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# SURVEY OF MEDICINAL PLANTS OF HARSIL VALLEY (DISTRICT UTTARKASHI) W.S.R. TO NIGHANTUS AND ETHNO-MEDICINE

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## ABSTRACT

Since prehistoric times, plants have been a fundamental resource for human survival, providing food, shelter, and medicine. Medicinal plants play a significant role in healthcare practices among tribal and rural communities. These communities possess extensive knowledge on the effective treatment of various health problems solely through the use of plant parts. This knowledge, which is passed down orally through generations, is invaluable. Therefore, an effort was made to assess the ethnomedicinal information of Plant species used by the local residents of Harsil Valley Region in the Uttarkashi District of Uttarakhand. The information presented in this paper was collected through extensive field visits in the forests, meadows, valleys and nearby villages, and interviews with local residents who possess knowledge about medicinal plants. The primary aims of this research are to document the traditional ethnomedicinal uses of these plants by local communities, and compare this knowledge with historical Ayurvedic texts. The data collection period extended from October 2022 to May 2025. A total of 63 plant species were collected during the field visit and reported to possess ethno-medicinal properties by the local dwellers. These plants are used by the community for their primary healthcare needs. The plants utilized for various purposes are listed along with their

Botanical name, family, local name, and ethno-medicinal importance. This study suggests that the inhabitants of Harsil valley possess a profound traditional knowledge regarding the medicinal use of plants. Documentation of this knowledge could potentially pave the way for further pharmacological research.

**KEYWORDS**: Medicinal plants, Ethno medicine, Health, Local Dwellers, Species.

## 1.0 INTRODUCTION

### 1.1 Background

Since the prehistoric era, many plant species have been utilised for traditional medicine, food, fodder, fibre, fuel, and shelter. Phyto-resources are essential to the basic life-sustaining support system for humankind, particularly in rural areas.[1] A substantial proportion of plant species used by humans are medicinal plants, which also play a major role in the delivery of primary healthcare services, particularly in poor nations.[2] MAPs are the primary source of raw materials for herbal pharmaceuticals and traditional health care systems.[3] According to estimates from the **World Health Organisation (WHO)**, 80% of people on the planet receive healthcare through traditional medicine, with the majority of these treatments utilising plant extracts or their active ingredients.[4] As a result, many traditional treatments take a more holistic approach to treatment. It is estimated that more than 13000 species of medicinal and aromatic plants are used in traditional medicines (TM) and herbal cosmetics.[5] The global trade of medicinal plants stands at **$201 Billion in 2023**. It's expected to continue expanding, reaching **375.6 Billion by 2032**, reflecting a compound annual growth rate (CAGR) of 7.22%, it is likely to increase more than 5 trillion by 2050.

Topography, habitat types, and eco-climatic conditions vary greatly throughout the Himalayan region, making it one of the most diverse and complicated ecosystems.[6] In addition to offering a multitude of ecosystem goods and services to people inside and outside the region, Among the many ecosystem services offered are provisioning (such as food, fibre, freshwater, timber, fuel, and medicines), regulating (such as floods and climate change), cultural (such as recreational and aesthetic), and supporting (such as soil formation). These services are essential to human well-being, including livelihoods, social cohesion, human health, and access to nutritious food. The unique socio-cultural traditions of the diverse ethnic groups living here are intrinsically linked to this bio-geographical and cultural richness through centuries of experimentation and empirical reasoning, has developed vast ethnomedicinal knowledge systems.

India has one of the richest traditions of herbal medicines systems in the world. **Ayurveda** is believed to be prevalent since the past 5000 years, the most noted system of medicine in the world. The **Shushrut Samhita** and the **Charaka Samhita** are great encyclopedias of medicine from 600 to 500 BC. An estimate reveals that Indian herbal industries consume about 2000 tons of plant resources annually[7] and the demand for herbal medicines is growing exponentially. However, there are habitat loss due to limited habitats and due to overexploitation of these MAPs from the wild. According to International Union for Conservation of Nature and Natural Resources (IUCN), across the globe about **34,000 plant species** are facing varying degrees of threat.[8] It is one of the most important tasks to conserve the genetic resources of medicinal plants, both in-situ and ex-situ.

### 1.2 Historical Perspective of Ethnomedicine

Traditional Knowledge (TK) related to human healthcare has been strewn and reached us mainly by two ways: **i. Classical healthcare system** (which is documented and literature is available), and **ii. Traditional knowledge** which is (undocumented as it is) orally transmitted from one generation to other.

Around 6000 years ago, in Indian subcontinent, a medical system existed which is known to everyone till date, as Ayurveda, which means 'Science of life' (Ayush = life; Vedas = Science). Based on Ayurveda three major treaties viz. Charak Samhita (900 BC.), Sushrut Samhita (600 BC.) and Ashtang Hriday (500 AD) came into existence. It was believed that the knowledge of Ayurveda was given by god. Ayurveda had nurtured almost all the medical systems of the world. It was respected in neighboring countries so much that it was translated into Greek (300 BC), Tibetan and Chinese (300 AD), Persian and Arabic (700 AD) and several other Asian languages, even though these culture had their own Materia Medica.

Powers (1874) coined the term 'aboriginal botany' for the study of plant use among traditional societies, which elucidated the total aboriginal dependence on plants for food and medicine. Later on, the term 'ethnobotany' was first used by a botanist - John W. Harshberger in 1895. He studied 'plants used by primitive and aboriginal people'. The concept of Ethnobotany has widen from time to time evolving in the process into a truly interdisciplinary science amalgamating anthropology, archaeology, botany, ecology, economics, medicine, linguistics and other disciplines. The discipline, therefore, gained serious attention and its focus shifted from 'man' to 'human' to people and from 'aboriginal' to 'primitive' to 'traditional'. Likewise, the term "ethnomedicine," first used by Hughes (1968), denotes the medical beliefs and

practices of indigenous and folk societies, encompassing their collective health knowledge, values, and skills that have been passed down through generations.

