local herbal healers (Hakeems) were mostly consulted during the study. During the study, the herbal healers (Hakeems) in the area were consulted the most. In order to avoid making erroneous identifications, knowledgeable individuals and herbalists were brought to the forests to verify the plant samples. To collect the ethnobotanical information (local name, medicinal uses, mode of preparation) and to study the traditional conservation methods, questionnaires, discussions and interviews among tribal practitioners in their native tongue were used.

Local name and botanical name

Knowhow of medicinal plants *viz*., their local name, medicinal importance and habitat has been largely obtained from people inhabiting the district under investigation. However, in some cases the names vary from place to place and person to person. Most popular local names and correct botanical names of the identified plants are properly documented.

Status of species

During the present study, efforts have been made to have some idea about the status of medicinal plants. The status of the medicinal plants of the study area has been established as below.

Table 1

Status	Occurrence of Species %
Common	Above 50
Vulnerable (W)	Between 30 to 50
Endangered (EN)	Between 20 to 30
Critically Endangered (CR)	Between 10 to 20
Rare (R)	Below 10

Results

The present study was conceived in light of the current gap in the sort of research that exists, as well as the possibility that the results acquired may be beneficial to a large section of the ailing people. For the purpose of the study, hilly areas and villages (like Tangmarg, Qazipora, Chontipatri, Ferozpora, Drung etc) were

surveyed for the various types of medicinal plants and their usage. The area is dominated by tribal people (such as Gujjars and Bakerwaals), whose ethnobotanical knowledge of therapeutic plants is rapidly vanishing and requires urgent documentation. These places are well-known for their abundant medicinal and aromatic plant collections. For centuries, humans have relied on forests for their daily needs. Medicinal plants are only source of their health. They've discovered a plethora of ethnobotanical uses for the vast plant wealth in the process. Ethnobotanical study is crucial in light of the recent trend of returning to nature. The information were collected from the inter viewees which were in the age range of 30 to 65 years. The data collection methods included direct interviewing, conducting a walk with the healers, and conducting a talk in the local language using semi-structured questionnaires. During the interviews, data on ethnomedicinal plants, their local names, plant parts used to treat specific ailments and methods of administration, reasons contributing to their endangeredness, and community-based protection strategies were gathered. Following identification, the plant species were assigned to their respective families.

Medicinal Plants recorded and documented during the study

27 endangered plants were identified during the survey, along with their ethnobotanical uses (Table 1). 7 of the 27 plants investigated are vulnerable, 8 are rare, 7 are endangered, and 5 are critically endangered (Figure 2). These plants belong to 22 families with herbs make up the majority of these. Fever, cough, rheumatism, constipation, boils etc and other ailments have been treated with these plants since ancient times. (Table 2).

Table 2: List of medicinal plants found in District Baramulla, Kashmir, India. (R=Rare, E=Endangered, CE=Critically Endangered, V=Vulnerable)

Botanical Name	Family	Local name	Status	Plant part used	Diseases/ailment treated	Method of use
Anagallis arvensis	Primulaceae	Chari saban	R	Whole plant	Ulcers	Crushed plant is applied on affected areas.
Asperagus racemosus	Asparageceae	Satavar	E	Leaves and roots	Burning sensation of skin	For burning sensation of skin paste of fresh leaves is applied.
Podophyllum hexandrum	Polygonaceae	Wan wangun	E	Roots and fruit	Heart disease and acidity	For curing heart disease extract of root is taken. For curing acidity fruit is eaten
Portulaca oieraceae	Portulacaceae	Nunner	R	Whole part	Cough	Whole plant extract is used to cure cough.
Cichorium intybus	Asteraceae	Kazal-handh	R	Root	Rheumatism	To overcome rheumatismdecoction of roots is taken twice a day for a week.
Arisaema jacquemontii	Araceae	Hapat- gogej	R	Root	Boils and blisters	To treat boils and blisters, dried root or tuber is powdered mixed with oil and applied on the affected part.
Glycyrrhiza glabra	Fabaceae	Shanger	R	Root	Cough	For curing cough decoction of root is taken.
Aesculus indica	Sapindaceae	Haandoon	E	Leaves	Fever	Extract of leaves given for fever
Angelia glauca	Apiaceae	Chora	CE	Whole plant	Dyspepsia and constipation	Whole plant is used to treat Dyspepsia and constipation
Saussurea simpsoniana	Asteraceae	Jogi padshah	R	Whole plant	Boils	To treat boils, whole plant extract is applied on the affected parts
Dioscorrea deltoidei	Dioscoraceae	Kraeth	E	Leaves	Weak eye sight	To treat weak eye sight and infection of eyes, juice obtained from the leaves is used as eye drops
Arnebia benthami	Boraginaceae	KahZabaan	CE	Roots	Pneumonia	Persons suffering from pneumonia are given tea added with the roots of arnebia.
Artemesia absinthium	Asteraceae	Tethwan	R	Leaves	Abdominal pain	To cure abdominal pain patients are given paste of dried leaves and inflorescences mixed with warm milk.
Viola odorata	Violaceae	Bunufsha	R	Root	Constipation	For curing constipation, the roots are eaten raw.
Hyoscyamus niger	Solanaceae	Bazaar bhang	V	Seed	Toothache	The ash produced by burning of seeds is used as tooth paste and paste is used to treat toothache.
Jurinea dolomiaea	Asteraceae	JhariDhoop	E	Roots	Fever	The extract of roots is given in case of fever after child birth
Valeriana jatamansi	Caprifoliaceae	Jatamansi	V	Roots	Wounds	For better healing of wounds, the paste of the roots is applied on wounds.

