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Traditional use of medicinal plants for curation of liver cirrhosis, tuberculosis and other associated health issues in Pin Valley National Park, Himachal Pradesh, India

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The present paper deals with the local community's traditional utilization of medicinal plants through their specialized health care practitioners called *Amchies* to treat some major health issues, *i.e.,* hepatitis, tuberculosis (TB) and other associated health issues in Pin Valley National Park (PVNP), Himachal Pradesh. A preliminary survey was conducted to identify the traditional healthcare practitioners covering all 13 villages (2270 souls in 545 households). Information on medicinal plants used and the mode of preparation was collected from informants. The primary data on the status of hepatitis, TB patients was collected from 93 households randomly from 13 villages and secondary data from hospitals and other archival records. Plants' use value and fidelity level were calculated to understand the importance and preference of plants species in use for treating ailments. A total of 17 plant species belonging to eight different families and an animal *Vulpes vulpes* (Red fox) were utilized. Males are more prone to hepatitis infection (23.7%) as compared to females (16.1%). The overall infection rate was 39.8%. The male age group 31-60 was found highly infected whereas in the female 15-30 age group. TB infection was more or less similar in both male and female cases (6.5%) and (8.6%), respectively. Overall TB infection was (15.1%). The majority of plants exhibit high use value, Fidelity level, and other cultural values. These plant species are extremely rare and threatened. In this study, specific details regarding the usage of medicinal plants, their methods of preparation, and dosages are offered.

Keywords: *Amchi*, Critically endangered plants, Spiti valley, Trans-Himalaya

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Plants have been utilized by human in a variety of ways from their sustenance to the development of their art, culture, and literature[1] and a great deal of such knowledge is occupied through the centuries of experiments and experiences in this direction[2]. Traditional medicines are the most important healthcare source for the vast majority of the population[3]. The dependence on nature for survival and sustenance over the period has guided humans to discover remedies for common diseases from natural resources, especially plants[4]. The traditional knowledge held by indigenous people is an important resource that should be conserved[5]. Additionally, herbal remedies are gaining widespread popularity throughout the world[6]. Traditional knowledge and resource use practices have been passed on through generations by cultural transmission about the relationship of living beings with one another and with their environment[7]. Nearly 80% of the world population in developing countries is still dependent on plants derived medicines traditionally[4,8,9].

The traditional healthcare system is necessary for realms where allopathic healthcare facilities are poor. In the ancient period due to the lack of modern healthcare facilities for curing ailments, the inhabitants of Tibet, Ladakh and Lahaul & Spiti had practiced shamanism that was prevalent in northern Asia under the name '*Ban*'. During the pre-Buddhist era, several forms of medical practice had existed in the Trans-Himalayan region such as *Ihaba* (shaman) and *Onpo* (astrologer) and the prominent system of indigenous therapy developed in this sequestered area was known as the Tibetan Medicinal System, which has evolved based on available bioresources, minerals and beliefs[4].

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Amchies being the practitioners of this ethno-medicinal system have enjoyed high respect and social status among the Trans-Himalayan Buddhist communities. People in the high-altitude areas remained isolated due to poor accessibility and harsh climatic conditions. Over centuries, people due to isolation developed their unique art, culture, and traditions of therapy. *Amchi* system in the trans-Himalaya Spiti valley is one such tradition that had developed its healthcare system based on the available natural resources.

Over 47 rare and endangered plant species were used traditionally in PVNP to cure 27 different illnesses[10]. Pin valley and other Spiti region is secluded from the rest of the world and is the most infected area with hepatitis virus and TB as compared to other districts in Himachal Pradesh[11], (*Amchies* perception). Due to a lack of expert health specialists, medical diagnostic laboratories etc. people make compromises with their health problems at initial level until the problem becomes major issue. Locals travel 250-700 km away to big cities like Shimla, Mandi, Manali, and Kullu for hepatitis and other serious health issues diagnosis. People generally avoid going because of the high financial costs unless they are in a serious condition that will result in death or a serious problem. The region's limited educational facilities, poor socioeconomic conditions, and inadequate healthcare facilities put the local community at risk of infection.

