Journal of Ethnopharmacology ∎ (∎∎∎∎) ∎∎∎–∎∎∎

Contents lists available at ScienceDirect

Journal of Ethnopharmacology

journal homepage: www.elsevier.com/locate/jep

Ethnobotanical uses of medicinal plants in the highlands of Soan Valley, Salt Range, Pakistan

Sadia Bibi [a], Jawairia Sultana [a], Humairia Sultana [b]

[a] Department of Environmental Sciences, Faculty of Biological Science, Quaid-i-Azam University, Islamabad, Pakistan
[b] Department of Agriculture and Food Systems, Melbourne School of Land and Environment, The University of Melbourne, Parkville 3010, VIC, Australia

ARTICLE INFO

Article history:
Received 26 January 2014
Received in revised form
5 May 2014
Accepted 8 May 2014

Keywords:
Ethnobotany
Medicinal plants
Herbalists
Communities
Disease
Traditional use

ABSTRACT

Ethnopharmacological relevance: Two thirds of the world's population relies on medicinal plants for centuries for several human pathologies. Present study aimed to identify, catalogue and document the large number of medicinal plants used in traditional medicine in Soan Valley, Salt Range, Pakistan.
Materials and methods: Informal interviews were conducted involving a total of 255 villagers (155 male and 65 female and 35 herbalists) to elicit the knowledge and use of medicinal plants.
Results: Local communities possessed knowledge of fifty eight (58) medicinal plant species belonging to thirty five (35) families to treat fifteen ailment categories. Whole plant and leaves were the most frequently used plant parts (24%) followed by seed (14%), root (12%), flower (7%), bulb (6%), fruit (4%), stem (3%), latex and rhizome (2%) and sap and gum (1%). Frequently used growth forms of medicinal plants were wild herbs (63%) followed by cultivated herbs (14%), wild trees (11%), wild shrubs (10%) and wild and cultivated herbs (2%). Preparations were administrated generally through oral and topical routes. Local people were familiar mostly with the species in order to deal common ailments particularly cough, cold, digestive problems, fever, headache, and skin infections. Complex ailments were treated by traditional healers. *Justica adhatoda*, *Olea ferruginea*, *Amaranthus viridis* and *Mentha royleana* were identified as plants with high use value (UV).
Conclusions: This study revealed that the area harbors high diversity of medicinal flora. Despite gradual socio-cultural transformation, local communities still hold ample knowledge of plants and their uses. The reliance on traditional medicines was associated with the lack of modern health care facilities, poverty and the traditional belief of their effectiveness. Medicinal plants play a significant role in management of various human diseases in the study area. A high degree of consensus among the informants was an indicative that plant use and knowledge were still strong, and preservation of this knowledge showed good foresight in the future. Awareness was thus needed to be raised among local people on sustainable utilization and management of plant resources.

1. Introduction

Ethnomedicinal investigations are imperative in illuminating significant indigenous plant species, primarily for finding new rudimentary drugs. Documentation of aboriginal medicinal knowledge of plant species has contributed to a number of modern drugs formulations for basic health care (Cox, 2000; Flaster, 1996). World Health Organization (WHO) (2010) estimated about 60% of the world's population in developing countries rely on plants for the treatment of various diseases, due to lack of modern health care facilities (Calixto, 2005; World Health Organization, 2010). In rural communities, medicinal plants gained attention because of their effectiveness, lack of modern medical alternatives, increasing costs of allopathic medicines, and cultural preferences (Heinrich, 2000; Tabuti et al., 2003a). Many rural people hold traditional knowledge of medicinal plants and the very fact existence of such local knowledge is dependent mainly on verbal transmission across generations (Joshi and Joshi, 2000; Tabuti et al., 2003a). Exposure to contemporary culture and access to modern amenities are altering the circulation and extent of local knowledge and use of medicinal flora in many local societies.

Research on traditional use of medicinal plants has attained considerable interest within the scientific community in recent years (Jabbar et al., 2007). Uses of folk medicines have increased substantially in industrial countries, as numerous drugs have been derived from the tropical flora (Nanyingi et al., 2008). Estimates suggest global medicinal plant business will reach $ 5 trillion (US) by 2050 (Shinwari, 2010).

Presently drugs available in the market are either plants derivative in crude extract, simplest form of plant part or the

http://dx.doi.org/10.1016/j.jep.2014.05.031
0378-8741/

mixture of various plants parts (Saqib et al., 2013). About two centuries ago herbal medicines subjugated the pharmacopoeia, and even today about 25% drugs available in Western pharmacy are either plant derived or formulated based on their prototype substances (Ernst, 2005; Gilani and Rahman, 2005; Mahmood et al., 2011a, 2011b, 2011c). According to WHO, among 252 drugs essential for basic health care, 11% are from plant origin (Rates, 2001). Out of the total 422,000 flowering plants reported worldwide (Govaerts, 2001) about 50,000 flowering plants were used as medicinal plants (Schippmann et al., 2002). Out of these, only 5000 plants had been screened phytochemically in order to explore their active constituents, while only preliminary pharmacological investigations had been carried out for the rest of the plants (Mahmood et al., 2011a, 2011b, 2011c; Payne et al., 1991).

