



Ethnobotanical analysis of medicinal plants used in the tribal communities of Takht-E-Nasrati, district Karak, Khyber Pakhtunkhwa

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The native people of Sub-tropical regions of Pakistan still have a decent amount of ethnobotanical knowledge of wild plant species. The current research evaluated the traditional medicinal plant use against different diseases in a remote area tehsil (Takht-e-Nasrati) of district Karak, Pakistan. This study was conducted in 2019 and 2020 to collect information regarding different ethnomedicinal uses of plant species growing in the region through questionnaires and semi-structured interviews. Floristically, a total of 193 plant species belonging to 25 genera were used as medicine. Asteraceae was the largest family with 18 species. The highest priority of local people was for leaves (33.84%). The most frequently usage was against stomach problems (20%). The native people of the (Takht-e-Nasrati) of district Karak use this study as a self-care guide. This research will also assist in the development of scientifically sound strategies for the conservation of medicinal resources and the long-term use of plant diversity in this sub-tropical area

Keywords: Ethnobotany; natural resources; stomach problems; Takht-e-Nasrati

INTRODUCTION

Wild plants and forests are considered to play a significant role in people's health and nutritional needs all over the world (Setalaphruk and Price 2007; Singh 2004). Tribal people have discovered that wild herbs play an important role in their livelihood (Jadhav et al. 2011). People all over the world have researched and practiced the use of plants growing in their surroundings for curing different diseases since prehistoric times (Yuan et al. 2016; Sewell 2014). The peoples of Pakistan have been using native medicinal plants emerging in their surroundings as indigenous medicines since ancient times, and they have played a leading role in the evolution of modern allopathic and conventional medical systems (Kala et al. 2006). Ethno-medical methods are the cornerstone of many healing systems, including Siddha, Unani, Sowa-Rigpa, Ayurveda, and even the allopathic system (Roy 2020). According to WHO, about four-fifths of people in developed countries depend on plant-derived medicines (WHO, 2003), and large populations of third-world countries use these traditional medicines due to their affordability (Allkin 2017). Plant compounds are the source of many of the medicines used in the allopathic system (Aziz et al. 2017). Plant usage and tribal cultures have been linked in ethno botanical studies (Pieroni et al.

2002; Verpoorte et al. 2005; Turner and Tjerve, 2005; Singh and Lal 2008; Manhood et al. 2011). Traditional knowledge is still passed down through the centuries, but cultural interaction, rapid land loss, construction activities, and deforestation have forced tribal peoples to leave their homelands, and knowledge is increasingly being lost. The preservation of this priceless primordial data necessitates urgent recording. Ethno botanical surveys look at how these plants are used for medicine, fuel wood, food, shelter, agriculture, timber, furniture, fodder, and religious ceremonies, among other items (Khan et al. 2003). This is the first quantitative ethno botanical survey from this area of the sub-tropical zone. This study represents the first quantitative ethno botanical survey from this part of Sub-tropical region. It will help in developing scientifically-informed strategies for the conservation of natural resources and sustainable use of plant diversity in this part of sub-tropical region.

MATERIALS AND METHODS

Study area

Takht-e-Nasrati is situated at 340 m above the sea level which received less than 500 mm annual rainfall. In the month of June and July the temperature reaches up to 42-45°C. The area is located in semi-arid climatic region,

having hot summer and very cold winter. In the year 2001-2010, 121.6 mm of rainfall per 10 year was recorded on district level June and July are the hottest months, whereas December and January are the coldest months. In the year 2001-2010 the mean maximum temperature was 39.5 °C, in the month of the June, whereas the mean minimum temperature was as low as 4.26 °C in the month of January, recorded on district level (Khan et al. 2011). The total population of Takht-e-Nasrati is 257137 while the population of District Karak is about 706299 according to 2017 census. The Tehsil Takht-e-nasrati is located at 32 47° to 33 28° North and 70 30° to 71 30° East (Fig.1). On the North East Tehsil Karak is situated on the East district Miawali is located on the west district Lakki Marwat is present and Tribal area neighboring district Bannu on the West. The total area of Tehsil is about 613.66 km². Greater part of the region consists of dry hills and uneven field areas i.e. 323.97 km². Area which is used for agriculture purposes is about 289.7 km². Although the hills are dehydrated but still they contain precious minerals like uranium, coal, gypsum and gas (Khan et al. 2011).