The traditional medical system in the area, where most villagers rely on it for a variety of health issues, particularly during the harsh winter, when access to government facilities, such as primary healthcare centres, is difficult, people rely on local healers for medication[10]. The research could assist government agencies in developing appropriate responses to such serious human health issues in the future. Taking the aforementioned issues into consideration, the current study was designed to better understand the valley's most serious and communicable health issues, as well as methods of prevention through traditional ways of life.

Materials and Methods

Study area

Pin Valley National Park (PVNP; 31° 6' 40" to 32°2' 20" N Lat. and 77°41' 21" to 78°6' 19" E Long.) located in the South-East of Lahaul and Spiti district of Himachal Pradesh (Fig. 1). Pin valley is located in

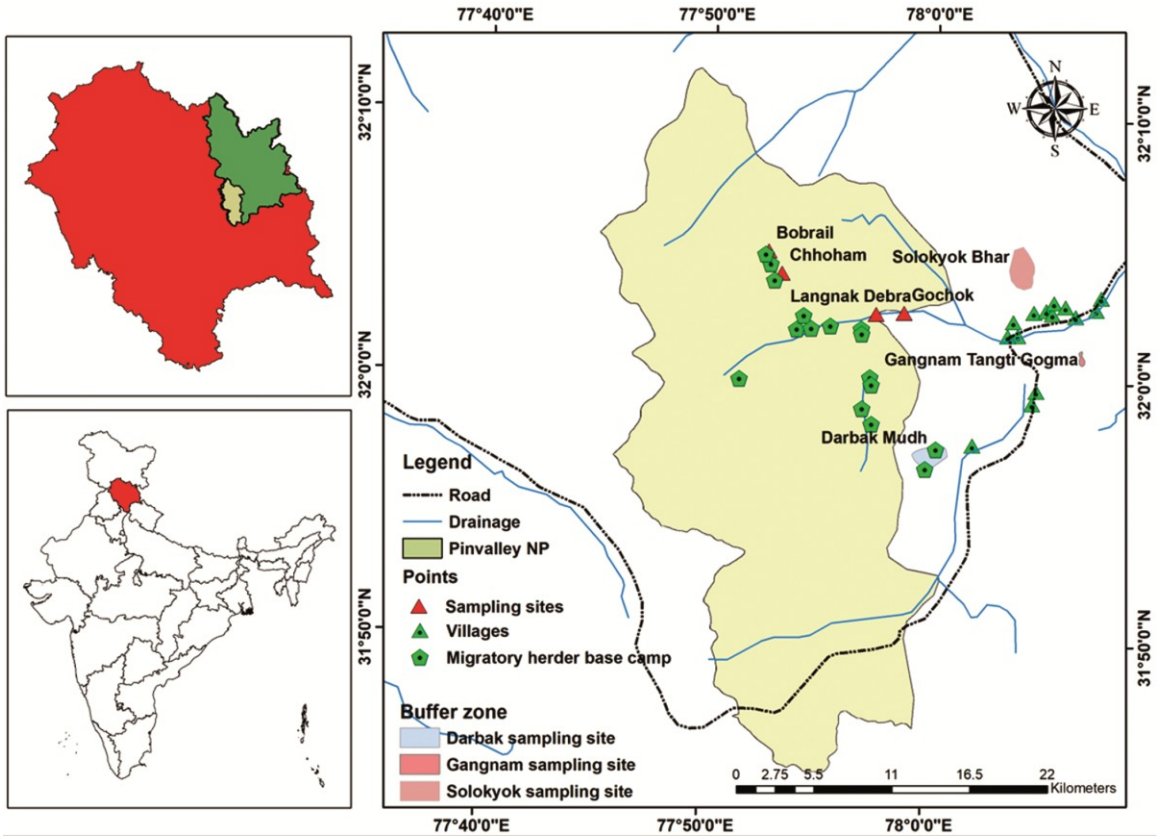

Fig. 1 — Location of study area *i.e.,* Pin Valley National Park, Himachal Pradesh (Source: WII)

the rain shadow of the Pir Panjal range and is classified under the biogeographic zone, Trans-Himalaya zone[12]. The zone experiences extreme cold, semi-arid to arid conditions with low plant productivity, and a plant growth season of about two and a half months from mid-June to August[13]. Pin Valley NP (core zone *ca.* 675 km² and buffer zone *ca.* 1150 km^2) largely formed by the catchments of river Pin and Parahio, which flow largely towards north-east and meet near Sagnam village, while the south-east flowing Spiti river, a tributary of river Sutluj meets at Khab in Kinnaur District. The PVNP is flanked by the Bara Shigri glacier complex to the North, the Great Himalayan NP (Kullu district) to the west, and the Rupi Bhaba Wildlife Sanctuary (Kinnaur district) to the south.