In Subcontinent first record of plant medicine was compiled in Rig Veda between 4500 and 1600 BC and Ayurveda between 2500 and 600 BC. This system traces its origin to Greek medicine, which was adopted by Arabs and then spread to Europe and Subcontinent. The subcontinent gained tremendous importance from ethno medicinal point of view, and diminutive consideration has been given to the ethnomedicinal values of medicinal plants in Pakistan. The field of ethnobotany was virginal in Pakistan (Mahmood et al., 2011a, 2011b, 2011c). Even though, few efforts had been made to investigate the medicinal properties of indigenous medicinal plants species (Ahmad and Husain, 2008; Husain et al., 2008; Qureshi et al., 2006, 2009; Mahmood et al., 2011c, 2011d, 2012, 2013b; Saqib et al., 2013) but a large number of medicinal plants and associated indigenous uses still remain undocumented. Further meticulous and outfitted surveys are needed to protect the pharmaceutical and ethnomedicinal knowledge from loss. Ethnomedicinal survey is a suitable approach to select plants for detailed pharmacological screenings (Sarić-Kundalić et al., 2010).

In Pakistan, ethno medicines have been practiced at large scale but, unfortunately, this knowledge is not being properly documented due to unawareness of local communities and authorities of the area where medicinal plants grow. There exists no detailed report on ethnomedicinal knowledge of plants from the Soan Valley, Salt Range, Pakistan. Local people in study area are unaware of the conservation of medicinal plants and remain ignorant of any threat faced by medicinal plants e.g. over cutting for fuel wood consumption, careless uprooting of medicinal plants and heavy grazing. Ruthless use of these plant resources will result in loss of valuable flora (Ahmad et al., 2007, 2008a, 2008b). Protected areas of the valley were badly invaded by invasive species, e.g. *Prosopis* species introduced in the Sodhi Game Reserve, was a threat to the subsistence of important local vegetation predominantly medicinal flora (Ahmad and Waseem, 2004).

The present study aimed: (1) to investigate and document the indigenous knowledge of commonly used medicinal plants from Soan Valley, Pakistan (2) to establish a baseline data for further comprehensive investigations on bioactive compounds (3) to save the indigenous medicinal knowledge.

2. Materials and methods

2.1. Study area

The study area (Soan Valley, Salt Range) is located along 72°00 and 72°30E and 32°25 and 32°45N, at an altitude of 762 m above sea level (Fig. 1). Salt Range Escarpment is a thrust between the foothills of Himalayan Mountains and Indus plains extending from the Jhelum River near Tilla Jogian in the east to the Indus River near Kalabagh in the west (Frisina et al., 2001). The highest point on the range is Sakeesar (5010 ft); throughout its length, the salt range shows a typical aspect of having steep cliffs to the south, but in the north descending gently to the plateau. Valley is cold, dry and wind exposed area surrounded by mountain covered with scrub forests and isolated from the rest of the area of district Khushab and Mianwali. A great diversity of plants is found throughout the valley. The unique habitat has diverse geological and ecological conditions with its own culture and traditions. Since last decade, the impact of climate change is very evident in the reign; valley is facing a problem of considerably low annual rainfall of 20 in. which caused lowering of water table and severely affected vegetation of the area, long periods of drought are frequent whereas winters are accompanied by frost (Ahmad, 2002, 2012). Last eight year metrological data showed that there were long dry spell in the area posing vigorous impacts on the vegetation and environment (Ahmad, 2012). Soan Valley held an important position among the ecological regions of Pakistan due to Ucchali Wetlands Complex and richness of its biodiversity. The Ucchali Wetlands Complex, constituting Ucchali, Khabbeki and Jahlar Lakes, had been designated as Wetlands of International Importance under the Ramsar Convention, a distinction it shares with only eighteen other wetlands in Pakistan. The three lakes of Ucchali Wetlands Complex were situated inside a cup shaped valley, while Namal and Kalar Kahar are located on its periphery.

In Soan Valley, there were 22 villages, out of which eighteen were included in the study area (Villages Chitta, Kotali and Ugali are very small settlements and located very close to each other so these three are considered one; similarly, Dhadhur and Makromi are also located very close to each other and sampled collectively). The important tribes living in the study area were Awan. Socio-economic conditions of the area presented a picture of excessive population pressure combined with intensive use of natural resources for livelihoods and daily needs. All land in the valley was privately owned, including the lake beds, which became available for cultivation when the water level had receded. Principal crops grown in the area were wheat in winter and vegetables in the summer. Wetlands provided a crucial source of irrigation in this essentially semi-arid zone. Grazing pressure in the region had badly eroded most communal grazing areas. Wood extraction was undertaken extensively both for the domestic fuel market and supply to urban centers. The effects of deforestation on both shamilat (community forests) and government forests had been extensive.

2.2. Data collection

The study was conducted during March 2012 to September 2012. A total 35 herbalists (Hakims) were identified via rapid appraisal approach (RAA). RAA was hard to quantify but provide valued insight into the variety of dimensions and expertise of the local community with indigenous herbal medicines. RAA was based on direct interaction with local inhabitants and observation during the field visits (Martin, 1995). Open ended approaches i.e. interviews and group meetings highlighted various issues, however, the RAA was easy to adopt and allowed valid participation at local level. Interviews, group discussion with knowledgeable persons and individual meetings with herbalists were also held in order to get deep insight and to collect more precise and data on indigenous medicinal knowledge. During the course of study, 255 key informants were interviewed (155 men (agricultural background), 65 women (from agricultural background) and 35 herbalists) (Table 1). Information regarding the disease treated by medicinal plant, part(s) used, habit, mode of preparation, course of administration and dosage, vernacular name of plant(s) and status of plant species were recorded. A total of 58 plant species belonging to 35 families were documented. Interviews were made

Please cite this article as: Bibi, S., et al., Ethnobotanical uses of medicinal plants in the highlands of Soan Valley, Salt Range, Pakistan. Journal of Ethnopharmacology (2014), http://dx.doi.org/10.1016/j.jep.2014.05.031