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ETHNOMEDICINAL EXPLORATION OF THE PLANT RESOURCES OF SHALKHO VALLEY, DISTRICT SHANGLA, PAKISTAN

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ABSTRACT

Shangla, is floristically diverse in the northern region of Khyber Pakhtunkhwa lies in the moist sub-tropical zone just above the tropic of cancer and features a wide range of mountains that boasts diverse ecological conditions. Shangla is khnown foe its captivating landscapes, magnificent forests, and a variety of unique flora and fauna. The dense forest serves as a hotspot for endangered fauna in the region. The current study emphasizes the medicinal uses of plants of Shalkho valley in Shangla. Field research conducted between 2020 to 2023 employed an open-ended survey to record and document the ethnomedicinal uses of valuable medicinal plants in Shalkho valley. Ethno medicinal data were collected through questionnaires administered to local residents, herbalists (pansars), traditional healers, midwives, and elderly individuals of both genders. The current study identifies a total of 67 medicinally important plant species from 49 families collected and documented from the Shalkho Valley. These 67 species were used by the local community in District Shangla to treat 35 different diseases. Out of these, 25 species (37.31%) from 25 families were herbs, 25 species (37.31%) from 18 families were shrubs, 14 species (20.89%) were trees, and the remaining 3 species (4.47%) are climbers. The Lamiaceae family is the most dominant, with 9 species, followed by Asteraceae with 3 species, and Moraceae with 3 species. Additionally, 59 wild edible species belonging to 20 plant families and 41 genera were documented. Regarding the plant parts used in recipes, the aerial parts were the most frequently used, accounting for 26 species (38.84%), followed by leaves 17 species; (25.37%), and fruits 12 species; (17.96%). The roots of 6 species (8.95%), seeds of 5 species (7.74%), bark of 4 species (5.97%), rhizomes of 3 species (4.47%), whole plants 3 species; (4.47%), and spike, oil, and gums, each representing 1 species (1.49%), were also utilized. In terms of administration, 52 plant species (77.61%) were used orally, while 15 species (22.38%) were used externally during the treatment process.

Keywords: Ethno-medicinal plants, plant remedies, Shalkho valley, district Shangla, Northern Khyber Pakhtunkhwa

Introduction

Ethnobotany is fascinating an interdisciplinary science that deals the intricate relationship between humans and plants. It combines elements of anthropology, botany, ecology and pharmacology to

study how different cultures interact with and utilize plant species for various purposes. (McClatchey *et al.*, 2009). Where local or indigenous people and cultures use a wide variety of plants for different purposes. Many people still rely on plants as a source of food, medicine, fuel for fires, building materials, colours, and money since they can be used in so many different ways. (Ajaib *et al.*, 2016). The term ethno botany encapsulate the blind of "ethno" referring to people or culture and "botany" at the heart of ethnobotany lies the exploration of the deep-seated relationship between humans and plants, which dates back to the dawn of civilization. Throughout history, plants have served as more than the source of food in shelter they have been integrated to cultural practices, spiritual rituals, medicines and economic sustenance for countless communities' worldwide. (Calixto, 2005). The main objective of the ethnomedicinal and ethnobotanical studies is to make better use of plant resources, preservation and transfer of traditional knowledge to future generations. (Kufer *et al*., 2005; Barkatullah *et al.*, 2009). The studies on medicinal plants of Pakistan have been carried out by various researchers which are mentioned below. Ethnobotany, an interdisciplinary field delves for various purposes. Ethnobotany hold significance importance for several reasons; as Preservation of traditional knowledge, Indigenous communities possess in valuable knowledge about the uses of various plant species for medicinal, cultural, and culinary purposes. Ethno-botanical studies help to and document this traditional knowledge before it fades away due to globalization and modernizations. In respect of Medicinal discoveries, many modern medicines have their origin in traditional plant-based remedies. Ethno-botanical research uncovers potential medicinal properties of plants, leading to the development of new pharmaceuticals and treatment for various ailments. This worth alert the Understanding of the cultural significance of plant can aid in conservation efforts, by recognizing the importance of certain plants species to indigenous cultures, conservation can work collaboratively with local communities to protect biodiversity and ecosystems. Ethnobotany fosters cross-cultural understanding by shedding light on the diverse ways in which different societies perceive and utilize plant resources. It promote appreciation for cultural diversity and traditional ecological knowledge besides, ethno-botanical practices fulfill a range of human needs across different cultures; in terms of Food security, Plant provide sustenance in the form of fruits, vegetables, grains, and spices with botanical studies examine traditional agricultural practices, crop diversity, and food preservation techniques, contributing to food security initiative worldwide.