Data collection

A preliminary survey was undertaken in Pin Valley, encompassing all 13 villages, which are inhabited by 2,270 individuals residing in 545 households. The objective was to identify both traditional healthcare practitioners and individuals afflicted with Hepatitis and Tuberculosis. Notably, Spiti Valley has been identified as one of the regions highly impacted by hepatitis according to previous research[11].

Building upon these insights, the current study aimed to assess the prevailing health issues within Pin Valley. Data collection spanned from May 2019 to January 2020, involving a comprehensive survey utilizing semi-structured questionnaires and interviews.

Throughout the survey and interviews, valuable information was gathered regarding the collection, utilization, and preparation methods of medicinal plants. Primary data on the prevalence of Hepatitis and Tuberculosis were acquired through random household surveys, involving 93 individuals across the 13 villages. Additionally, secondary data from hospitals and archival records were referenced.

Before initiating the collection of plant samples, exhaustive information on medicinal plants associated with TB, Hepatitis, and other liver disorders was obtained from experienced *Amchies* (traditional healers). Subsequently, the names of these plants were cataloged in a field diary. Following this, concerted efforts were made to collect specimens of all identified medicinal plants (Plate I) during the peak vegetation period, with the guidance of local *Amchies*.

Ensuring accurate identification and comprehensive understanding, expert *Amchies* were consulted to record detailed information regarding the uses, preparation methods, and dosages of the collected