In India, classical healthcare systems have a deep-rooted history. The earliest mention of medicinal use of plants in Hindu scriptures is recorded in Rigveda, an oldest repository of human knowledge, written between 4500 and 1600 BC. The references to herbal plants in Rigveda are very brief, but more details are given in the Atharvaveda. Ayurveda is said to be a part of (Upaveda) of Atharvaveda. Approximately around 1500 BC, Ayurveda was delineated into two distinct schools: Atreya the School of Physicians and Dhanvantari the School of Surgeons. Subsequently, the classic works of Charaka and Sushruta described the drug treatment system prevailing at that time. The **Charaka Samhita** (approx. 900 BC), detailed the use of 341 plants and plant products, while the **Sushruta Samhita** (approx. 600 BC) described 395 formulations, including plant, animal, and mineral-based drugs. Around 500 AD, Vagbhatt compiled knowledge from both the schools of Ayurveda in his **Astanga Hridaya** which was considered to be third major treatise on Ayurveda. in addition to Ayurveda there are several other traditional healthcare systems such as Unani, Siddha, Chinese, Amchi and Homeopathy are practiced a vast number of plant species, about 9000 plant species. In India alone, about 2000 plant species are used in the classical healthcare system: Ayurveda (900 species), Siddha (800), Unani (700) and Amchi (300).

## 2.0 Significance of Traditional Knowledge or Ethnomedicine

'Ethnomedicine' is a branch of ethnobotany that deals with the study of traditional medicines, not only of those that have relevant written sources but also of those, whose knowledge and practices have been verbally transmitted over the centuries (WHO 2002).

Traditional knowledge is now widely recognized as a crucial component of our cultural heritage. It is transmitted orally from one generation to other. It tends to be collectively owned and takes the form various verbal and nonverbal forms of communications like stories, songs, folklore, proverbs, cultural values, beliefs, rituals, community laws, local language, and agricultural practices, including the development of plant species and animal breeds.

In 2003, in the Convention, for Safeguarding Intangible Cultural Heritage by UNESCO, it was stated that knowledge and practices concerning nature and the universe are part of our cultural heritage, and therefore worthy of being protected and sustained. This recognition has propelled ethnobotany and ethnomedicine to the forefront of scientific research. Even before

getting recognition as science, TK was considered important as western science profited from the appropriation of traditional knowledge without proper acknowledgment. but there is a growing awareness of its value for modern medicines, industries and agriculture. It has also gained recognition around the world due to rapidly growing demand for alternative and basic therapeutic uses of plants The reasons for such a rapid growth are potential discovery of new drugs, new formulations and wider socio-economic implications. Even today, **more than 80% of the people in the developing countries depend on the traditional medicines for primary healthcare** India ranks second in the world in terms of use of traditional MPs after China. **Nearly 65% of India's population in the rural areas uses Ayurveda and folk medicines** to meet their primary healthcare need.

### 3.0 Medicinal Plant Diversity and Threats: A Global and Indian Perspective

Globally, ca. 2,97,000 higher plant species are known to occur, of which about 52,885 (18%) species have medicinal value.[9] China, for instance, has over 4,000 species of medicinal plants, with 1,000 commonly used.[10]

India exported of herbal products. In India, the annual turnover of herbal medicine is estimated at **128,738 metric tons** in the 2024-25 fiscal year, with approximately **90% of medicinal plants** being collected from the wild. Now currently India's Herbal products exports valued at **$689.34 million USD per year**, makes it the second-largest exporter of raw herbal drugs after China.

The Indian Himalayan Region (IHR), covering 18% of India's landmass, is a significant reservoir of medicinal plants, harboring over 10,500 species of flowering plants, of which **1,748 (14%)** are of medicinal importance. Uttarakhand, known as a "herbal state," is particularly rich, with **964 reported medicinal and aromatic plants**.[11] These are distributed across various habitat types along an elevational gradient in the state from tropical to alpine climates. In Uttarakhand, the alpine region forms about 24.11% of the geographical area of the state and it supports a high diversity of MPs where about 1400 species of vascular plants are reported, out of which 400 species are known for their medicinal value.[12] However, this wealth is under threat. The high demand and overexploitation of these plants, has led to a decline in their natural populations. For example, 14 MAPs in Uttarakhand are on the global IUCN threat list, and 40 are at a regional level.[13]

## 4.0 The Present Study: Focus on Harsil Valley

### 4.1 Background and Scope

Much of the research on high altitude MAPs has so far focused on the listing, status assessment and distribution patterns of a few targeted species, analysing economic implications in terms of availability of secondary metabolites and bioprospecting for industrial uses. However, there are limited ground-level servey studies on the MAPs in the Harsil Valley of Uttarkashi District. Detailed Ethnomedicinal information on the wild, cultivated MAPs of high- altitude medicinal plants are virtually lacking from the Harsil Valley region. Keeping the above information gaps in view, this Ethnomedicinal Survey was done in the Harsil Valley region of Uttarkashi, Uttarakhand.

### 4.2 AIMS AND OBJECTIVES

The major aims and objectives of the study area are as follows

#### 4.2.1 AIMS

- Study the flora of the Harsil valley region and its ethno-medicinal uses, and collect various medicinal uses of plants used by the local people.
- Extensive survey, collection, identification, and documentation of medicinal plants of the study site, with special emphasis on those drugs described in Ayurvedic texts.
- A critical study of Ayurvedic texts i.e. *Nighantus*, regarding the herbs found on the study site and the collection of recent ethno-medicinal information

#### 4.2.2 OBJECTIVES

- Survey of medicinal plants at the study site.
- Collection and identification of medicinal plants.
- Authentic botanical verification of medicinal plants at the study site
- Documentation of traditional knowledge about ethno-medicinal uses of medicinal plants at the study site.
- Literature analysis of the pharmacological properties and therapeutic uses of these ethno-medicinal plants on the basis of Ayurvedic texts.
- Medicinal and other uses of plants of the study site.
- Name, address, and basic information of local people who are practicing ethno-medicine.

**4.3 Study Site -** The study will be conducted within the **Harsil Valley region**, which is situated in Uttarkashi district, a region located on the southern slopes of the mid Himalayas**. Harsil is located at Latitude 31° 01' 60.00" N and Longitude 78° 43' 59.99" E** and **our study area is 10 km around it** in all directions. The selected study area encompasses the entirety of regions commencing from sukki, jhala, Purali, Harsil, Bagori, Mukhwa, Dharali villages and Some treks and some alpine Meadows (Bugyals) like Lama top, Avana khalyani trek, Shri Kantha trek, Sattal trek, Brahmatal trek, Monal trails trek, Jhinda bugyal, Sukki top and adjacent areas and forests, taking Harsil as Central point of the study area.