Topography of the region is irregular. The area can be divided into mountainous area, plain and small hills. Hilly area consists of Chokara, Lakerka, SarajKhel, Naray Khowra, Zarki Nasrati, Takht-e-Nasrati, Shahidan, Shawa, Kanda Khel, Shanawa. The region which is mainly consists of desert lies on the south of Warana and Chokara adjacent district Bannu and on the east side with Zarki Nasrati and Shanawa. The name of this desert is called "Thall". It consists of Jahangiri Banda, Bogara, Warana, Ahmad Abad, Gandiri Khattak, Gardi Banda, Zarin Kala, MoniKhel and Jarassi. The flora of Karak is xerophytic type. Diversity occurs among the flora of the area, the most common tree plants in the area are *Zizyphus mauratiana*, *Zizyphus jujuba*, *Melia azedrach*, *Tamarix aphylla*, *Accacia modesta*, *Accacia arabica*, *Albizia lebbeck* are permanent vegetation. *Cymbopogon jawaruncusa* are the familiar among the grasses. Similarly *Rhazya stricta*, *Calotropis procera* and *Dodonaea viscosa* are the shrubby vegetation. *Asphodelus tenuifolius*, *Silene conidea* and *Cirsium arvense* are the weed flora in the area.

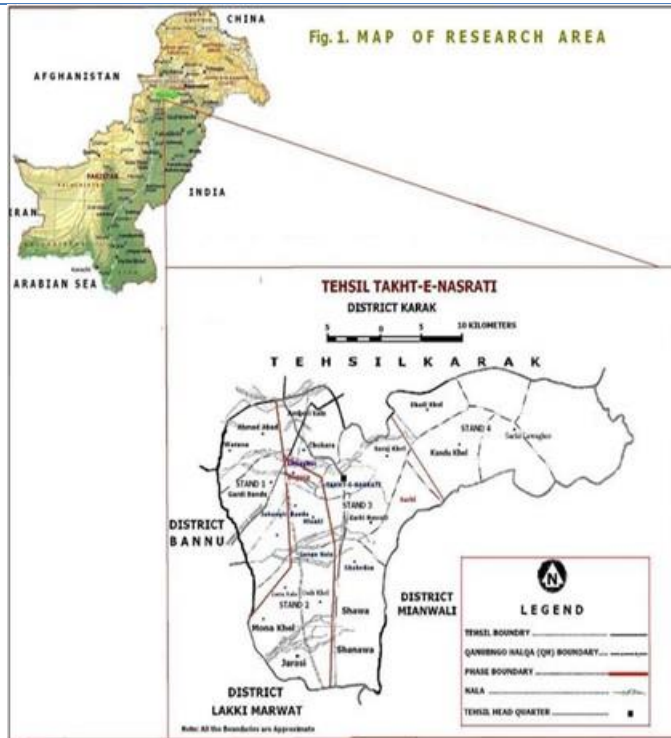


Figure 1: Map of the study area

Methodology

During the years 2019-20, field trips were taken in the study areas to collect ethno botanical information and record indigenous knowledge. Plant specimens were collected, along with detailed field notes on habitat, life type, phonological status, and medicinal value. Local inhabitants were interviewed in each small village about the local names and medicinal uses. The trained or usually older men were given more importance because their expertise and experience were thought to be more authentic. All the collected plants were properly pressed, dried and mounted on standard herbarium sheets and the voucher specimen were deposited at Peshawar University herbarium. The nomenclature is based on Flora of Pakistan (Nasir & Ali, 1970-1989; Ali & Nasir, 1989-1991; Ali & Qaiser, 1993-2021).