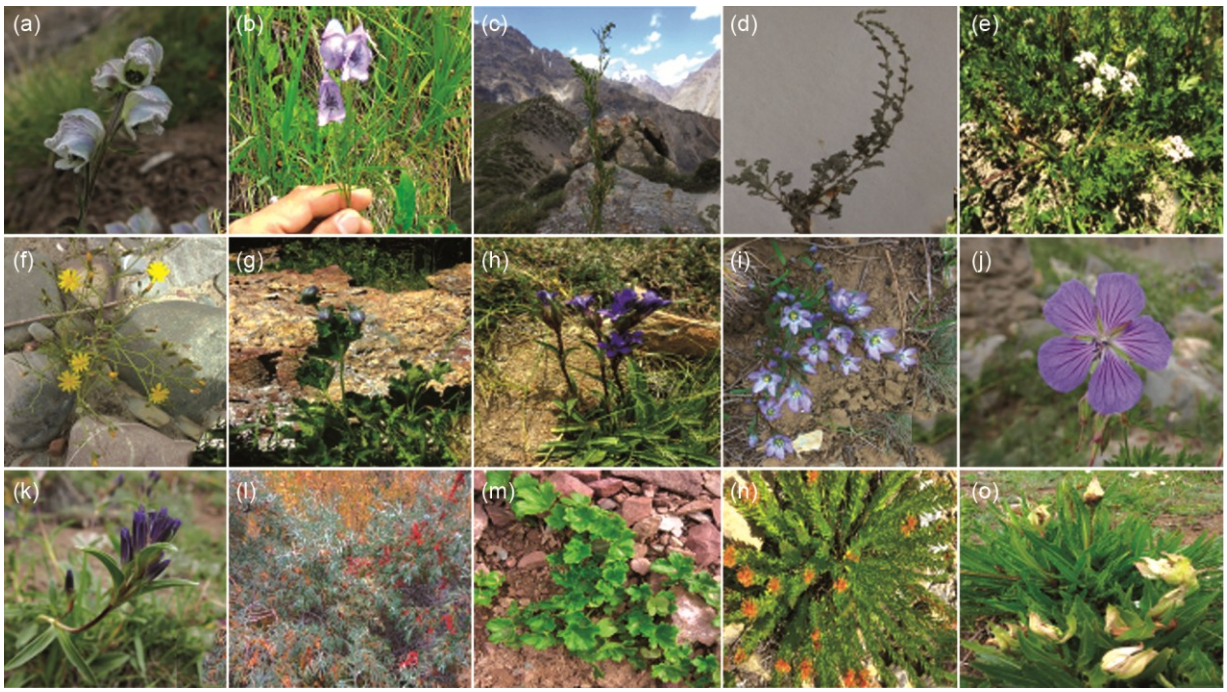

Plate I — Some important ethnomedicinal plant species from the study area: (a) *Aconitum heterophyllum,* (b) *Aconitum violaceum,* (c) *Artemisia salsoloides,* (d) *Artemisia maritima,* (e) *Carum carvi,* (f) *Crepis flexuosa,* (g) *Delphinium brunonianum,* (h) *Gentianopsis paludosa,* (i) *Gentianella moorcroftiana,* (j) *Geranium pratense,* (k) *Gentiana tianschanica,* (l) *Hippophae rhamnoides,* (m) *Picrorhiza kurroa,* (n) *Rhodiola tibetica* and (o) *Saussurea bracteata*

plants. Each plant's binomial nomenclature, family name, local names, locality, and habitat types were meticulously documented. The collected plant specimens were further verified and deposited for future reference at the W.A. Rodgers Herbarium, Wildlife Institute of India (WII), Dehradun.

Data analysis

Plants use value, fidelity level was calculated to understand the importance and preference of plants species in use for treating certain ailments. A non parametric test Mann-Whitney U test was performed to test the significance difference between the male and females patients infected with TB and hepatitis.

Use value (UV)

The UV was calculated using the formula UV = ∑Ui/n,[14] modified from Phillips and Gentry 1993a, 1993b[15,16], where: Ui=the number of uses mentioned by each informant for a given species, n = the total number of informants.

Fidelity Level (FL)

Fidelity level is a good tool to identify the key informants' best preferred medicinal plant species used to treat disorders. Medicinally important plant species taken by the locals have high FL than those which were less relevance. Fidelity level specifies the degree percentage of informants apply the use of several plant species for same purpose. It was aimed to calculate the importance of plant species for the said purpose. All the aliments (health issues) were grouped into categories before calculating FL[15]. Fidelity level was assessed by the formula FL = Ip/Iu × 100, as Ip is respondents number used medicinal plant species for a particular disorder while Iu is respondents number used same plant for any disorder[16,17].

Results

A total of 17 plant species belonging to 8 different families and an animal *Vulpes vulpes* (Red fox) Canidae family were being utilized by local healthcare practitioners to cure hepatitis, TB and other health issues associated (Table 1). In Pin Valley hepatitis infection was (39.8%) out of total surveyed (N=93), of which 23.7% in males and 16.1% in females. In the case of males the maximum infection was in the age group 31-60 (30.77%). While in females the maximum infection was in the age group 15-30 (22.86%). In the age group above 60 infection was nil both in males and females (Fig. 2a & b). The significance difference between male and female hepatitis infected patients was Mann-Whitney U test Z=0.91396 and p value=0.361. Overall TB infection was 15.1%, of which in males (6.5%) and females (8.6%). The significance difference between male and female TB infected patients were Z=0.55137 and p value=0.58138. There was no significance difference of TB cases between the male and female. The Gentianaceae family of *Gentiana* spp. have the highest UV and highest FL in the use of liver disorders among the herbs available in the valley (Table 2 & 3).

Discussion

The tribal population of the country, as per the 2011 census, is 10.43 crores, constituting 8.6% of the total population. 89.97% of them live in rural areas and 10.03% in urban areas across all the states[4].