Harsil is a village, tourist hill station and army area located on the banks of the Bhagirathi River, on the way to Gangotri, a Hindu pilgrimage site in Uttarkashi district of the Indian state of Uttarakhand. Situated at an **altitude of 9,005 ft (2,745 metres) from sea level**, Harsil lies 78 km from Uttarkashi, 215 km from Dehradun, 270 km from Haridwar. The temperature of Harsil in summers: maximum 240C, minimum 120C, in winters: maximum 120 C, minimum -20C (Harsil receives heavy snow fall in winter). Monsoon season of Harsil is from July to September and with expected **rainfall: 516 mms per annum and average snowfall 1203 mm per annum.**

The region is also famous for its rich biodiversity, culture, tradition and mythology. Geographically, it has rich vegetation and mostly covered by forest areas. This region has a mixed forest and is very rich in medicinal flora.

**4.4 Study Design and Extent of Work**

The proposed area of study is a vast reservoir of plant wealth. Herbal drugs, due to their free availability, are the most important source of therapeutic agents in traditional medicine practice. Information will be collected from local healers and residents using a structured questionnaire. This data will be meticulously compared and analyzed against references from Ayurvedic Nighantus to document the rich, yet often unrecorded, heritage of ethnomedicine in the region. This research will not only contribute to the scientific understanding of medicinal plants but also aid in the conservation of endangered species and support the economic well-being of the local communities who have been the custodians of this invaluable knowledge for generations.

## 5.0 MATERIAL AND METHODS

The study was **carried out between October 2022 and May 2025**, with the aim of exploring the ethnomedicinal significance of herb species in the study area and documenting the traditional knowledge held by the local population. Regular field trips were arranged to survey the surrounding areas inhabited by the local people, with the aim of collecting plant specimens and gathering pertinent information pertaining to ethnomedicinal practices. Extensive interviews were conducted with identified traditional healers as part of the study.

**Two basic approaches** were employed to study traditional knowledge. The first approach, referred to as the **'Inventory'** approach, involved conducting surveys of the study area and collecting plant specimens. The second approach, known as the **'Interview'** approach, consisted of administering questionnaires to gather information on the local names and medicinal uses of plants utilized by the residents of *Harsil* valley region. The collected plant specimens were presented to the local community members, who were then interviewed to ascertain their knowledge about these plants. Traditional healers, elders, and women were consulted regarding the medicinal uses of the plants, and their responses were cross-checked with other individuals knowledgeable in traditional healthcare. Both approaches were repeated with various informed individuals, such as elders and traditional healers.

The plants specimens were collected, numbered, photographed, documented and prepared herbarium following usual methods of herbarium preparation and preserved. Collected plant specimens were preliminarily identified with the help of Supervisor, Co-supervisor and Regional Flora and verified by Scientist and botanist, at forestry and climate change division, Uttarakhand Space Application Centre, Dehradun.

A questionnaire was designed to gather data on the local names of plants, their medicinal significance, and whether they were collected for personal use or for commercial purposes. Since the majority of traditional healers were illiterate, structured interviews were conducted using a set of predetermined questions. The data collected was obtained directly from the respondents. Information regarding the medicinal properties of plants was gathered exclusively from local residents living in the vicinity of *Harsil* valley.

The methods used in this study were specifically designed to gather valuable information on the ethno-medicinal uses of plants by the local people residing in *Harsil* Valley region. The plants were categorized alphabetically based on their botanical name, family, local name,

growth habit, and medicinal properties.

## 6.0 ENUMERATION OF HERBAL DRUGS USED BY LOCAL DWELLERS

A total of 63 plants were reported by the local dwellers to have ethnomedicinal uses during the study. These plants are displayed in tabular form, along with their Latin name, Family, Local name, and habit of the plant.

| S. No | Botanical Name | Family | Local Name | Habit | Ethnobotanical use |
|---|---|---|---|---|---|
| 1. | *Abies pindrow* (Royle ex. D.Don) Royle | Pinaceae | *Ronsali* | Tree | Fever, cold, pain & swelling, Cough, Asthma, Respiratory Diseases |
| 2. | *Aconitum heterophyllum* Wall. | Ranunculaceae | *Atis* | Herb | Pneumonia, Bronchitis, Fever |
| 3. | *Acorus calamus* Linn. | Acoraceae | *Vach* | Herb | Cold and cough, Fever, Pain and inflammation, Worm infestation |
| 4. | *Ainsliaea aptera* DC. | Asteraceae | *Kauru* | Herb | Fever, Stomachache |
| 5. | *Ajuga parviflora* Benth. | Lamiaceae | *Nilkanthi* | Herb | abdominal problems, skin diseases, Acne, earaches |
| 6. | *Allium humile* Kunth. | Amaryllidaceae | *Faran* | Herb | Jaundice, Tonsillitis, Inflammation |
| 7. | *Allium wallichii* Kunth | Amaryllidaceae | *Lainka* | Herb | Cold and cough, Cuts and wounds |
| 8. | *Anaphalis triplinervis* (Sims.) C. B. Clarke | Asteraceae | *Bugla* | Herb | Cuts & tears |
| 9. | *Angelica glauca* Edgew. | Apiaceae | *Chorak* | Herb | Fever, Cold and cough, Worm infestation, Constipation, Stomach problems |
| 10. | *Artemisa gmelinii* Web. ex Stechm | Asteraceae | *Chhamra* | Herb | Earache, Swelling, Pain, Bleeding, Toothache, Skin diseases |
| 11. | *Asparagus Racemosus* Willd. | Liliaceae | *Shatawar* | Herb | Lactation, Diuretic, Urinary disorders, Stomach-ache, Dysentery, Health tonic |
| 12. | *Berberis lycium* Royle. | Berberidaceae | *Kilmodu* | Shrub | Fever, Jaundice, Diabetes, Eye Inflammation |
| 13. | *Bergenia ciliata* (Haworth) | Sexifragaceae | *Silphara* | Herb | Swelling, Micturation Problem , Renal-calculi |