While traditional medicine system, such as Ayurveda, Traditional Chines Medicine (TCM) and indigenous healing practices relay heavily on plant-based remedies. Ethno-botanist documents and study these medicinal plants, identifying bioactive compounds and potential treatment for various diseases. Additionally *Cultural and spiritual significance* is also exist, many plants hold cultural and spiritual significance in indigenous societies, playing essential role in ritual, ceremonies and traditional practices. Ethnobotanical research elucidates the symbolic meanings to different plant and the cultural practices associated with them, along sides ethnobotany also add in economic livelihoods, Plants serves as source of income in livelihood for many communities through activities such as agriculture, forestry, and the trade of medicinal plants, spices, and handicrafts. Ethnobotanical studies inform sustainable resource management strategies that support local economies while conserving natural resources. Razzaq *et al*. (2015). To sum-up, ethnobotany serves as a bridge between traditional ecological knowledge and modern scientific enquiry, offering insights into the multifaceted relationship between humans and plants. By studying the cultural, medicinal, economic, and ecological dimensions of plant use, ethno-botanists contribute to conservation efforts, medical advancement, and cross cultural understanding. As we navigate an increasingly interconnected world, the wisdom embedded in ethno-botanical practices remains vital for promoting sustainability, preserving biodiversity, and honoring the rich tapestry of human plan interactions.

The unresolved Shangla is a district situated in the Khyber Pakhtunkhwa province of Pakistan. The district stands at an elevation of 3100 meters above sea level. It is located between 34° and 35° N latitude and 72° to 74° E longitude (Hussain *et al.*, 2021). The district is divided into six tehsils - Alpuri, Chakesar, Puran, Makhozay, Besham, and Kana - and covers a total area of 1,586 km^2.

Shangla is bordered by Kohistan to the north, Battagram and Torghar (Black Mountain of Hazara) districts to the east, Swat to the west, and Buner to the south. According to the 2017 census, the district has a population of 1,156,420 with an average annual growth rate of 4.2% and a population density of 345 people per square kilometer. There are a total of 64,391 households, each consisting of an average of 8.1 people (Razzaq *et al.,* 2015). The Great Himalaya Range's western part houses the Shangla District, which is renowned for its towering mountains and narrow valleys. The district has varying elevations, ranging from 1,300 to 3,440 meters above sea level, with the northern part near Kuz Ganrshal being the highest point at 3,440m. The district is home to several beautiful green valleys, including Shalkho Mountain, Karral, Bahadarsar, Jabba, and Pirsar, which offer breathtaking and picturesque views. The community in Shangla depends heavily on natural resources for their livelihoods. Unfortunately, because of the growing population and the need for more agricultural land, residents often resort to cutting down forest trees for domestic purposes. This is mainly because alternative fuel sources such as coal, gas, and electricity are scarce in the area. During the snow season, households in Shangla may find themselves cutting down 2 to 3 trees for heating and meeting the needs of their livestock. Despite these challenges, the region boasts isolated agricultural fields that are well-suited for the cultivation of high-demand cross-pollinated vegetables and crops.

The local community heavily relies on the timber sourced from open forests, which has led to the depletion of the once-plentiful national tree (*Cedrus deodara)*. This tree is now at heightened risk. Shangla, a district in Khyber Pakhtunkhwa, Pakistan, is characterized by severe underdevelopment, and illegal wood smuggling is prevalent. The district faces extreme poverty, as highlighted in an official government report, which underscores the urgent need for sustainable natural resource management, reconstruction, and rehabilitation. Residents of Shangla are calling for increased attention and collaborative efforts from the government and non-governmental organizations (NGOs) to address their subpar living standards, insufficient infrastructure, challenging winter conditions, remote geographical location, and damages resulting from earthquakes (Iqbal *et al.,*, 2020).