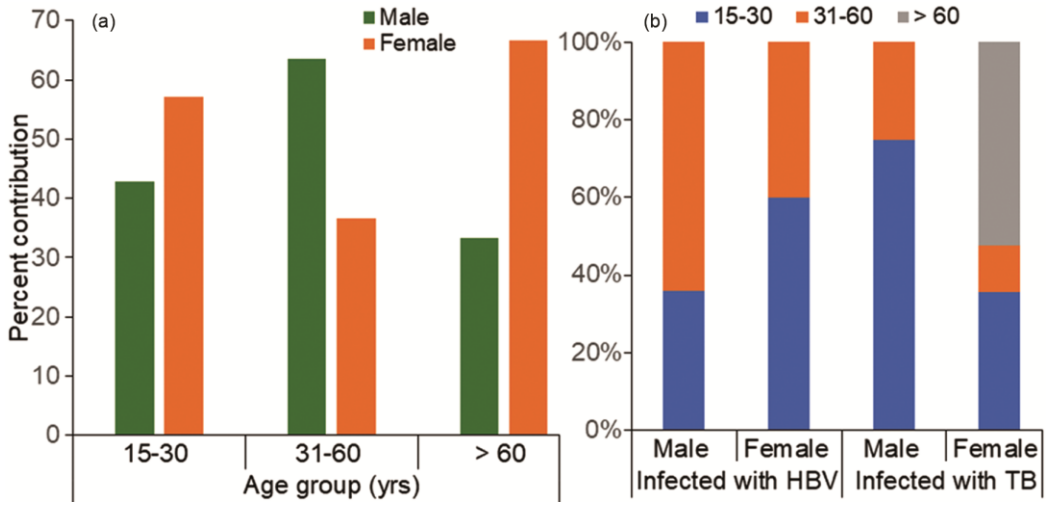

Fig. 2 — Percent contribution by age groups (a) and severity of hepatitis and TB infection (b)

Table 1 — Medicinal plants and animal parts (Red fox) used for curing hepatitis, TB and other liver disorders in Pin Valley National Park

Species	Family	Vernacular name	Habitat	Illness treated	Plant parts used and methods for making medication	Doses	Other cultural use values
Aconitum heterophyllum Wall.	Ranunculaceae	Bonkar karpo	Tsangru and Solokyok	Fever, indigestion, and lung disorders caused by flu and TB	Shoot and root parts collected in July-August, dried in shade and mashed to a fine powder. The teaspoonful of root part is boiled in a glass of water for 10-15 min. After that filtered and allowed to cool down. The shoot part is taken with lukewarm water	½ glass of decoction ½ an hour before a meal and ½ teaspoon shoot powder ½ an hour after meal once or twice a day	Medicinal use only
Aconitum violaceum Jacq. Ex Stapf.	Ranunculaceae	Bonkar nakpo	Darbak	Fever, liver disorders, indigestion and lung disorders caused by flu, TB	Shoot and root parts collected in July-August, dried in shade and mashed to a fine powder. The teaspoonful of root part is boiled in a glass of water for 10-15 min. After that filtered and allowed to cool down. Shoot part is taken with lukewarm water, it acts as diaphoretic and brings perspiration	½ glass of decoction ½ an hour before a meal and ½ teaspoon shoot powder ½ an hour after meal once or twice a day	Medicinal use only
Artemisia salsoloides Willd.	Asteraceae	Atonk nakpo	Pin Valley National Park	Common respiratory problems caused by flu	Dry leaves and seeds mashed to a fine powder and consumed with lukewarm water	½ teaspoon 2-3 times a day after meal	Medicinal use only
Artemisia maritima L.	Asteraceae	Atong karpo	Pin Valley National Park	Common respiratory problems caused by flu	Dry leaves and seeds mashed to a fine powder and consumed with lukewarm water	½ teaspoon 2-3 times a day after meal	Worship incense, fodder, and commercial usage for making scent.
Carum carvi Linn.	Apiaceae	Zeera karpo	Near agriculture fields and meadows	Common cold and coryza, TB, also used in Ayurveda	Seed collected during August-September and mashed to a fine powder	½ teaspoon twice in a day with lukewarm water	Spice and during the winter, tea made from seeds is beneficial for preventing colds and supporting digestion.

…Contd.

Table 1 — Medicinal plants and animal parts (Red fox) used for curing hepatitis, TB and other liver disorders in Pin Valley National Park (Contd.)

