Research Paper

Quantitative ethnomedicinal study of plants used in the Nelliyampathy hills of Kerala, India

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ABSTRACT

Ethnopharmacological relevance: Inspite of tremendous advances made in allopathic medical practices, medicinal plants have played an important role throughout the world in treating and preventing a variety of diseases and hence there is urgency in recording such data. This is the first ethnobotanical study in which statistical calculations about plants are done by the Pearson correlation coefficient (PCC) method. The present study was aimed to identify plants collected for medicinal purposes by the traditional healers of Nelliyampathy hills, located in Palakkad district of Kerala, India and to document the traditional names, preparation and uses of these plants.
Methods: The field study was carried out over a period of 2 years (2011–2013) using semi-structured interviews with 66 informants (most of the informants belonged to an age between 50 and 70 years) in six remote locations in the hills. Ethnomedicinal data was analyzed using frequency citation (FC), relative frequency of citation (RFC) and use value (UV) along with a Pearson correlation coefficient (PCC). Demographic characteristics of participants, ethnobotanical inventory of plants and data on medicinal application and administration were recorded.
Results: A total of 85 medicinal plants belonging to 49 families were reported to be used against 19 different ailments in the hills. The maximum reported medicinal plant families were Cucurbitaceae with 6 species followed by Acanthaceae, Malvaceae and Fabaceae (each 5 species), Asteraceae, Lamiaceae, Moraceae and Myrtaceae (each 3 species), the most dominant life form of the species includes herbs (42) followed by tree (20), climber (15) and shrub (8), the most frequent used part was leaves (40%) followed by root (14%), seed and flowers (each12%), fruit (9%), bark (7%), stem (2%), latex (2%), rhizome and whole plant (each 1%), the most common preparation and administration methods were paste (32%), powder (22%), decoction and juice (each 20%) and raw (4%), infusion and inhalation (each1%). The Pearson correlation coefficient between RFC and UV was 0.638 showing highly positive significant association.
Conclusions: In this study, we have documented considerable indigenous knowledge about the native medicinal plants in Nelliyampathy hills for treating common ailments. The plants such as further investigated phytochemically and pharmacologically which leads to natural drug discovery development may be based on the present study. The study has various socioeconomic dimensions which are associated with the local communities.

1. Introduction

India has about 8% of the world's biodiversity on 2% of the earth's surface area, making it one of the 12 mega-diversity centre of the world, due to the species richness and level of endemism recorded in the various agro-climatic zones of the country. In reported that there are more than 17,209 different kinds of flowering plants, out of which more than 7918 plants have medicinal values in India (Basu, 1994). India is inhabited by more than 550 ethnic/tribal communities, consisting about 8% of the total population of the country. It has been estimated that about 15% of the total geographical area of the subcontinent is covered by nearly 5000 forest dominated tribal villages (D'Rozario et al., 2004). In this respect, India is considered as a great repository of ethnobotanical wealth. But, traditional knowledge base and practices have been marginalized due to political and socio-economical reasons. Off late, interest in traditional medicine has been initiated to explore the knowledge base from various tribal groups across the country (Jain and Patole, 2001; Pei, 2001; Ignacimuthu et al., 2006; Sandhya et al.,

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2006; Ragupathy and Newmaster, 2009). Several studies have related that tribal population in remote area, not only depend on plant based resources for medicines, food, forage, and fuel, but also play a vital role in the management of natural resources (Ignacimuthu et al., 2006; Ragupathy et al., 2008; Ragupathy and Newmaster, 2009). Tribal communities in Kerala meet their health-care needs by using non-timber minor forest products and pre-parations based on traditional knowledge. Further, it has been established that herbal drugs obtained from plants are safe in treating various ailments with few side effects (Morvin Yabesh et al., 2014).

Nelliyampathy hills are located in the Palakkad district of Kerala. Palakkad is one of the 14 districts in Kerala and also the richest state in India in terms of plant diversity; traditional healing systems are still popular here. The richness of Nelliyampathy hills flora is based on geographic, climatic, topographic and edaphic factor. The tribal region (traditional healers) is the remote area of Kerala where the people have no urgent access to modern medicinal facilities. Therefore, the traditional medicines are the preferred for such people. There is no hospital for intimate treatment of people in the remote area of Nelliyampathy hills, and people rely on indigen-ous medicinal plant for basic health care treatment. So far no systematic ethno botanical survey has been made in this area and this is the first report on the medicinal plants used by the local traditional healers.