1.2 Shalkho Valley

The Shalkho Valley is positioned between 72° 38' and 28° 60' E longitude and 34° 50' to 51° 40' N latitude. The valley is distinguished by a rugged and uneven terrain. The climate experiences low temperatures in winter, while reaching up to 20°C in the summer. Phytogeographically, the Shalkho Valley falls within the Syno-Japanies floristic region. Geo-climatically and ecologically, it is characterized by various vegetation types, including moist temperate, alpine, and sub-alpine (DCR 2017). Located on the west-facing side of the ridge top in the Souray Bund area near Gandaow, there is a pristine Shalkho forest that sits at an altitude of 2556 meters and is dominated by *Abies pindrow*. This dense forest is officially designated as a conserved area and is acknowledged as the densest forest in Shangla District. The canopy of the forest is populated with numerous large and ancient trees, deriving its vitality from its considerable distance from residential areas. This majestic forest spans a significant expanse in Shangla District and extends into Swat District, serving as a vital habitat for diverse wildlife, including monkeys, bears, and snakes, owing to the abundance of sizable trees. However, during our data collection, we noticed instances of individuals engaging in the unauthorized cutting of pine trees at lower elevations.

The forest floor is covered with debris, including dry leaves and cones. The soil is rich in ground flora, and it has pebbles, gravels, and sedimentary rocks. Additionally, there are patches of grass scattered throughout the forest. The density of this pristine Abies pindrow forest is 371 stems per hectare, with a basal area of 142.7 square meters per hectare. The composition includes small-sized trees (1%), the medium class (35%), the large class (48%), and the extra-large class (16%) of individuals. Despite its ecological significance, the forest faces challenges such as illegal logging and overgrazing. To preserve this valuable woodland, proactive measures must be taken to prohibit these harmful activities (Iqbal *et al.,* 2017).

Material and methods

Study area visits

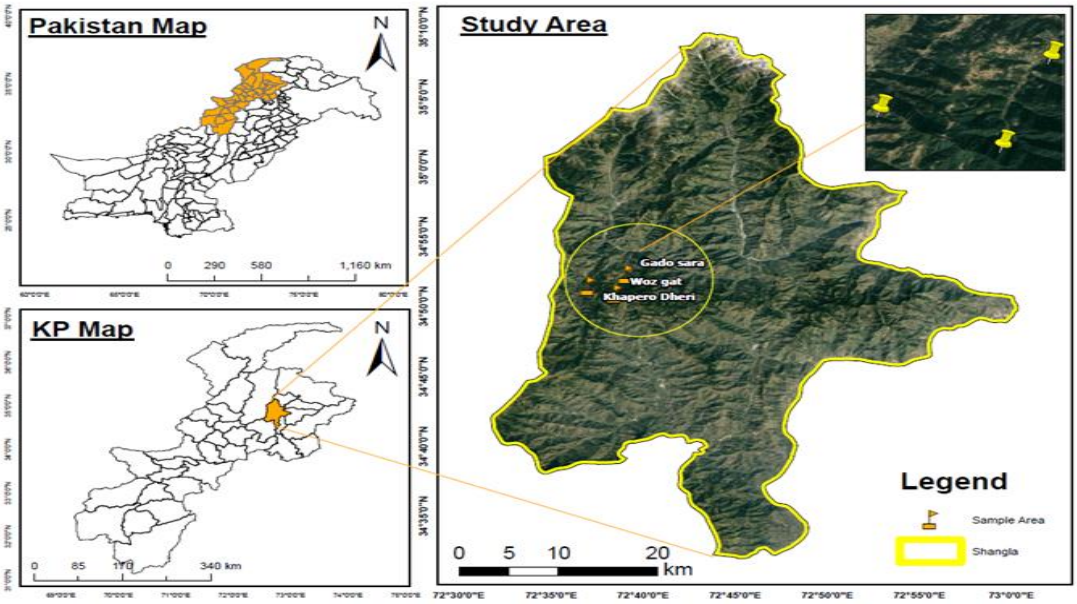
Shalkho valley explored for its high esteemed medicinal capabilities and natural products in the spring and late summer for plants collection between 2021 and 2023.