RESULTS

Medicinal Plant Taxonomy and Habit

A total of 193 species from 62 families were found to be used in the treatment of various ailments during the current research. The botanical name, local name, voucher number, family, part used, and medicinal uses of the species were all recorded. Asteraceae and Poaceae had the most species (eighteen each), followed by Lamiaceae (ten species), Solanaceae and Brassicaceae (eight species each), and Fabaceae (seven species each). The most well-known therapeutic families, according to the literature, were Asteraceae, Poaceae, Lamiaceae, and Solanaceae (Fig. 5). Herbs were the most widely reported

life type, with 136 (70%) reports, followed by shrubs with 31 (16%) reports and trees with 26 (14%) reports, respectively. The widespread use of wild herbs may be due to their relative ease of access and effectiveness in the treatment of various diseases (Table. 1, Fig. 2).

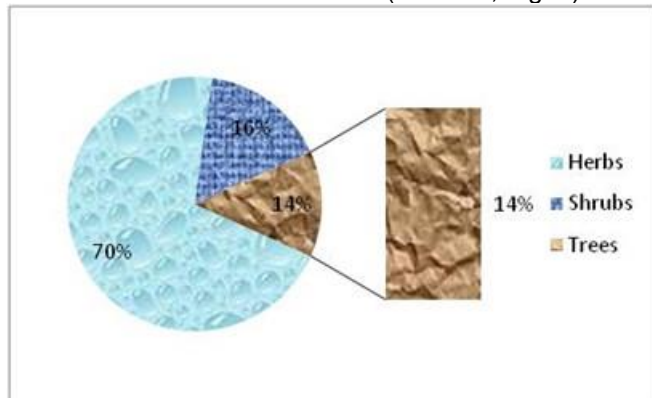


Figure 2: Habit %age of medicinal plants

Plant Parts Used

According to a total of 260 usage studies, the leaves of 88 species (33.84%), followed by fruit and whole plants (13.84% each) followed by flowers and (13.4%) were the most frequently used parts of the plants for treating various diseases (Fig. 3). Gum, bulb, and flower were the least commonly recorded plant parts, each accounting for 1%. 88 plant parts were used for skin, 48 for constipation, 34 for blood purification, 25 for digestion, 25 each for diabetes and diuretic, 16 for stimulant, 14 for wound healing, 13 for sexual disorders, 8 for dysentery, 7 for immunity, 6 for jaundice, 5 for fever, and 4 for cough, 136 being used as medicinal (Fig. 4). Most of the medicinal plants were used for gastric problems, diarrhea, abdominal pain, constipation, stomachache and also for skin diseases. Unsustainable collection methods, poor post-harvest methods, soil erosion, ecological pressure of overgrazing, deforestation and harsh climatic factors had negative effect and are the main causes of the depletion of the local flora.