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| | Sternberg | | | | |
| 14. | *Boenninghausenia albiflora* (Hook.) | Rutaceae | *Pissumar* | Herb | Cuts and wounds, Fever |
| 15. | *Carum carvi* Linn. | Apiaceae | *Kala jeera* | Herb | Cold and cough, Abdominal pain, Dysentery, Worm infestation, Indigestion |
| 16. | *Cedrus deodara* (Roxb. ex D.Don) G.Don. | Pinaceae | *Deodara* | Tree | Joint pain, Sotha, Skin disease |
| 17. | *Cotoneaster microphyllus* Wall ex Lindl. | Rosaceae | *Bhandera* | Shrub | Diarrhoea, dysentery, Cuts and wounds, oral problems |
| 18. | *Crepidium acuminatum* (D.Don) Szlach. | Orchidaceae | *Jeevaka* | Herb | Bronchitis, Purgative Health Tonic |
| 19. | *Daphne papyracea* Wall. ex G.Don. | Thymelaeaceae | *Satpura* | Shrub | Joint pain, Skin disease, Purgative |
| 20. | *Dipsacus inermis* Wall. | Caprifoliaceae | *Phooli* | Herb | Cough, sore throats, swelling, pain |
| 21. | *Dolomiaea costus* (Falc.) Kasana & A. K. Pandey | Asteraceae | *Kuth* | Herb | Diarrhoea, Stomach pain, Indigestion, Joint pain, Cold and cough, Skin disease |
| 22. | *Elsholtzia fruticose* (D.Don) Rehder | Lamiaceae | *Pothi* | shrub | Rheumatism, rheumatoid arthritis pain, fungal infection |
| 23. | *Ephedra gerardiana* Wall. | Ephedraceae | *Somalata* | Shrub | Asthma, Cold and cough, Pain and swelling |
| 24. | *Ferula jaeschkeana* Vatke | Apiaceae | *Jangali Hing* | Herb | Bronchitis, cold and cough, Pneumonia, Flatulent colic |
| 25. | *Habenaria edgeworthii* Hook. f. ex Collett. | Orchidaceae | *Riddhi* | Herb | General weakness, Cold and cough, Fever |
| 26. | *Habenaria intermedia* D. Don. | Orchidaceae | *Vriddhi* | Herb | Cold and cough, Fever, Thirst, Burning sensation, General weakness, Muscular pain, Sprains , Arthritis |
| 27. | *Hedychium spicatum* Ham. ex Sm. | Zingiberaceae | *Ban-Adu* | Herb | Pneumonia, Fever, Cough, Asthama, Cuts or Wounds |
| 28. | *Heracleum canescens* Lindl. | Apiaceae | *Kakarya* | Herb | Sunburns, skin diseases |
| 29. | *Hippophae salicifolia* D.Don. | Elaeagnaceae | *Chuk* | Tree | Diabetes, Phthisis, Cuts and wounds |
| 30. | *Juniperus* | Cupressaceae | *Hapusha* | Shrub | Swelling, Chronic |

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| | *communis* L. | | | | cough, Joint pain, Digestive problems |
| 31. | *Lilium polyphyllum* D. Don | Liliaceae | *Kshirkakoli* | Herb | Agalactia, Dyspnoea, Rheumatalgia, Fever, Cough, General Weakness |
| 32. | *Lamium album* L. | Lamiaceae | *Tilka* | Herb | Uterine tonic, Vaginal discharge, Dysmenorrhea |
| 33. | *Malaxis muscifera* (Lindl.) Kuntze | Orchidaceae | *Rishbhak* | Herb | Burning sensation, Rejuvenator, seminal weakness, Insect bite, Health tonic |
| 34. | *Malus pumila* Mill. | Rosaceae | *Seb* | Tree | Dry cough, Ringworm, Skin disease, Insomnia, Fever |
| 35. | *Nardostachys jatamansi* (D.Don) DC | *Valerianaceae* | *Baalchhari* | Herb | Hair growth, Jaundice, Anxiety, Blood purifier, Memory inhancer |
| 36. | *Persicaria amplexicaulis* (D.Don) Ronse Decr. | Polygonaceae | *Kutrya* | Herb | Asthma, Cuts and wounds |
| 37. | *Phytolacca acinosa* Roxb. | Phytolaccaceae | *Jagarya* | Herb | Urinary disorder, Asthma, Boils |
| 38. | *Picrorhiza kurrooa* Royle ex. Benth | Scrophulariaceae | *Kuru* | Herb | Fever, Blood purifier, Jaundice, Diabetes, Cold and Cough |
| 39. | *Pinus wallichiana* A. B. Jacks | Pinaceae | *Kail* | Tree | Bone fracture, Asthma, Scorpion sting, Snake bite, Heel Crack, Joint pain, Swelling |
| 40. | *Plantago major* L. | Plantaginaceae | *Lahurya* | Herb | Constipation, Cuts and wounds, Dry cough |
| 41. | *Podophyllum hexandrum* Royle. | Podophyllaceae | *Bankakri* | Herb | Cuts and wounds, Skin disease, Boils, cold, Constipation |
| 42. | *Polygonatum cirrhifolium* (Wall.) Royle | Liliaceae | *Mahameda* | Herb | Rejuvenator, Health tonic, General weakness, Joint Pain, Cuts & Wounds, Aphrodisiac |
| 43. | *Polygonatum verticillatum* (L) All. | Liliaceae | *Meda* | Herb | Health tonic, General weakness, Joint Pain, Cuts & Wounds, Rejuvenator, Galactagogue, Aphrodisiac, Fever |
| 44. | *Potentilla fulgens* | Rosaceae | *Bajardanti* | Herb | Toothache, Wound, |