Plant collection and identification

The collected taxa were identified using catalogues and the "Flora of Pakistan" (Nasir and Ali 1970-1995, Ali and Qaiser 2000-2012). Voucher specimens were deposited at the department of Botany University of Peshawar (PUP) for reference.

Ethnomedicinal Data Collection

To document the ethnomedicinal applications of valuable medicinal plants in the study area, an open-ended questionnaire was crafted. This ethnomedicinal data was gathered through direct interactions with local residents, pansaries, hakims, midwives, and elderly sages (both men and women) during field studies conducted between 2021 and 2023. Given the prevalent illiteracy among respondents, all questionnaires were filled out on site. The collected data encompassed local names, seasonal availability, parts used, collection times and methods, detailed posological information such as preparation recipes and dosages, routes of administration, and uses in both ethno-veterinary and human medicine. To ensure the reliability of the data, interviews were conducted with around 10-15 individuals per medicinal plant to accurately document local names and traditional uses (Rafiq *et al*., 2024; Ullah *et al*., 2024).



RESULTS

The current study is designed to manuscript the medicinal plant of the Shalkho Valley which elaborate that District Shangla is abundant with medicinal plants that the locals use to treat a variety of illnesses and ailments. It is crucial to gather, record, and safeguard this indigenous knowledge for upcoming generations. The current study elaborates a total of, 67 medicinally important plant species from 49 families were collected and documented from Shalkho valley. These 67 species are used for the treatment of 35 various diseases by local community in District Shangla. Out of these, 25 species (37.31 %) from 25 families were herbs, 25 species (37.31 %) belonging to 18 families were shrubs, where 14 species (20.89 %) were Trees and the remaining 3 species (4.47 %) documented as climbers. Tab & Fig No 01. In which Lamiaceae represents as the dominant family with 9 species, followed by

Asteraceae 3 species and Moraceae 3 species respectively. A total of 59 wild edible species belonging to 20 plant families and 41 genera were documented.

Where in case of plant parts used in the recipes is illustrated as the major plant part used for recipe preparation was areal parts 26 species (38.84 %), followed by leaves 17 species (25.37 %), and fruits 12 species (17.96 %), where roots of the 6 plants species (8.95 %), seeds 5 species (7.746 %), bark 4 species (5.97 %), rhizome 3 species (4.47 %), whole plant (3 species; 4.47 %) where spike ,oil, gums represents 1 specie (1.49 %) each. Tab & Fig No 02. In case of administration of the recipes 52 plant species (77.61 %), used oraly where15 species (22.38 %), used as external during the treatment process. Tab & Fig No 03

Table No 1.

Habit	No of Species	No of families	Percentage (%) of species
Herb	**25**	**25**	(37.31 %)
Shrub	**25**	**18**	(37.31 %)
Tree	**14**	**8**	(20.89 %)
Climbers	**3**	**2**	(4.47 %)

Fig No 1.

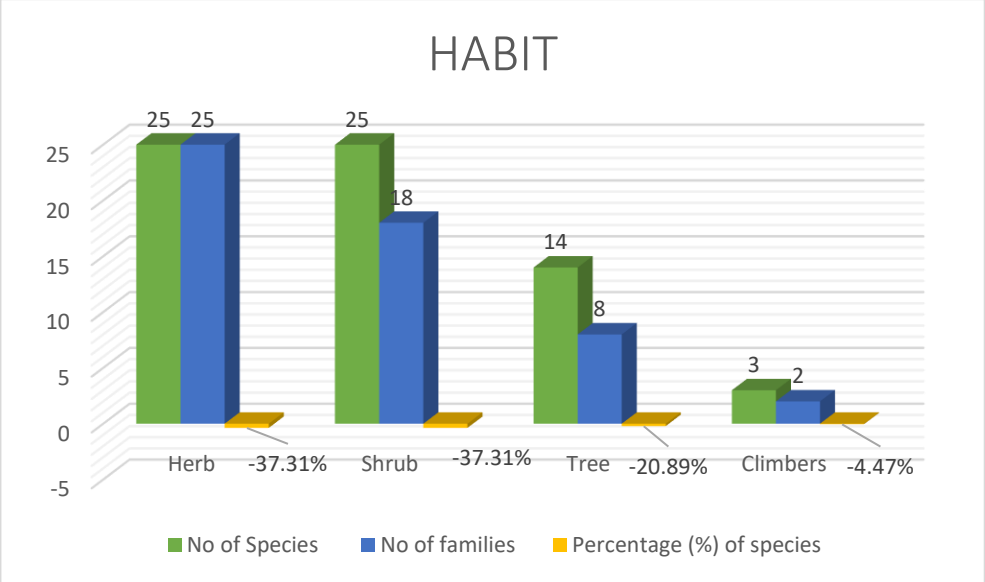


Table No 2.