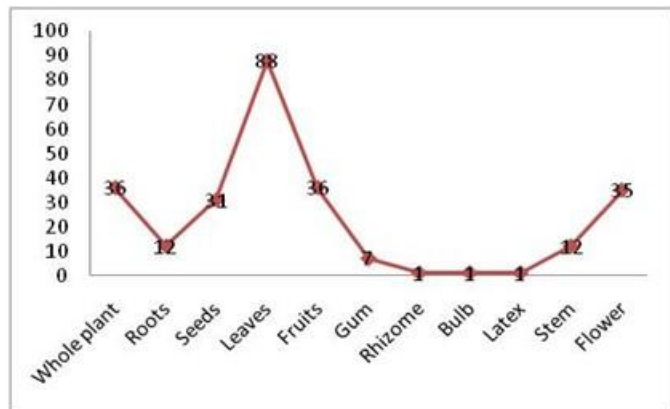


Figure 3: Detail of plant uses for various diseases

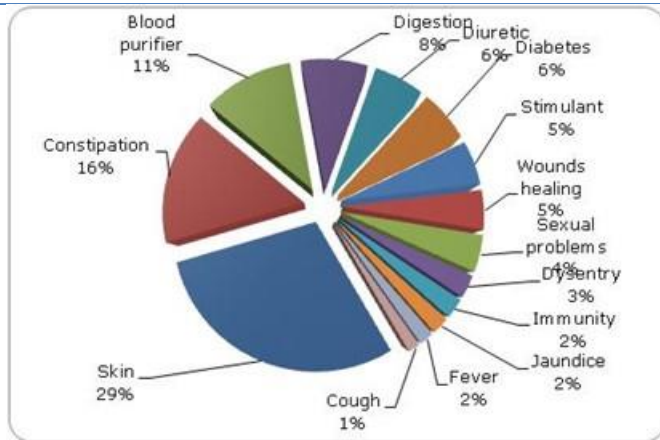


Figure 4: Percentage of each disease

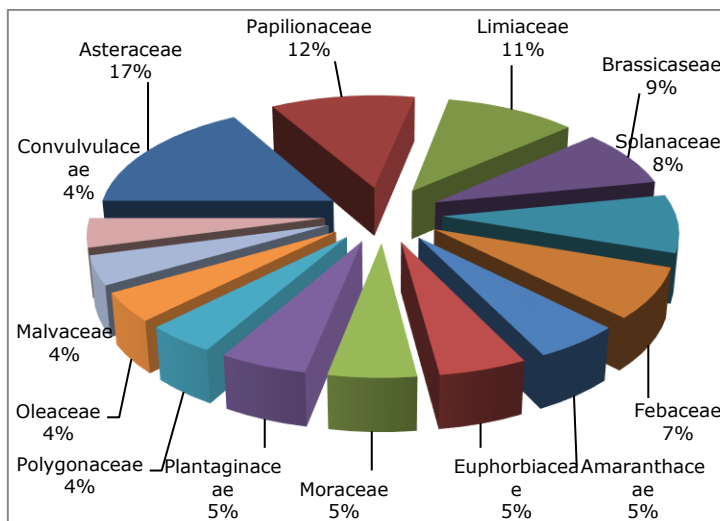


Figure 5: Distribution of medicinally important families.

DISCUSSION

Medicinal plant research in Asia continues to receive significant national and international attention, particularly with regard to its multiple roles in poverty alleviation and health care support. Nine countries (Korea, China, India, Malaysia, Indonesia, Myanmar, Thailand, Sri Lanka and Vietnam) have already published their National Monographs for herbal drugs, while official herbal pharmacopeias exist in Indonesia, Bangladesh, Thailand, India, Sri Lanka and Vietnam. Practitioners are becoming more involved in incorporating medicinal plant management and use methods in general. The maximum number of species used belonged to Poaceae having 9.32% (18 sp) followed by Asteraceae with 8.29% (16 sp) followed by Papilionaceae having 5.69% (11 sp) followed by Lamiaceae with 5.18% (10 sp) followed by Brassicaceae and Solanaceae having 4.16% (8 sp) the remaining families contributed less than 4% in the (Table). Most of the medicinal plants were used for gastric

problems, diarrhea, abdominal pain, constipation, stomachache also for skin diseases. Ethnobotany gives us an account of uses of plant species by the people relating to particular area that how they take in to use plants as food stuff and for medicinal purposes (Qureshi, 2012). Plants are a vital source of traditional medicines that are used for the treatment of various ailments (Husain et al. 2008; Mahmood et al. 2011a). Main objective of ethnobotanical research is to record the indigenous uses of plant resources. Until now, 80% of the world's population depends on traditional medicines for its primary health (Shinwari & Qaiser, 2011). Farmers not only use plants as fodder but also for treating various ailments there are several reports on medicinally used plants from other regions of Pakistan (Abbasi et al. 2013; Ahmad et al. 2015).

CONCLUSION

The aim of this research was to record the medicinal plants used by the people of Karak (study area). According to this research, the majority of rich knowledge (ethno-medicinal) is kept by the elderly, so documentation is critical. For medicinal purposes, 193 plant species from 20 families were used. Asteraceae had the most species used, accounting for 8.29% (16 spp). The importance of ethnomedicinal uses of wild medicinal plants is emphasised in this report. Our current research will help to educate future generations about traditional plant knowledge, and this study will identify a useful self-care tool for native people of the Karak (Takht-e-Nasrati).

CONFLICT OF INTEREST

The authors declared that present study was performed in absence of any conflict of interest.

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AUTHOR CONTRIBUTIONS

LB designed and RR perform the survey work and also wrote the manuscript. AU & AZ performed data analysis. MNK and FZ review and editing the manuscript. All authors read and approved the final version..

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