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| | Wall. ex Hook. | | | | Eye disease, throat infections |
| 45. | *Prinsepia utilis* Royle. | Rosaceae | *Bhekal* | Shrub | Joints, Pain, abdominal pain, skin infections |
| 46. | *Pyracantha crenulata* D. Don | Rosaceae | *Ghingharu* | Shrub | Fever, Rejuvenation, Joint pain |
| 47. | *Rheum webbianum* Royle. | Polygonaceae | *Archa* | Herb | Internal injuries, Bone fracture, Indigestion, flatulance and abdominal disorders, General weakness. |
| 48. | *Rhododendron arboreum* Sm. | Ericaceae | *Buransha* | Tree | Indigestion, Dysentery, Asthma, Fever |
| 49. | *Rhododendron campanulatum* D.Don | Ericaceae | *Simru* | Shrub | Indigestion, Dysentery, Asthma, Fever |
| 50. | *Roscoea purpurea* Smith | Zingiberaceae | *Kakoli* | Herb | Cough, Dyspnoea, Rheumatic joints pain, Fever, General Weakness |
| 51. | *Rubia cordifolia* Linn. | Rubaceae | *Manjith* | Climber | Wound, Blood purifier, Dysentery, Skin disease, Jaundice |
| 52. | *Rubus ellipticus* Sm. | Rosaceae | *Hinsalu* | Shrub | Headache, Skin infections and ulcers, Burns, cold, cough, headache, and fever, Diarrhea and dysentery |
| 53. | *Rumex hastatus* D. Don | Polygonaceae | *Amedu* | Shrub | Cuts and wounds, Mouth ulcers, Laxative, Tonic, anti-rheumatic, Skin disease |
| 54. | *Sedum sp.* | Crassulaceae | *Bugna* | Herb | Skin burn, Cuts and wound |
| 55. | *Skimmia anquetilia* NP Taylor & Airy Shaw | Rutaceae | *Kedarpati* | Shrub | Burns, wounds, headache, general fever, swellings, Rheumatism |
| 56. | *Taraxcum officinale* Weber. | Asteraceae | *Kanphool* | Herb | Fever, Joint pain Jaundice Skin disease |
| 57. | *Taxus wallichiana* Zucc. | Taxaceae | *Thuner* | Tree | Muscles and joints problems, Fracture, Cough and cold, Respiratory problems |
| 58. | *Thalictrum foliolosum* DC. | Ranunculaceae | *Kirmuli* | Herb | Gout, Rheumatism Eye inflammation |
| 59. | *Urtica parviflora* Roxb. | Urticaceae | *Kandali* | Herb | Baldness, sprains and swelling, coughs, |

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| | | | | | fevers, blood purifier. |
| 60. | *Valeriana wallichii* DC. | Valerianaceae | *Sumaya* | Herb | Fever, Wound, Joint pain, Insomnia, Hysteria, Epilepsy |
| 61. | *Verbascum thapsus* Linn. | Scrophulariaceae | *Gidarh tambaku* | Herb | Inflammation, Chest complaints, Diarrhoea, Earache, Cuts and wounds |
| 62. | *Viola pilosa* Blume. | Violaceae | *Kauru* | Herb | Cold and cough, Headache, jaundice, fever, Pain, Inflammation. |
| 63. | *Zanthoxylum alatum* Roxb. | Rutaceae | *Timru* | Shrub | Cough, Pyorrhoea, Gum bleeding, Toothache |

## 7.0 RESULTS AND DISCUSSIONS

During this study, a total of 63 plant species were surveyed and these reported species are highly regarded and relied upon by both traditional healers and local communities. Of the reported species, 42 were classified as herbs, 13 as shrubs, 7 as trees and 1 as climber. Herbs were the most abundant and readily accessible among the identified plant species.

A total of 15 different parts of plants were identified as being utilized in therapeutics. Among these, leaves, roots, stem bark, Fruit, flowers, and rhizomes were the most commonly utilized. The preparation of drugs was predominantly done through decoction and paste methods. Leaves of 35 species, roots of 25 species, bark of 08 species, Fruits of 07 species, rhizomes of 06 species, flowers of 06 species, seeds of 04 species, tubers of 03 species, bulbs of 03 species, stems of 02 species, heartwood of 02 whole plants of 02 species, oil of 01 species, branches of 01 species, and resin of 01 species were reported as being employed by local dwellers to address their health issues.

A total of 124 therapeutic preparations are reported to be used in ethnomedicine. Among them, decoction and fresh herb paste are widely utilized in therapeutic forms. Out of the total 124 preparations, decoction was prepared in 42 preparations, followed by paste in 33 preparations, powder in 28 preparations, juice in 14 preparations, oil preparation in 04 preparations, hot infusion in 02 preparation, and hot fomentation in 01 preparation were used by local dwellers.

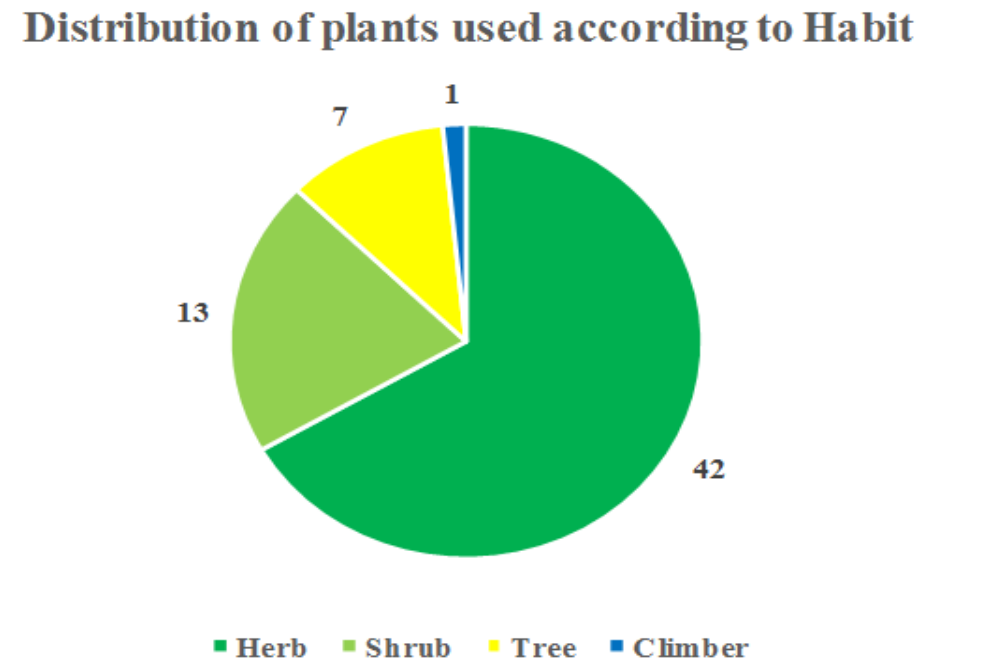
The majority of therapeutic preparations (69.35%) were administered internally, while 30.65% were used externally in the form of pastes and oils, among other forms.