Part used	No of Species	No of families	Percentage (%) of species
Areal part	**26**	**22**	(38.84 %)
Leaves	**17**	**12**	(25.37 %)
Fruits	**12**	**9**	(17.96 %)
Roots	**6**	**6**	(8.95 %)
Seed	**5**	**5**	(7.74 %)
Bark	**4**	**4**	(5.97 %)
Rhizome	**3**	**3**	(4.47 %)
Whole Plant	**3**	**3**	(4.47 %)
Spike	**1**	**1**	(1.49 %)
Oil	**1**	**1**	(1.49 %)
Gums	**1**	**1**	(1.49 %)

Fig NO 2.

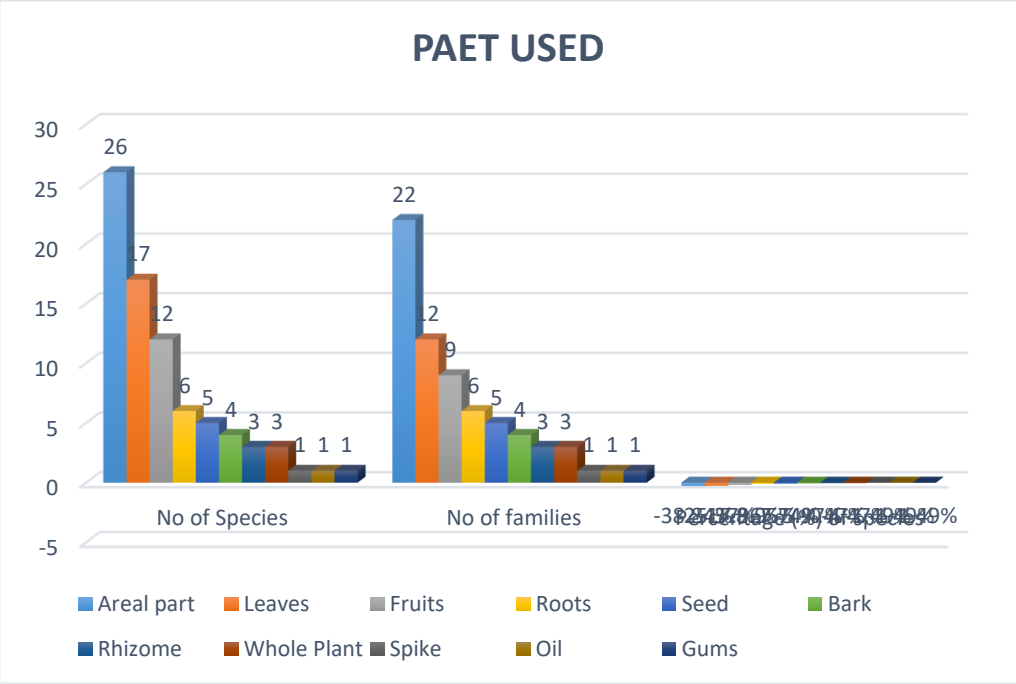
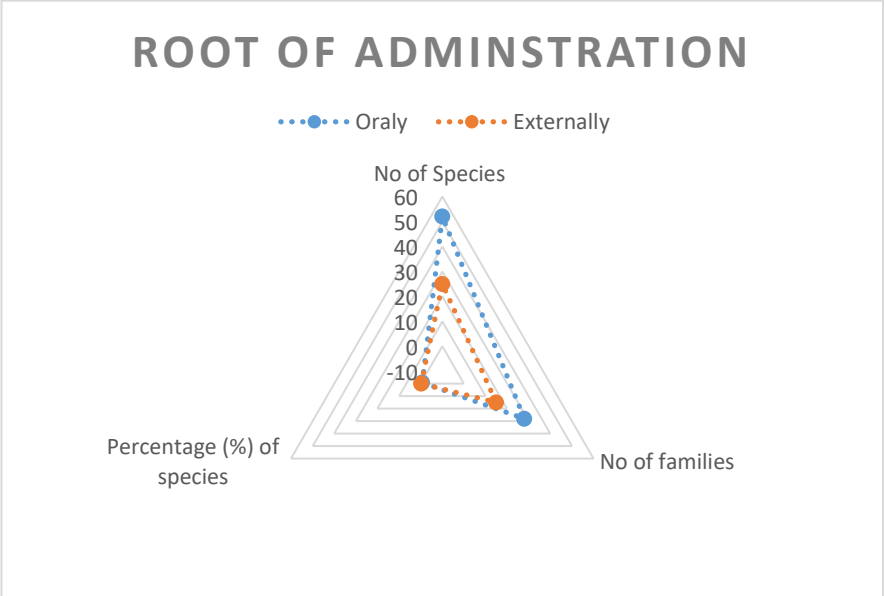