Aconitum heterophyllum	Ranunculaceae	Patris	CE	Seeds	Tonsillitis	To treat tonsillitis, the crushed seeds are mixed with honey and applied on throat.
Dactyorhiza hatagirea	Orchidaceae	Salem Panja	CE	Tuber	Pyorrhea	The juice extract from the tuber is used for the treatment of pyorrhea.
Oxalis carniculata	Oxalidaceae	Amrul	V	Leaves	Diarrhea and fever	Extract of leaves is taken for curing diarrhea and fever.
Potentilla nepalensis	Rosaceae	Ratanjot	V	Whole plant	Burns	Ash of burnt plant is applied on the affected area
Atropa belladonna	Solanaceae	Sagangur	E	Leaves	Asthma	Smoke from burning leaves is inhaled to cure asthma.
Bergenia ligulate	Saxifragaceae	Pashanabheda	V	Leaves	Wounds	Paste of fresh leaves is applied on the affected areas.
Picrorhiza kurroa	Schrophulariaceae	Coad	E	Rhizome	Liver and respiratory disorders	Liver and respiratory disorders are treated withtea prepared from the rhizome.
Euphorbia helioscopia	Euphorbiaceae	Gur-sochal	V	Whole plant	Boils	Milk sap of whole plant is applied on affected part.
Colchicicum leutem	Colchicaceae	Fafoode	V	Bulb	Wounds	The paste is applied on the wounds for better healing
Saussurea lappa	Asteraceae	Kouth	CE	Roots	Inflammation and arthritis	The oil extracted from the root is used for anti- inflammatory and pain relieving purposes.

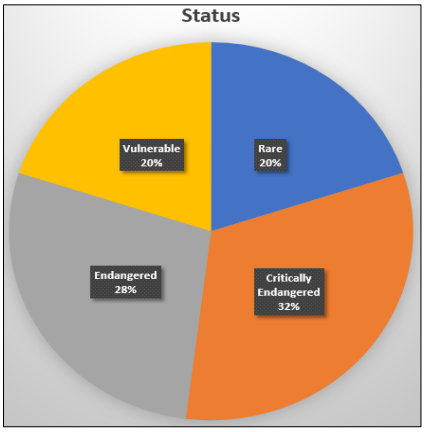

Fig 1: Status of Medicinal plants documented in Baramulla district, Kashmir, India.

The Kashmir Himalaya is home to a diverse range of habitats that support a thriving floristic diversity that has been used as a source of sustenance by its inhabitants since prehistoric times. The Kashmir valley is densely forested, which supports a varied diversity of plant species. The friendly attitude does not apply only to indigenous species, but also to exotics (Singh *et al*., 2016, Aslam *et al*., 2010) [50, 4]. Kashmir is renowned for the economic value of its plants and their products, which include medicine, fodder, and fibre. Due to the great and unique floristic diversity, a high proportion of plants are used as medicine in some form or another (Dar & Dar, 2006) [14]. According to folklore and documentation, the ethnic use of some of these plants in medicine extends all the way back to 3000-1000 B. C. and was most likely the only way to cure and protect the human population from numerous ailments (Bhata *et al*.). The extinction of certain plant populations as a result of excessive demand for medical purposes is a major source of concern, as these plants form the backbone of our traditional medicinal system, which is still used by a sizable population. As a result, it is critical to conserve these plants, as if conservation measures are not adopted immediately, these God-given resources will be completely exhausted in their native habitats (Lone *et al*., 2014) [35].