Species	Family	Vernacular name	Habitat	Illness treated	Plant parts used and methods for making medication	Doses	Other cultural use values
Crepis flexuosa (D.C.) Benth	Asteraceae	Sertik	Common near the riverine area and other dry places	Jaundice	Dry shoots mashed into powder and mixed with other ingredients and consumed with lukewarm water	½ teaspoon 2-3 times in a day after meal	Only medicine
Delphinium brunonianum Royle.	Ranunculaceae	Du-tsi-Loma	Chhohem	Flu, infectious diseases and internal body heat	Aerial parts collected during August-September and mashed to a fine powder	½ teaspoon twice in a day with lukewarm water	Medicinal use only
Geranium pratense D. Don ex. Sweet	Geraniaceae	Li-kadur (root), Polomendok-shoot parts	Common near agriculture fields and in the meadows	Fever, indigestion and lung disorders	Flowers collected in June-July and mashed to a fine powder	One teaspoon in a day with lukewarm water.	Fresh flowering plant used for worship, Fodder
Gentiana tubiflora (G. Don) Griseb.	Gentianaceae	Tikta Nyonpo	Near marshy riverbeds and higher meadows	Indigestion, Jaundice and other liver disorders	The aerial part of the plant is mashed into a fine powder and mixed with other ingredients like curd/milk and the little amount is taken with lukewarm water	½ teaspoon 2-3 times a day after meal	Fresh flowering plant used for worship, Fodder
Gentianella moorcroftiana (Wall. ex D. Don) Airy Shaw	Gentianaceae	Baltik	Thango, Kilung Nala and near agriculture fields	Indigestion, fever, jaundice, acidity, headache and other liver disorders	The dried whole plant is mashed into a fine powder and mixed with curd or milk and the little amount is taken with lukewarm water	½ teaspoon 3 times in a day ½ an hour before breakfast, lunch and dinner	Fresh flowering plant used for worship, Fodder
Gentiana leucomelaena Maxim. ex Kusn	Gentianaceae	Buksuk Shipo	Chhohem	Indigestion, Jaundice and other liver disorders	Plants are ground with boil water and a small portion of petals of *Polemonium caeruleum* L. (Aun Ser Mendok) and *Gentionopsis paludosa* (Hook.) Ma (Gyatik) is added. The mixture boiled with cow milk or curd is given an empty stomach in the early morning for 15-22 days[20]	½ teaspoon empty stomach early morning	Fresh flowering plant used for worship, Fodder
Gentianella Sp.	Gentianaceae	Tikta	Near agriculture fields, riverbed moist places, and meadows	Jaundice	Dry shoots mashed into powder and consumed with lukewarm water	½ teaspoon 2-3 times a day after meal	Fresh flowering plant used for worship, Fodder

…*Contd*.

Table 1 — Medicinal plants and animal parts (Red fox) used for curing hepatitis, TB and other liver disorders in Pin Valley National Park (Contd.)

Species	Family	Vernacular name	Habitat	Illness treated	Plant parts used and methods for making medication	Doses	Other cultural use values
Gentianopsis paludosa (Hook.) Ma	Gentianaceae	Chaatik	Alpine meadows, rarely found	Jaundice and other liver disorders	Dry shoots mashed into powder and consumed with lukewarm water	½ teaspoon 2-3 times in a day, early morning empty stomach and ½ an hour after lunch and dinner with lukewarm water	Fresh flowering plant used for worship, Fodder
Gentiana tianschanica Rupr. ex Kusn.	Gentianaceae	Sumchu tikta	Alpine meadows (Tsangru-Tangti Gogma)	Jaundice, indigestion and other liver disorders	Dry shoots mashed into powder and consumed with lukewarm water	½ teaspoon 2-3 times in a day after meal	Fresh flowering plant used for worship, Fodder
Hippophae rhamnoides L.	Elaeagnaceae	Tarkuk	Common near riverine areas	Common cold, TB, anti-aging and as an immunity booster	Berries mashed to a fine powder. Jelly-jam and juices are used in most households. Jam-jelly is prepared from its berry given to pregnant ladies to facilitate delivery. Its tea, when taken in the early morning, is beneficial for health.	½ teaspoon 2-3 times a day after meal with lukewarm water.	Fuelwood, as a farm field fence.
Picrorhiza kurroa Royle ex Benth.	Scrophulariaceae	The flower part is called Honglen and rhizome is called as Kru	Darbak	Fever, indigestion and lung disorders by flu, TB	Rhizomes collected in July-August, dried in shade and mashed to a fine powder then teaspoonful boiled in a glass of water for 10-15 min. After that filtered and allowed to cool down	½ a glass of decoction once or twice in a day	Medicinal use only
Rhodiola tibetica (Hook. F.& Thomson) Fu	Crassulaceae	Drsolo-marpo	Gangnam and Solokyok	Asthma, highly useful for lung disorders and keeps the lung healthy, TB	Roots collected in August-September. Dried in a shed and mashed to a fine powder.	½ glass of decoction with lukewarm water once or twice in a day	Medicinal use only
Saussurea bracteata Dcne.	Asteraceae	Pangtsi	Gangnam and Solokyok	Fever, indigestion and lung disorders caused due to infectious diseases	Shoots collected in August-September, dried in shade and mashed to a fine powder. Used as a decoction as well as taken in a powdered form.	½ glass of decoction with lukewarm water once or twice in a day	Medicinal use only

…*Contd*.

