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Contributions to the phytotherapies of digestive disorders: Traditional knowledge and cultural drivers of Manoor Valley, Northern Pakistan



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ABSTRACT

Ethno pharmacological relevance: Ethno medicinal traditional knowledge regarding the uses of indigenous medicinal plants used for various human digestive disorders are mostly known to the elder community members. As the young generation is not much aware about such vital traditional medicinal practice because they rely on elders.

Aim of study: To document, accumulate and widely disseminate the massive indigenous knowledge of century's practiced therapeutic uses of medicinal plants by the local people living in this remote area.

Materials and methods: A total of 63 local inhabitants (39 males and 24 females) were interviewed through a structured questionnaire. The data obtained were quantitatively analyzed through the use value (UV_i), fidelity level index ($FL\%$) and relative frequency citations ($RFCs$), consensus index ($CI\%$) and informant consensus factor (F_{IC}). For novel uses all the plants were checked with previously published articles on same disease by analyzing through Jaccard index (JI) and Sorensen's similarity index (QS). Plants specimen were preserved, mounted and labeled on the herbarium sheets, cataloged and deposited with voucher numbers in Hazara University Herbarium, Mansehra, Pakistan (HUP).

Results: 44 plant species belonging to 44 genera and 28 families were documented in the current study. These medicinal plant species were used commonly as an ethno medicine against 26 various digestive disorders out of which most frequently occurred are; stomach ache, diarrhea, indigestion, constipation and inflammation etc. Herbaceous plant species were the dominant among plants studied which were 64% of the total plants, followed by trees (20%) and shrubs (16%). Lamiaceae was the leading family among collected medicinal plant species (13.6%). Maximum medicinal plant species were used for treatment of stomach ache (11.7%), diarrhea and indigestion (10.9% each). Most widely used parts were leaves (41% citations), fruit and whole plant (12% citations each) for medication of various digestive problems by the traditional drivers. Dominated medicinal plants with most use values were *Ficus carica* having ($UV_i=0.90$) and *Trifolium repens* ($UV_i=0.84$). Based on the RFC values, the most cited medicinal plant species by the traditional drivers were *Ficus carica* (0.43) and *Berberis lycium* (0.41), while most respondents percentage was noticed for same plant species calculated through consensus index ($CI\%=42.9\%$ and 41.3%) respectively. The medicinal plant species with highest fidelity level was of *Grewia optiva*, *Juglans regia* and *Sorbaria tomentosa* each cited 100% for anthelmintic, easy digestion and Diarrhea respectively. Due to representation by only single medicinal plant taxa ($Nt=1$), the digestive diseases viz. cholera, colon cancer, emetic, internal injuries, kill microorganisms, Soothing, tumor and urine suppression had maximum F_{IC} value. The analytical result reveals that 57% of medicinal plant species were reported for the first time regarding their uses. new medicinal uses of *Anaphalis contorta*, *Caltha palustris*, *Pinus wallichiana*, *Plantago himalaica* were recorded for the first time from Pakistan and *Aralia cachemirica*, *Bupleurum longicaule*, *Pleurospermum stellatum*, *Potentilla argentea* and *Juglans regia* across the globe for currently reported medicinal uses. Besides this, all the mentioned plant species were reported for the first time for digestive disorders from Manoor Valley as no single study up-till now has been conducted ethno medicinally.

Conclusion: The present study revealed the importance to document and launch list of all the possible plants that are used in traditional medicinal practices against digestive disorders in the unexplored study

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area and to show the important medicinal plants for future biological, phytochemical and pharmacological experimentation regarding digestive problems.

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1. Introduction

The origins of the therapeutic use of herbal medicine can be traced back to China about 5000 years ago. The extracts of several plants have been used as a folk medicine throughout the world and many drugs prescribed by physicians are either directly isolated from plants or commercially modified of natural products (Wang et al., 2007). About 80% Indigenous people of all over the world as well as Pakistan relies on traditional medicines for health practices (Hocking, 1958), but now it is restricted to the rural areas (Ibrar et al., 2007). Because the rural areas inhabitants greatly depend on natural resources due to lack of modern medical facilities (Sandhya et al., 2006) while in contrast, the urban community member deviates towards modern health facilities. But presently traditional knowledge is facing severe threat due to changing life styles and modernization in rural societies (Shinwari et al., 2003). Plants are vital sources of traditional medicines and used for the treatment of various ailments without having side effects these plants resources are easily affordable and accessible. Approximately 4,22,000 flowering plants reported from the world, more than 50,000 have been used worldwide for medicinal purposes (Walter and Hamilton, 1993) and from Pakistan 6000 plant species have been documented among which only 600 plants have been reported for ethno medicinal studies (Shinwari et al., 2003). These medicines are safe and environment friendly (Prasad et al., 2013). Ethno medicinal investigations have established emphasis on the relationship between the plants uses and ethnic communities (Verpoorte et al., 2005). It is therefore imperative to increase ethno medicinal studies in order to preserve this valuable knowledge before its extinction (Khan et al., 2011).