The Kashmir Himalaya offers a wide range of medicinal plants and is home to many of them. However, over 70% of the known medicinal plants are subjected to destructive harvesting (Dawa *et al*., 2018) [35]. Law enforcement in J&K, has made it illegal to harvest medicinal plants from the wild, with the exception of the Gaddi, Gujjars, and Bakarwal tribes, who are allowed to collect the species for personal use exclusively. As a result, medicinal plant knowledge is limited to tribes (Dutt *et al*., 2015) [16]. Recent concerns to biopiracy and intellectual property rights have required early bio-prospecting of possible medicinal plants used in folklore, placing a significant amount of money at risk. The first and most critical stage in this process would be to document ethnomedicinal plant applications in order to translate indigenous knowledge into commercial products on a large scale, benefiting all stakeholders. This policy would protect our bioresources from piracy (Wagay, 2014, Kadirgamar, 2002) [53, 27].

Traditional strategies to conserve these medicinal plants

Medicinal plants over the centuries have nurtured different oral and codified streams of Indian Systems of Medicine such as Ayurveda, Siddha, Unani, Tibetan and Folk systems, besides several thousands of household health traditions (Ravishankar & Shukla, 2007) [46]. Thus, medicinal plants are indeed an integral part of the Indian medical heritage. Reviving these time-honored medicinal traditions would secure the health security of millions of people while also providing the globe with innovative and safe herbal medicines. This dual significance underlines the need for conserving the resources. Recognizing the ecological significance and economic utility of medicinal plant resources, global awareness of the importance of their conservation is developing. Conservation aims to promote sustainable development by safeguarding and utilising biological resources in ways that do not deplete the world's diversity of genes and species or degrade critical habitats and ecosystems. It encompasses a broad range of tasks, including collection, propagation, characterisation, evaluation, disease indexing and

elimination, as well as storage and distribution. Plant genetic resource conservation has long been recognised as an integral part of biodiversity conservation (Chen *et al*., 2016, Kasagana & Karumuri, 2011) [11, 29].

Conservation of these diverse medicinal plant resources is possible by conserving the habitats. In the case of medicinal plants, the effective means to conserve them in the natural habitats is through in situ approach. The significance and relevance of in situ conservation is more prominent than ever before considering the current status of medicinal plants in the wild and their trade. This concept ensures the protection to the resources by offering the status of a "protected" area to the conservation site besides facilitating the continuation of different ecosystem processes (Hamilton, 2004) [21]. Preservation of natural environment and its individual components appears to have been an issue of some concern to some the rulers of the State of Jammu and Kashmir in the past. The State has a constitutional commitment with its people to protect them from social, economic and political injustice, abolish all exploitation and take special care to enrich the material and cultural life of the people. To protect and regulate multiple components of rich biological diversity including medicinal plants of the State a good number of laws have been enacted from time to time (Kala *et al*., 2006) [28].

Despite the government conservation plans' little acknowledgement of traditional management practises, indigenous peoples have employed them for millennia to ensure the survival of a diverse range of plant species. Various traditions are motivated by the spiritual, economic, and ecological value of these plant species, among other factors. Certain medicinal plants are intentionally protected for their medicinal benefit, whereas others are preserved by chance for reasons other than their therapeutic potential (e.g., timber, firewood, shade, or spiritual needs).

During the study it was found that people in the study area were found to be knowledgable about the traditional fundamentals of medicinal plant conservation. Medicinal plant species were conserved through a variety of traditional ways such as home gardens, selective harvesting, and so on. Selective harvesting was the most popular indigenous conservation method in the study area. Harvesting medicinal plants is targeted to specific portions of the plants in order to avoid damage to the plant for long-term use. The value of selective harvesting as a conservation approach could be linked to the method's ability to allow plants to continue budding.

Domestication/cultivation of medical plant species, which came in second, is ascribed to the fact that it helps to reduce dependency on wild medicinal plants while also maintaining resource sustainability for current and future generations. Due to the anthropogenic pressures and land-use changes affecting the natural forest, which has been declining in both explicit and implicit ways on a daily basis, home gardens have long been the most effective and ubiquitous method for biodiversity protection. Traditional healers and others with knowledge of medicinal plant species are said to have a tendency to keep information about the plants they know hidden. This practice trend, on the other hand, has both negative and good conservation implications. While it is possible to reduce plant harvesting since only a few individuals are aware of these species, it is also possible for these few people to completely destroy the species due to ignorance. In the context of conservation, keeping secrets regarding medicinal plant information may result in knowledge disappearance and thus a great loss to future generations.