Table 1 — Medicinal plants and animal parts (Red fox) used for curing hepatitis, TB and other liver disorders in Pin Valley National Park (Contd.)

Species	Family	Vernacular name	Habitat	Illness treated	Plant parts used and methods for making medication	Doses	Other cultural use values
Vulpes vulpes (Red fox) *	Canidae	Aahtse	Lung	Lung disorders like an ulcer caused due to infectious diseases	A small part of the lung, dried in shade mixed	2 times with lukewarm water	Dead animal skull kept for locally use called 'Sipnon' protect from evils

*Note: Only if fresh dead red fox lung is found because the Buddhist traditional healers don't hunt any wild animal

Table 2 — Use value (UV) of medicinal plants reported for given diseases

Species name	∑Ui	∑n	UV
Gentiana tubiflora	59	12	4.9
Gentianella moorcroftiana	49	12	4.1
Gentiana leucomelaena	29	6	4.8
Gentianella Sp.	28	7	4.0
Gentianopsis paludosa	14	4	3.5
Gentiana tianschanica	3	1	3.0
Crepis flexuosa	11	3	3.7
Artemisia salsoloides	12	4	3.0
Artemisia maritima	22	7	3.1
Hippophae rhamnoides	11	12	0.9
Carum carvi	48	12	4.0
Delphinium brunonianum	58	12	4.8
Geranium pratense	13	4	3.3
Picrorhiza kurroa	46	12	3.8
Aconitum heterophyllum	42	12	3.5
Aconitum violaceum	36	8	4.5
Saussurea bracteata	51	12	4.3
Rhodiola tibetica	14	4	3.5
Total	546	144	3.8

Table 3 — Fidelity level (FL) of medicinal plants reported for specific diseases

Illness treated	Species	Ip	Iu	FL value (%)
Aging	*Hippophae rhamnoides*	12	12	100
Blood disorders	*Hippophae rhamnoides*	12	12	100
Blood pressure	*Hippophae rhamnoides*	12	12	100
Cancer	*Hippophae rhamnoides*	12	12	100
Common cold	*Carum carvi*	12	12	100
Diabetes	*Picrorhiza kurroa*	12	12	100
	Aconitum heterophyllum	12	12	100
Diarrhoea	*Delphinium brunonianum*	12	12	100
Digestive problems	*Saussurea bracteata*	8	12	67
Fever	*Delphinium brunonianum*	12	12	100
Gout	*Delphinium brunonianum*	8	12	67
Liver disorders	*Gentianella moorcroftiana*	12	12	100
	Gentianella sp.	12	12	100
	Gentiana tianschanica	12	12	100
	Gentiana leucomelaena	11	12	92
	Gentianopsis paludosa	10	12	83
	Gentiana tubiflora	9	12	75
	Crepis flexuosa	9	12	75
Lung infections	*Vulpes vulpes*	3	12	25
Respiratory disorders	*Artemisia maritima*	12	12	100
	Geranium pratense	12	12	100
	Saussurea bracteata	12	12	100
	Rhodiola tibetica	11	12	92
	Aconitum violaceum	9	12	75
	Artemisia salsoloides	8	12	67

In the present study we have documented the rural people traditional way of curing some serious health issues like hepatitis and tuberculosis. Seventeen rare and critically endangered medicinal plants used to cure these health issues by local *Amchies*. According to the literature, little is known about the use of these plants in the treatment of jaundice and other liver-related disorders[2,18-21]. Previous studies revealed 47 rare and endangered medicinal plants used to cure 27 different types of health problems in PVNP[10], similarly, 28 ethnomedicinal plants from the PVNP[20].