Table No 3.

Root of administration	No of Species	No of families	Percentage (%) of species
Oraly	**52**	**28**	(77.61 %)
Externally	**25**	**15**	(22.38 %)

Fig NO 3



Discussion

In this view the current study is desgined to manuscript the medicinal plant of the shalkho valley which elaborate that District Shangla is abundant with medicinal plants that the locals use to treat a variety of illnesses and ailments. It is crucial to gather, record, and safeguard this indigenous knowledge for upcoming generations. The current study elaborates a total of, 67 medicinally important plant species from 49 families were collected and documented from Shalkho valley. Ethnomedicinal profile of district Shangla was also studied by Razzaq *et al*. (2015). Information about

the ethnomedical applications of wild medicinal flora in District Harnai, Balochistan, was collected by Tareen *et al*. (2016). These 67 species are used for the treatment of 35 various diseases by local community in District Shangla. Out of these, 25 species (37.31 %) from 25families were herbs, 25 species (37.31 %) belonging to 18 families were shrubs, where 14 species (20.89 %) were Trees and the remaining 3 species (4.47 %) documented as climbers. In which Lamiaceae represents as the dominant family with 9 species, followed by Asteraceae 3 species and Moraceae 3 species respectively. A total of 59 wild edible species belonging to 20 plant families and 41 genera were documented. Information regarding medicinal plants of Kohistan and Shangla Top was gathered by Shinwari *et al.* (2017). A total of 61 important medicinal plants from 34 families and 49 genera have been documented from the region. 38 endemic species from Pakistan's Lesser Himalayas have ethomedicinal uses (Majid *et al*., 2019). Where in case of plant parts used in the recipies is illustrated as the major plant part used for recipe preparation was areal parts 26 species (38.84 %), followed by leaves 17 species (25.37 %), and fruits 12 species (17.96 %), where roots of the 6 plants species (8.95 %), seeds 5 species (7.746 %), bark 4 species (5.97 %), rhizome 3 species (4.47 %), whole plant 3 species(4.47 %) where spike ,oil, gums represents 1 species (1.49 %) each. In case of administration of the recipes 52 plant species (77.61 %), used orally where 15 species (22.38 %), used as external during the treatment process. (Hussain *et al.,* 2021), concluded the same findings from swat valley.

Conclusion

The current study findings briefly elaborate the ironic ethnomedicinal resources of the Shalkho Valley, which is used for the treatment of various important human and animal diseases, These 67 species are used by the local community in District Shangla to treat 35 different diseases. These plants belongs to various families with different habit and medicinal outlet, in which Lamiaceae, is the dominnat family followed by Asteraceae. Regarding the plant parts used in recipes, the aerial parts were the most frequently used, accounting for 26 species (38.84%), followed by leaves 17 species (25.37%), and fruits 12 species; (17.96%). The roots of 6 species (8.95%), seeds of 5 species (7.746%), bark of 4 species (5.97%), rhizomes of 3 species (4.47%), whole plants 3 species; (4.47%), and spike, oil, and gums, each representing 1 species (1.49%), were also utilized. In terms of administration, 52 plant species (77.61%) were used orally, while 15 species (22.38%) were used externally during the treatment process.

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