



Quantitative ethnobotanical survey of medicinal flora thriving in Malakand Pass Hills, Khyber Pakhtunkhwa, Pakistan



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ABSTRACT

Study objective: Ethnobotanical knowledge is proving to be invaluable for drug discovery in the wake of effective prospecting from biodiversity. On the other hand, the escalating human pressure is threatening the endogenous flora. Situated at the foothill of the Himalayas, Pakistan boasts of rich floristic distribution. However, many lush yet imperiled regions of this country has never been explored. It inspired us to evaluate and document the taxonomic composition, significance of medicinal plants and associated traditional knowledge in the District of Malakand, Khyber Pakhtunkhwa Province.

Materials and methods: Vegetation growing in Malakand pass hills, Pakistan was studied and data were collected using an open-ended questionnaire, in addition to interviewing the local elderly, knowledgeable persons, and herbal practitioners. Relative Frequency Citation (RFC) and Use Value (UV) of the medicinal plants were calculated and their correlation was determined by Pearson correlation coefficient. **Results:** This study encompasses 92 plant species belonging to 56 families thriving in the study area. The information gathered includes ethnobotanical inventory and their pharmacological uses. Quantitative analysis throws light on the consistence of RFC and UV. Asteraceae and Lamiaceae were the most abundant families represented by 6 species each. Shoots were the most used parts (23.6%) and wound healing (7.91%) was the most common therapeutic use.

Conclusion: The result obtained from the study implies that local inhabitants rely on these plants for their medicinal requirements. Also, the statistics reveal that, the vegetation can be assessed for potential drug leads. However, urban expansion is threatening the existence of indigenous flora and old generation with ancient herbal wisdom is perishing. So, it appears imperative to preserve the traditional knowledge. This survey is expected to contribute to the discovery of novel bioactive constituents, stimulate conservation efforts of the perturbed flora and promote sustainable exploitation of the medicinal bounty.

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1. Introduction

Since the dawn of civilization, plants are in use as sustenance and medicine. Statistics reflect that nearly 80% of the global population uses plants for their primary health care (Ajose, 2007). Promotion of primary health care is a priority agenda of World Health Organization (WHO). As per an international conference in 1978, Alma-Ata declaration was formulated to encourage community participation, self-reliance, sustainable and integrated approach for health care (WHO). Despite more than three decades of this treaty, it's far from

being a success due to multiple social, political and economic factors (Gillam, 2008). However, the conceived vision still holds pertinence, especially in developing countries (Vasan et al., 2014). Another study reports that two third of the world population depends on medicinal plants for a multitude of ailments (Bibi et al., 2014a, 2014b). Though synthetic drugs and antibiotics are more effective than phytomedicines, they pose higher degree of side effects as well (Vale and Oleastro, 2014). Consequently, the quest for and reliance on herbal medicine has accelerated in recent years (Petrovska, 2012). The rising inclination of Western populace and practitioners towards herbalism has catapulted its global significance (Vickers et al., 2001). Plants are extensively being screened for therapeutic phytochemicals and lead compounds (Katiyar et al., 2012).

Ethnobotany, the study of human–plant interactions is deemed crucial in success of the drug discovery pursuits (Heinrich, 2000;

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Mandal et al., 2012). Ethnobotanical studies and traditional knowledge are important to set priorities in the local communities and promote sustainable development (Cámara-Leret et al., 2014). Hypotheses from ethnobotany is believed to contribute to natural product databases and expedite pharmaceutical lead compounds identification and derivatization from the pharmacophores (Albuquerque et al., 2012; Patwardhan et al., 2005).

The Himalayas, one of the imposing mountain ranges of the world harbors rich floristic diversity (Sharma et al., 2014). In fact, the wonder herb *Rhodiola imbricata* with immune-stimulatory and radio-protective effect has been recognized here, recently (Tayade et al., 2013). Pakistan, situated at the foothills of this formidable mountain system (lesser Himalaya) has an impressive botanical repertoire due to varying climate ranging from subtropical, temperate to alpine (Abbasi et al., 2013b; Khan et al., 2013). The diversified ecological zones has resulted in 6000 species of flowering plants in Pakistan (Selin, 2008). Therefore, it is important to glean the ethnobotanical information, for conserving the floristic diversity for posterity, and utilizing them for public health management. The inhabitants of Pakistan's remote, mountainous terrain rely on these plants for easing various ailments (Ahmad et al., 2014; Khan et al., 2013). To preserve the traditional knowledge and contribute to drug prospecting, ethnobotanical studies have been conducted in different regions of this country. Literature browsing showed surveys conducted in Malam Jabba, Swat (Sher and Al Yemeni, 2011), Wana, South Waziristan Agency (Ullah et al., 2013), Naran Valley, Western Himalaya (Khan et al., 2013), Mastung of Balochistan province (Bibi et al., 2014a, 2014b), Soan Valley, Salt range (Bibi et al., 2014a, 2014b), Lesser Himalaya (Mujtaba Shah et al., 2014), Nara Desert (Qureshi and Raza Bhatti, 2008), Barawal Bandi, Upper Dir (Hussain et al., 2014), Banda Daud Shah, Karak district (Murad et al., 2013), Lakki Marwat district (Ullah et al., 2014), and Chail valley (Ahmad et al., 2014), to name a few.