The present study was aimed (i) to compile the ethnoflora with traditional medicinal applications of the Nelliyampathy hills for the scientific community, (ii) to assess quantitatively the ethno-medicinal data using RFC and UV indices in order to look for most cited and used species which have not been previously reported on medicinal uses that may provide baseline data for future evaluation regarding their pharmacological and clinical screening.

2. Materials and methods

2.1. The study area and ethnobotanical survey

Nelliyampathy hills occupy Palakkad districts of Kerala (Southern western Ghats) and cover an area of 285 km² and lies between 10.53″ N latitude and 76.68″E longitude (Fig. 1). The vegetation is floristically rich compared to other regions of Western Ghats and represents several unique habitats. The study was conducted in 8 villages of Nelliyampathy hills (Ayilur, Elavancheri, Kairady, Kollengode, Mutha-lamada, Nemmara, Thiruvazhiyad and Vandazhy) forest management plan by-laws.

2.2. Data collection

The study area was investigated to get information from local traditional healers having practical knowledge of medicinal plants. The healers from 8 villages were interviewed during September 2011 to August 2013. During the course of the study, six field trips were carried out in the study area and for that totally 60 days were spent with the local traditional healers. Methods of selecting informants depended upon the distribution of local people having sound knowledge. They were requested to collect specimens of the plants they know or to show the plant species on site. These informants were traditional healers themselves or had tradition of healing in their families and had knowledge of the medicinal use of the plants. The wealth of medicinal plant knowledge among the people of this district is based on hundreds of years of beliefs and observations. This knowledge has been transmitted orally from generation to generation. However it seems that it is vanishing from the modern society since younger people are not interested to carry on this tradition.

2.3. Ethnomedicinal data collection and ethnographic composition

A total of 66 informants with a different age range were randomly selected for interviews. A total of 38 men (58%) and 28 women (42%) were interviewed. The informants were divided into two age groups (1) 41–60 and (2) 61–80 years old. Most of the informants belonged to an age between 50 and 70 years. Primary local language spoken in the area is Irula (90% of the population) while the other locally known languages include Malayalam, Kan-nada and Tamil. The selection of informants was mainly based on their rich indigenous knowledge and long term experience of utilization of plants. Field surveys mainly comprised, general meet-ing, male interviews, female interviews, local herbalist's interviews and transect walk. The semi-structured questionnaire based inter-views were begun with informants after explaining the aims of the study. The informants were asked various questions about their traditional local name, life form, illness treated, part used and the method of preparation and administration. Interviews were gener-ally conducted in the local language of Tamil and Malayalam. In order to collect detailed information relating to herbal medicine inhabitants of the community were requested to share the knowl-edge of medicinal plant utilization in local language. All interviews were conducted with the assistance of native translators in their local language. All documented data were then translated into English.

2.4. Preservation of plant specimens

Standard method was followed with record to collection of plant materials, drying, mounting, preparation and preservation of plant specimens (Jain, 1964). Voucher specimens of medicinal plants in triplicate were collected prepared and identified. Plants with their correct nomenclature were arranged alphabetically by family name, vernacular name and ethno medicinal uses. The identification and nomenclature of the listed plants were based on The Flora of Presidency of Madras (Gamble, 1935) and The Flora of Tamil Nadu Carnatic (Matthew, 1983). They were later verified at Botanical Survey of India, Southern Circle, Coimbatore, India. The voucher specimens were deposited in the herbarium of Pushpam Herbarium Cabinet (PHC), A.V.V.M Sri Pushpam College, Poondi, Thanjavur.

2.5. Socio-economic conditions of Nelliyampathy hills

The flora of the Nelliyampathy is very diverse with many medicinal plants with useful pharmaceutical values and a number of economically important species of wild plants. Biodiversity is a significant natural resource for the socio-economic welfare of the people of the hills. Wild plant species and traditional medicine were one of the economical sources for the local communities. Animal and plant communities supported the development of early popu-laces of this region for centuries, providing the base for the evolution from hunting to forestry, agriculture, animal husbandry and now tourism and trade. The narrow hills and high mountains kept Nelliyampathy physically isolated which forced indigenous people to depend on local biodiversity for food and other essential needs. Continuing use and maintenance of biological diversity is important to the people of Nelliyampathy. Economic development of Nelliyampathy depends on management of high diversity of crops, maintaining high pastures, raising fodder species in varied mountain environment and development of livestock biodiversity and medicinal plants. These will be the feasible options for ensuring food security and generating cash income of the people of the hills.