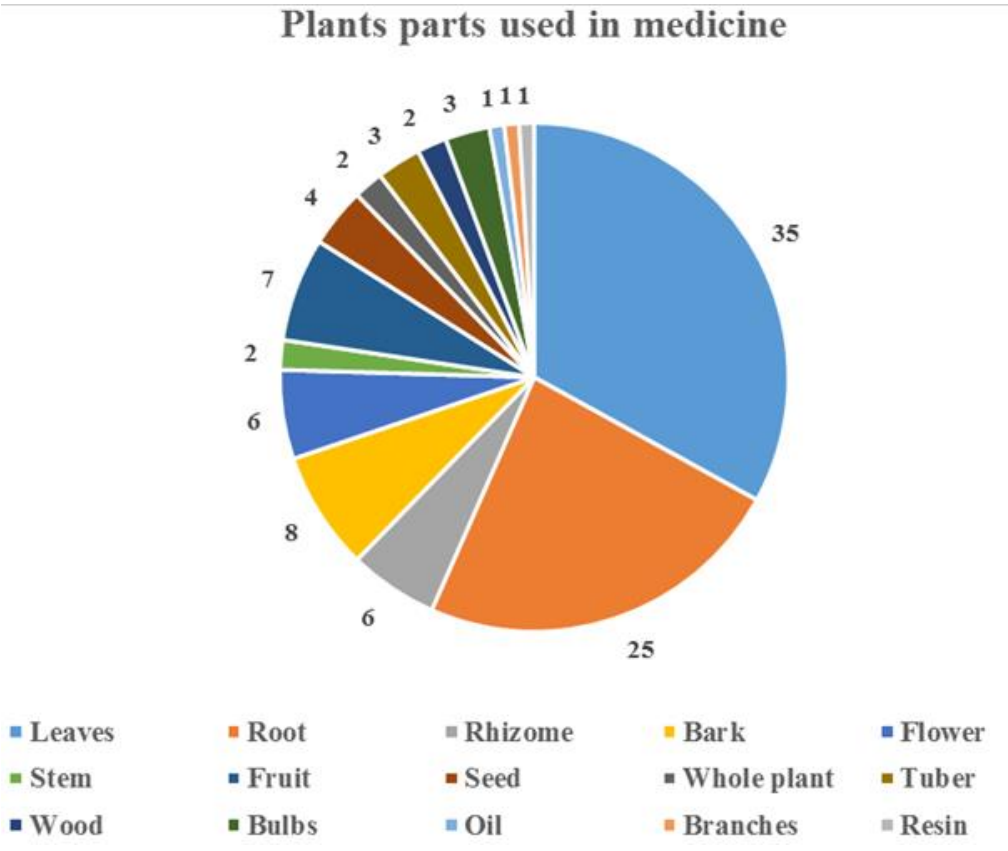
Out of these 63 plants, 36 of them are ethnomedicinal plants which also have documented uses in the ayurvedic Lexicons and 27 were reported by local people, have therapeutic properties without any references in *Ayurvedic* lexicons. The maximum therapeutic preparation has been documented for its utilization in the management of skin disorders, respiratory disorders, and digestive disorders.

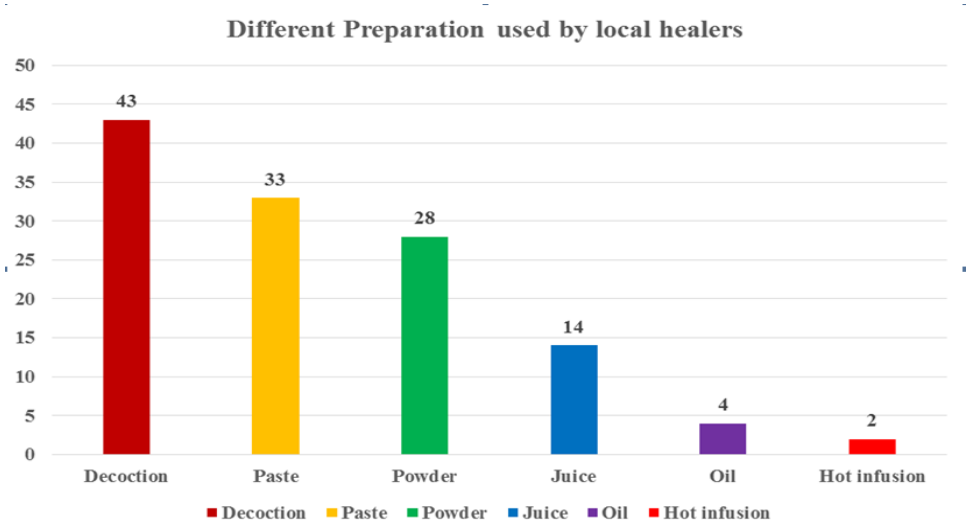
Almost 13 systems of the human body were found to be treated by these 63 plant species. Among them, the integumentary system benefited from the use of a maximum of 46 plant species, while the respiratory system benefited from 31 species. The digestive system was treated by 23 plant species, while the musculoskeletal system benefited from 21 plant species. Trauma and injury benefitted by 19 plant species, the Lymphatic/Immune system benefited from 10 plant species, The endocrine system benefited from 09 plant species, ENT problems from 08 plant species, Oro-dental Problems from 06 plant species, the nervous system from 05 plant species, the Cardiovascular/circulatory system from 05 plant species, the reproductive system from 04 plant species, the excretory / renal system benefitted from 03 plant species.