Awareness campaign

This community-based study included an awareness campaign as part of the research. The main goal was to educate the target community about the current situation and to mobilise them to manage and conserve medicinal plants more efficiently. Communication tools were used to solve problems, attract attention to specific issues, persuade people to modify their behaviour, and change practices. During the study, different awareness campaigns were undertaken, such as, one-to-one discussions, workshops, seminars, focus group discussions along with the traditional healers, community leaders, marketers and other responsible people were conducted. Participants (both male and female) were given an equal chance to discuss their experiences in all of the programmes.

Discussion and Conclusion

The present studies indicated that documentation of traditional knowledge related to the use of plants as medicine is essential among tribal population as they possess vast knowledge of immense value inherited from forefathers that have been passed down orally through generations (Jovovic & Kratovalieva, 2015) [25]. The traditional knowledge of the medicinal plant practitioners, village elders and marketers were documented by collecting data through survey questionnaires specifically designed for them. The usage trend of different medicinal plants by the village community is documented by collecting the data from the respective respondents. It was understood that most of the rural folks availed the traditional healing at least for their primary health care, and only on serious sicknesses the patients are approaching the conventional health care hospitals. The numerous uses of home remedy were indicated by observing the high percentage of respondents using the herbal remedies. The people who are residing close to the conventional hospitals approached traditional healers for specific treatments *viz*; bone fracture, jaundice, piles, skin diseases etc. Distance to the Primary Health Centers, lack of proper road and communication systems in the rural areas led the rural community to go for homemade remedies. Low economic conditions and illiteracy of the rural people still contribute to the utilization of Local Health Practitioners. In the back drop of the above observations, the importance of herbal medicines and the scope of promoting the traditional systems in the rural villages of the Baramulla district becomes important and deem fit. The responsibility of the Government authority in fulfilling these aspirations of the traditional healers and needy villagers was a dire necessity. Recognition of these tribal medicines by the Central or State Government is very much demanding as per observation of the study. The rural people still consult the 'hakeems'/traditional practitioners as their first line of treatment for any kind of sickness or disease. Different medicinal plant practitioners have different skill of their own. Among the herbalists some are skilful in healing bone fractures, while some are capable of healing kidney stones and jaundice. The rural villagers have low socio-economic status and cannot afford to pay the high visiting fees to the healers. Taking into account their economic status, the healers or the herbal practitioners charge minimal amount and as such

they do not have much scope for progress. The threat status of the medicinal plants is identified from the responses of the respondents of the villages adjacent to forest areas. Accordingly the plants were categorized as per Rare, Endangered, Critically Endangered and Vulnerable. This categorization of the threat status of the medicinal plants has created an awareness and scope to conserve them accordingly. There are several factors that posed a threat for the decrease in the medicinal plants of the Baramulla district of Kashmir Valley as observed from the responses of the respondents Conservation and protection measures needs to be initiated and taken up by the local bodies, forest department, State Government as per the threat status analysis mentioned in table 2.

The importance of indigenous knowledge in medicinal plant conservation is widely acknowledged. According to (Chen *et al*., 2016) [11], around 15,000 medicinal plant species are threatened with extinction worldwide, meaning that the world loses at least one significant medicine species every two years. Therefore, medicinal plant conservation should be centered on the community, leveraging their experiences that have been developed and transferred over time, including verbal expressions and useful practices on long-term medicinal plant conservation. During the study it was revealed that medicinal plant species play an important role in the treatment of ailments in rural communities. The rising reliance on herbal remedies and overexploitation of plants have raised anthropogenic pressures on medicinal plants. A considerable contribution to medicinal plant conservation and other resource conservation is made by traditional management techniques. Conservation of medicinal plants isn't a key priority for traditional management approaches, but because most plants have medicinal value, they're protected. It's imperative that any conservation strategy be tied to bettering human health, especially in rural places where modern health facilities aren't readily available. As a result, these activities should be promoted because they help to conserve plants and make sustainable use of them, which benefits primary health care. The use of medicinal plants to treat a variety of ailments plays a significant role in providing primary health care to the rural residents of Baramulla district in Kashmir Valley, given the high cost and side effects of allopathic drugs. The people of Baramulla have a profound traditional knowledge of medical plants because the area is rich in medicinal plants. An highly valuable database may be created from this information, which will serve as a starting point for commercial bioresource exploitation. For people in the pharmaceutical and medical fields, as well as those working on alternative cures like phytochemists and botanists, this information could be quite useful. Traditional knowledge, on the other hand, is evaporating due to urbanisation. A large number of plant species are also threatened with extinction. Because of human activity. Overgrazing, overexploitation, deforestation, soil erosion, floods, and an increase in tourism are just a few of the problems facing the area. This has made a large number of plants susceptible or even extinct altogether. As a result, it's imperative that we document this important ethnobotanical data as soon as possible and act decisively and swiftly to safeguard these priceless plants.

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