Digestive disorders are the complaints of digestive tract i.e., food and liquid absorption, digestion, or defecation (Neamsuvan et al., 2012). It is because of lack hygienic condition, and malnutrition (Tariq et al., 2015), nature of food that we consume and it's incompatibility with our constitution (Zaidi et al., 2009; Khan et al., 2013), eating impenetrable, unnecessary or uneven foods, imbalanced and spicy diets and adulteration of food and contamination of drinking water (Khan and Ahmad, 2015). Causes of such disorders include various kinds of bacteria, viruses and parasitic organisms (Mathabe et al., 2006; Karki and Tiwari, 2007), like rotavirus, *Helicobacter pylori*, *Salmonella*, *Shigella* and *Escherichia coli* (Zaidi et al., 2009; Khan et al., 2013) *Vibrio cholerae*, *Aeromonas*, *Pseudomonas*, *Campylobacter*, *Klebsiella*, and *Staphylococcus aureus* (Acharyya et al., 2009). Approximately 103 million people in Pakistan with an annual growth rate of 3% (Woods, 1991). Major health risks in Pakistan are extensive communicable diseases, insufficient sewage systems and lack of pure drinking water (Mahmud et al., 1993; Motarjemi et al., 1993). The high infant morbidity and mortality rates reflect inadequate nutrition and exposure to polluted water (Woods, 1991). Some of the most common digestive disorder of Pakistan people faces in their day to day life are diarrhea, dysentery, colic and cholera (WHO, 2008; Dwivedi et al., 2006; Olajuyigbe and Afolayan, 2012; Tariq et al., 2015), acidity, constipation, dyspepsia and indigestion (Khan and Ahmad, 2015), stomach-aches, cramps, vomiting, to the complicated conditions such as cancer and gastric ulcer (Zaidi et al., 2009; Khan et al., 2013). Many of medicinal plants have not been screened for their phytochemistry and pharmacological action against microbes, which could support their use in traditional medicines (Tariq et al., 2015).

For the past about thirty two years, orally transmitted knowledge due to its economic value has been expanding and permitted the assemblage of such an important knowledge regarding medicinal plants actively investigated in less-developed areas such as Pakistan (Haq, 1983; Khan and Zaidi, 1991; Haq and Hussain, 1993; Bukhari, 1994; Hussain and Khaliq, 1996; Shinwari and Khan, 2000; Gilani et al., 2001; Sher, 2002; Hamayun et al., 2003; Hussain, 2003; Humayun, 2005, 2007; Gilani et al., 2001, 2006; S.J. Qureshi et al., 2008; Afzal et al., 2009; Ahmad et al., 2009; R.A. Qureshi et al., 2009; Abbasi et al., 2010a, 2010b, 2010c; Hazrat et al., 2011; Shah et al., 2012, 2013; Akhter et al., 2013; Shah et al., 2013; Saqib et al., 2014; Ijaz, 2014; Ahmad et al., 2015; Butt et al., 2015; Ijaz et al., 2015, 2016; Kayani et al., 2015; Khattak et al., 2015). The traditional culture and the natural ecosystem of these regions have been relatively well conserved. Since orally transmitted traditional knowledge is possessed by older generation, most of it can disappear severely following their deaths (Kim et al., 2006; Kim and Song, 2008). However, no single ethno medicinal study has been conducted in Manoor Valley (Remote Valley), Mansehra, Pakistan and the main reason of its un-exploration till now is its geographical isolation, very harsh climate, no road and transportation in whole valley, the jeep can move only up to 10 km of area and that is also very hard/difficult even a weak hearted person can not travel for a single km.

The present study was the first effort to target digestive disorders and their traditional treatments in an unexplored remote valley (Manoor Valley) of Khyber Pakhtunkhwa where these diseases and infections were found most common. The main purpose of the study was to explore, conserve and document the first ethno medicinal survey and traditional drivers knowledge against digestive disorders of the study area and to show the important medicinal plants for future biological, phytochemical and pharmacological experimentations regarding digestive problems. The available literature shows that such studies can constitute the starting point for the development of new drugs (Bibi et al., 2011; Shinwari et al., 2013).

2. Materials and methods

2.1. Study area

The Manoor Valley (Remote valley) is in District Mansehra. It is reached from the main Kaghan Valley road at the junction 'Mahandri' and is about 50 km north of Balakot (Fig. 1a). The community in the Manoor Valley has multiple urgent needs resulting from economic poverty, geographical isolation and very poor provision of health, education and communication services. The research work cannot address all these issues but hopes to make a significant impact on a number of key indicators for the health of the valley community. Badal gran, Baikri, Banda, Bhattan, Bela, Bishla, Munshian Sehri, Kundian Harian, Shikaran, Buttan, Dogan, Challi, Jabra, Chari, Bairi, Gran, Kattha Raiter are major villages of Manoor valley (Fig. 1b).

The Valley is full of natural resources and sceneries but many factors like no transportation, health care centers, electricity, markets, schools etc as well as environmental factors like harsh climate, heavy snow fall, wild carnivores (Bears and leopards) and no agricultural lands are their due to which it did not gain any importance yet. For data collection several visits were made on the basis of seasonal variation to different areas of Manoor Valley, Mansehra.

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