An earlier study from Dr. YSP Govt. Medical College, Nahan and Indira Gandhi Medical College (IGMC), Shimla, Himachal Pradesh revealed the prevalence of HBsAg was 21.9% with 22.6% in females and 20.9% in males and HBeAg was positive in 24.4% of HBsAg positive cases, higher in the 15-24 years' age group and 30.5% in the reproductive females with the infectivity rate of 24.4%, more in young and reproductive populations in the Spiti valley[11]. Our recent study revealed that overall hepatitis infection was 39.8% with 23.7% in males and 16.1% in females. The tribal residents of the area had socio-cultural interaction with the people living in adjoining areas of Tibet across the international border and infection could have possibly made its way through these interactions as the prevalence of 9.8% had been once reported by the study in Tibet[22]. Also, a study on Tibetan refugees in India has shown a prevalence of 11.9% in them[22]. The community spread of this chronic hepatitis virus was due to infected mother to offspring and also the puncturing

of vein treatment technique if unsterilized properly locally called '*Peru*' by the *Amchies* may be one of the reasons as per a gastroenterologist (Dr. Brij Sharma) in IGMC, Shimla (pers. Comm.). Another reason could be the harsh climatic conditions and complicated social structure in these rural areas. An earlier study from Lahaul and Spiti discovered that the harsh climatic conditions are to blame for the deficiency of Vitamin-D (83.8%) among high altitude people[11]. TB cases were more or less similar in both males and females. Local furnace and exposer to dust during agropastoral practices resulting more prone to the respiratory problems (*Amchies* and self observed perception).

An effective communication strategy and its implementation are good ways to raise awareness about a disease and its causes, which can change a person's or group's attitudes about a disease, advocate policy changes in favour of prevention and control, and create social norms that promote healthy living. However, due to a lack of education and understanding among the rural population, people are afraid to openly discuss hepatitis and tuberculosis infection if anyone is infected. When asked about hepatitis and tuberculosis, they try not to tell the person in front of them. As a result, more infections can spread. Therefore, emphasis should be placed on broadening the reach of information, education, and communication activities that address social and health issues.

Plant-related community culture is important in selecting species for developing ethnomedicinal formulations[21]. It is critical to raise awareness and popularize locally used medicinal plants among the next generation, which is especially important among the economically disadvantaged populations of rural and remote areas[23]. The use of herbal remedies has attracted much attention because the process of producing most herbal remedies is simple, inexpensive and has fewer side effects[18]. The ethnomedicinal plant species could be used for phytochemical, antimicrobial and pharmacological aspects in the future and accumulation of the traditional knowledge with old aged people is a great concern but it's been losing up generation after generation. Effect of modernization, fewer sources of income from these types of occupation and protected status of the present study area are major reasons for this[10,11,24]. It's a fact that the traditional knowledge is mainly among old healers and old age is a crucial factor and affirm that possible life experiences within praying practices and the knowledge acquired by the cultural use of some plant species, makes older people respected figures in their communities and perhaps, therefore, the community itself perceives them as keepers of the knowledge of healing rituals through the use of plants[25].

Conclusion

Hepatitis and tuberculosis have serious consequences for the local community, and using traditional medicines in the early stages of infection can reduce infection rates. Plants play an important role in religious and social ceremonies in both rural and urban societies. Indigenous uses and religious significance of plants act as catalysts for biodiversity conservation. People in high-altitude rural areas where modern healthcare services are scarce or non-existent must rely on traditional healthcare and readily available bioresources to survive. However, by taking a step-by-step approach to planning, we can effectively address the key constraints to health communication interventions. The crucial finding was that the informants were willing to share their expertise in ethnobotany with researchers. More scouting expeditions, conservative tactics, inspecting committees, awareness, joint teamwork, and prudent resource management are all urgently required.

Recommendations

- *Amchies* 'Peru' system needs to be properly sanitized before treatment.
- A proper health awareness programs should be organized by medical teams.
- Medicinal plants uprooting should be done in a systematic way so that can regeneration can occur.
- The traditional pure organic diet from self made agriculture fields must be taken once at least in a day.
- Minimizing consumption of alcohol in traditional festivals can lead to a healthy lifestyle.

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Conflict of Interest

The authors declare that there is no conflict of interest.

Author Contributions

KT and BSA conceived the idea; KT collected data from the field, formal analysis, writing - original draft, figures and tables preparation; supervision: BSA, SL; review and editing: KT, BSA.

Prior Informed Consent

A detailed information was gathered only after the consent of the local community.

Ethics Approval

Authors hereby declare that, there are no competing conflict of interest with regards to the specific work undertaken.

Data Availability

The collected data will be available through request from the authors.

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