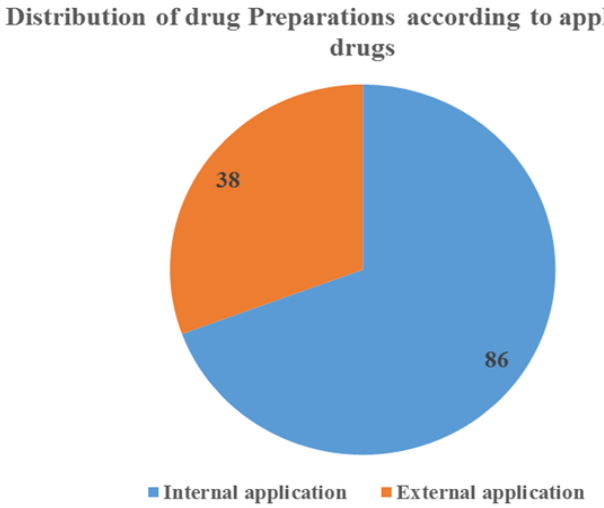
It is important to note that these studies are preclinical in nature, and the ethnomedicinal uses of these plants by the local dwellers/healers have not been thoroughly evaluated. Once their therapeutic efficacy is thoroughly evaluated, these medicinal plants could potentially be added to the *Ayurvedic* pharmacopoeia of India.

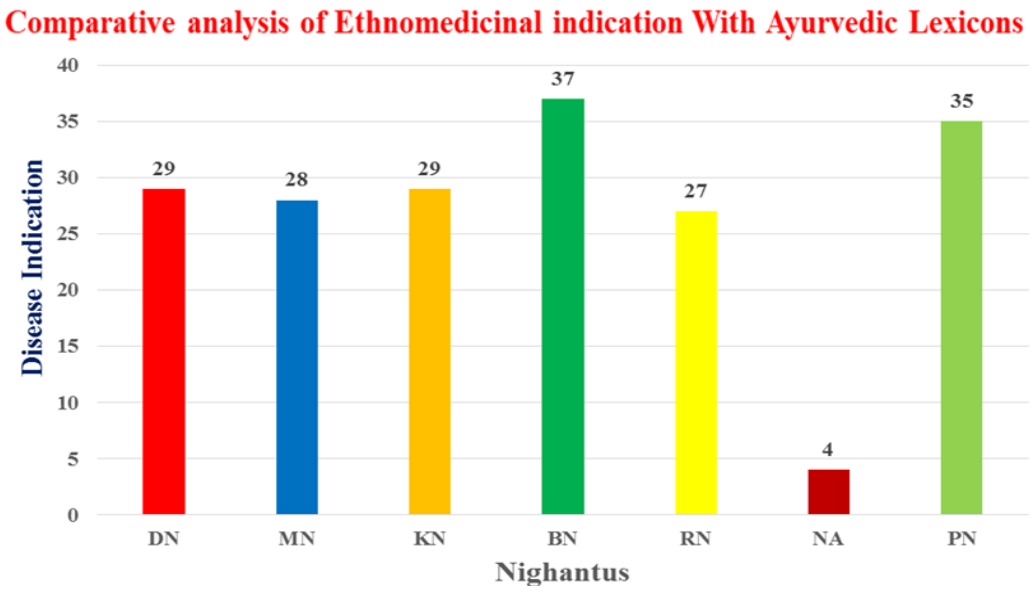
Extensive research has been carried out on the ethnomedicinal plants in the *Harshil Valley* region of Uttarkashi District. Every possible and maximum effort has been made in this study. It is anticipated that the findings of this research will greatly contribute to further research and development in the field.