Khyber Pakhtunkhwa is one of the four provinces of Pakistan. Malakand constitutes a Division of this province and the districts Swat, Shangla, Buner, Chitral, Lower Dir, Upper Dir, and Malakand come under it (Khan et al., 2011a, 2011b). Malakand is a lush valley surrounded by hills. The valley has loamy soil, annual precipitation of 600–650 mm, moderate winters and summers. Malakand Pass Hills has historical relevance and it harbors floristic abundance. To the best of our knowledge, ethnobotanical documentation of flora of Malakand Pass Hills (34°35'N 71°57'E/34.583°N 71.95°E) has never been carried out. Though, ethnoveterinary relevance of flora in Malakand valley near Dir district has been recorded (Ul Hassan et al., 2014). To bridge the gap in knowledge of botanical diversity, this study investigated the indigenous flora of Malakand Pass Hills. The study area included three adjacent villages, Malakand khas, Jaban and Banj. The original inhabitants in this area are Gujars, with native language Gujro and local language Pashto (Khan et al., 2011a, 2011b). The residents earn their livelihood by cattle rearing, selling bovine products and trading forest resources.

Overexploitation and reckless clearance of the forest has put the vegetation in this area under intense pressure. Also, these anthropogenic activities are destroying wildlife habitat. This ethnobotanical study is conducted to address multiple issues, primarily, documentation of the native medicinal flora, preservation of the traditional knowledge, alerting the concerned population against the jeopardy of perturbation and motivating for conservation.

2. Materials and methods

2.1. Data collection

For obtaining the data, frequent field trips were made to the investigated area from March 2013 to August 2014 (Fig. 1). The information pertaining to the ethnobotanical uses of the flora were collected by a questionnaire method. The study design consisted of interrogation of the well-versed people and local herbal practitioners on the spot. A total of 87 respondents were interviewed, which included 13.8% pansaris (herbal sellers), 50.6% elders (including both men and women above the age of 50 years), 21.8% in the age range of 20–40 years, and 12.6% young people below 20 years of age as shown in Fig. 2. The traders were questioned for they are assumed to have sound knowledge of medicinal importance of local plants (Sher et al., 2014). Majority of the selected informants were senior folks as casual discussion implied their superior indigenous knowledge compared to the younger generation (Mussarat et al., 2014).

Ethnobotanical data regarding vernacular names of plants, traditional usage of plants, and other auxiliary facts was collected. The reports were considered authentic when corroborated by at least 10 interviewees. Demographic distribution of the participants (gender, age, and occupation) was also recorded. The Code of Ethics as set by 'International Society of ethnobiology' was adhered to while conducting the interview (The ISE Code of Ethics, 2006). The consent of the inhabitants was taken prior to the survey.

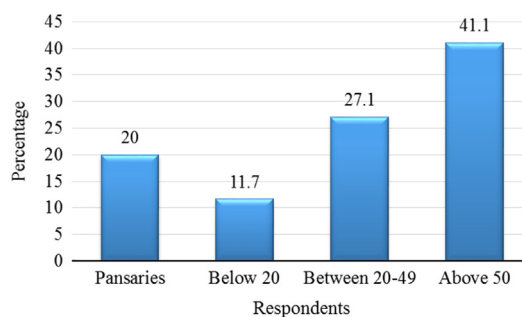


Fig. 2. Percentage of respondent groups.

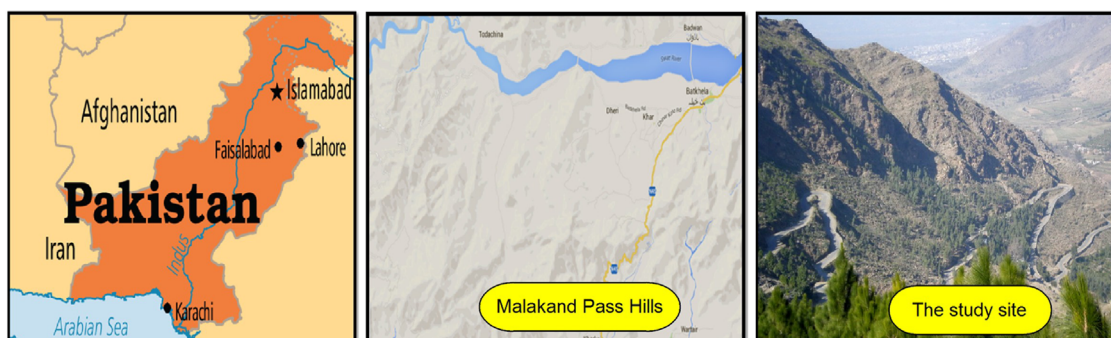


Fig. 1. The site of ethnobotanical survey of the plants (Malakand Pass Hills, Khyber Pakhtunkhwa, Pakistan).

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