Distribution of plants used according to Habit
1
7
13
42
Herb
Shrub
Tree
Climber

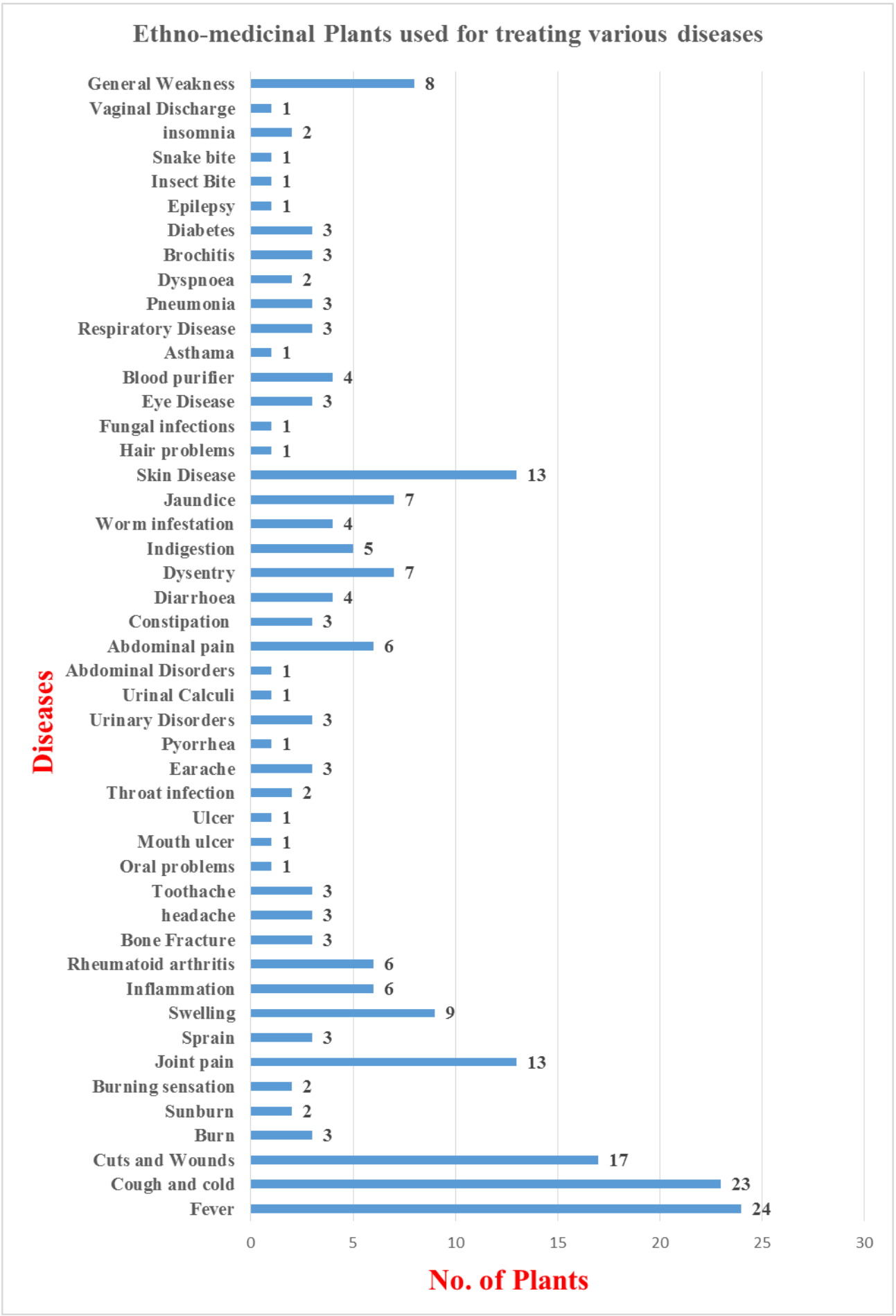

Plants parts used in medicine
35
25
6
8
6
2
7
4
2
3
2
3
1
1
1
Leaves
Root
Rhizome
Bark
Flower
Stem
Fruit
Seed
Whole plant
Tuber
Wood
Bulbs
Oil
Branches
Resin

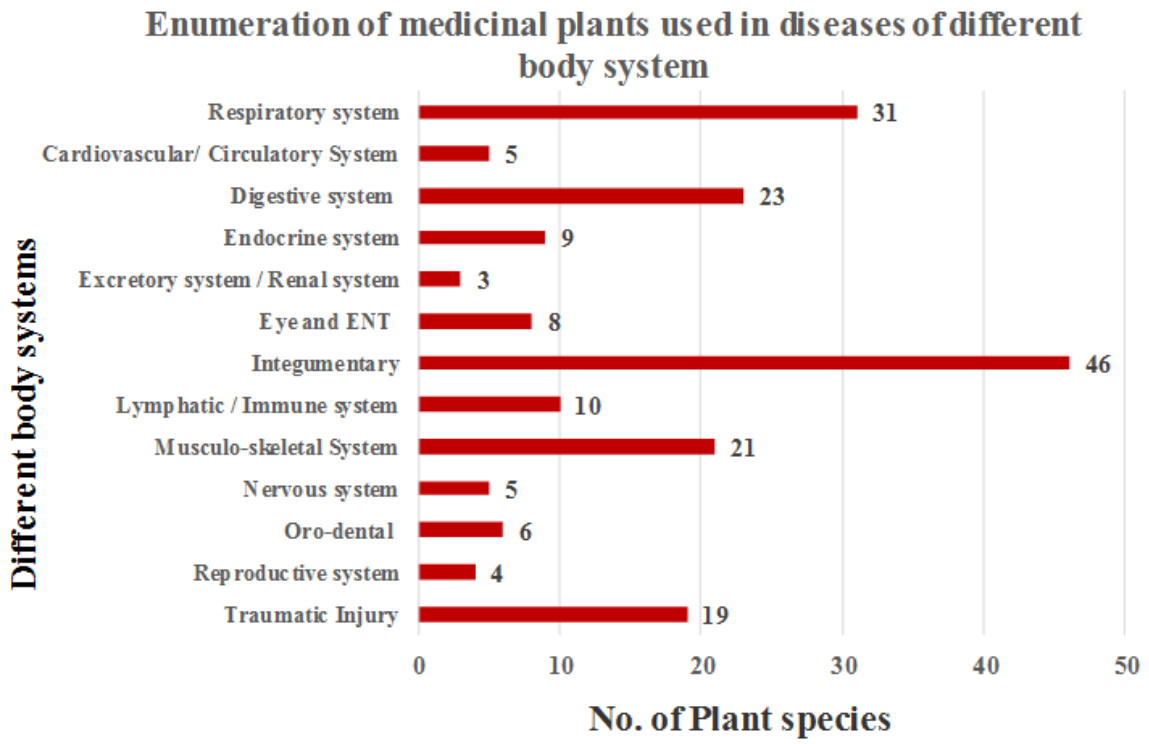



*DN= Dhanvantari Nighantu, MN= Madanpala Nighantu, KN= Kaiyadev Nighantu, BN= Bhavaprakash Nighantu, RN= Raj Nighantu, NA= Nighantu Aadarsh, PN= Priya Nighantu


Ethno-medicinal Plants used for treating various diseases
General Weakness 8
Vaginal Discharge 1
insomnia 2
Snake bite 1
Insect Bite 1
Epilepsy 1
Diabetes 3
Brochitis 3
Dyspnoea 2
Pneumonia 3
Respiratory Disease 3
Asthama 1
Blood purifier 4
Eye Disease 3
Fungal infections 1
Hair problems 1
Skin Disease 13
Jaundice 7
Worm infestation 4
Indigestion 5
Dysentry 7
Diarrhoea 4
Constipation 3
Abdominal pain 6
Abdominal Disorders 1
Urinal Calculi 1
Urinary Disorders 3
Pyorrhea 1
Earache 3
Throat infection 2
Ulcer 1
Mouth ulcer 1
Oral problems 1
Toothache 3
headache 3
Bone Fracture 3
Rheumatoid arthritis 6
Inflammation 6
Swelling 9
Sprain 3
Joint pain 13
Burning sensation 2
Sunburn 2
Burn 3
Cuts and Wounds 17
Cough and cold 23
Fever 24
Diseases
0 5 10 15 20 25 30
No. of Plants




## 8.0 CONCLUSION

The ethno-medicinal survey conducted in Harsil Valley in the Uttarkashi district of Uttarakhand revealed that the local inhabitants of this area possess extensive knowledge of herbal medicine. However, due to the increasing exposure to modernization, it is possible that their knowledge of traditional plant uses may diminish over time. Therefore, it is crucial to conduct further research and investigations to preserve and expand their knowledge, particularly in the isolation and purification of active compounds from these plants. Such investigations will provide valuable insights for future drug therapy development.

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