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Documentation and quantitative analysis of the local knowledge on medicinal plants in Kalrayan hills of Villupuram district, Tamil Nadu, India

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ABSTRACT

Ethnopharmacological relevance: The aim of the present study was to document the medicinal plants by the traditional medical practitioners from Kalrayan hills of Villupuram district in Tamil Nadu, India. Quantitatively analyses of the data were made to acquire some useful leads for further studies.

Materials and methods: Successive free listing was the method adopted for the interview. In this study, 54 traditional healer medical practitioners were included and their knowledge on medicinal plants was gathered. The data were assessed with the help of two indices viz., informant consensus factor (F_{ic}) and Informant Agreement on Remedies (IAR).

Results: The present survey is in accordance with some of the aspects of our previous surveys. Regarding the demography of the informants, it exhibited unevenness in male–female ratio and majority of the informants were poorly educated. Practicing this system of medicine as part time job by majority of the informants might indicate the reduced social status of this medicinal system. The present study had recorded the usage of 81 species, which in turn yielded 1073 use reports. The major illness category 'aphrodisiac, hair care and endocrinal disorders' hold a high F_{ic} values. Among the other illness categories, gastro-intestinal ailments, genito-urinary ailments and dermatological infection ailments have a high percentage of use reports. Eye ailments, general health, kapha ailments, psychological ailments and skeleton muscular system ailments were the other illness categories with high F_{ic} values. Some of the claims viz., *Argyrolobium roseum* (aphrodisiac ailments), *Rosa brunonii* (eye ailments) *Hibiscus surattensis* (dermatological infections ailments), *Bauhinia variegata* (neurology Ailments), *Cotinus coggygria* (circulatory system/cardiovascular ailments) and *Uvaria narum* (gastro-intestinal ailments) which have relatively high consensus can be taken up for further biomedical studies, since no substantial studies have been conducted on them.

Conclusion: Based on the results of our present study, we have highlighted some claims which are at high use in the study area but having little scientific support. Studies on such claims will provide scientific base to some extent which in turn will be useful to improve the health of indigenous people.

1. Introduction

According to World Health Organization (WHO) up to 80% of the populations in some developing countries use traditional medicine (WHO, 2008). Traditional herbal medicine is still an important component of healthcare in India. India is the second largest country in the world with over one billion with diverse socio-cultural backgrounds. It accounts for 16% of the world's population and holds 21% of the world's global burden of diseases. The impact of traditional systems of medicine in the public healthcare system of India is substantially high and medicine is intimately interwoven with religiosity and ethnicity (Broom et al., 2009).

Traditional medicine in Tamil Nadu was previously called as *Thamzhil maruthuvam* (=Tamil medicine) and term *siddha* medicine was coined after 1923 by the British (Sebastia, 2011). The *Siddha* system of traditional medicine is being practiced majorly in Tamil Nadu and in places where the Tamil people live. Evidence has shown that from around 3rd century BC onwards the ancient *Tamils* had developed their own literature and had maritime relationships with other parts of the world (Gaur and Sundaresh, 2006). The names of some literature belong to *sangam* period (300 BC–300 AD). *Thrikadugam, sirupanchamoolam* and *elathi* are some

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medicinal formulations that are still in use. Likewise, the 95th chapter of *thirukural* (a Tamil classic) deals with principles of medicine and food (Pope et al., 1982) *purananuru* (a Tamil classic) mentions about the antiaging effect of *Phyllanthus emblica* (Mudaliyar et al., 1983). The literatures used in contemporary *Siddha* practices started from 4th–5th century AD and become predominant in 16th century; however the elements of healing practices emerged earlier (Zysk, 2008).

The traditional *Siddha* practitioners enhance new formulas, test them and pass the effective formulations to the next generations (Sujatha, 2011). These methods are poorly documented and analyzed. Quantitative measures of ethnobotany are believed to uncover the cultural truth or the generalized knowledge (Vandebroek, 2010). These quantitative approaches measure the degree of consensus on the usage of a particular medicinal plant. The consensus analyses have been used to test the falsifiable hypotheses on the use of plants and also as a tool for selecting medicinal plants for further research program (Canales et al., 2005; Case et al., 2006); thus such quantitative approaches are helpful to abstract the results of a ethnobotanical survey to get an excellent information (Mutheeswaran et al., 2011).

The present survey is aimed to document the knowledge of traditionally trained healers in Kalrayan hills of Villupuram district in Tamil Nadu, India on medicinal plants and to quantitatively analyze it. Quantification of data was done primarily to identify potential plant species for further biomedical studies and also to know the groups of plant species that were highly used, held high IAR and had consensus.

2. Materials and methods

2.1. Description of the study area

Villupuram district lies between 11 38′ 25″ N and 12 20′ 44″ S: 78 15′ 00″ W and 79 42′ 55″ E with an area of 7194 sq Km. The Kalrayan hills in the north represents a continuous range of hills covered with some thorny forests and vegetation. It is surrounded on East and South by Cuddalore district. West by Salem and Dharmapuri districts and on the North by Thiruvannamalai and Kanchipuram districts. Villupuram is the largest district in the state. It is divided into 22 blocks. The district has a population density of 482 inhabitants per square kilometer and has a sex-ratio of 987 females for every 1000 males. The literacy rate of Vilupuram district is 72.08. Nearly 38% of the study area is the forests of Eastern Ghats (Fig. 1).

2.2. Data collection

The field surveys were conducted between May 2012 and September 2013 in Kalrayan hills of Villupuram district. A total of 200 field days was spent to gather the data. Traditional healer medical practitioners were identified by interviewing the elderly people in Villupuram district. The practitioners who had been practicing for more than 2 years were included in the survey. In the first visit, the purpose and nature of the project were explained to each practitioner in a simple language, to get prior informant consent. After establishing a clear consent from them, formal interviews were conducted from the second visit onwards. In this study, 54 traditional healer medical practitioners were included and their knowledge on medicinal plants was gathered. The interviews were conducted in the local language *'Tamil'* and the documentation of the data in the field was also done in the local language.

Successive free listing was the method adopted for the interview (Heinrich et al., 2009). The interview consisted of two parts. The first part dealt with the demographic profile of the informants which included the name, gender, age, professional experience, educational status and occupation. The second part dealt with their medicinal plant knowledge. The informants were asked to describe the medicines that were given by them with their mode of usage. The details regarding the parts used, dosage, mode of preparing the medicine, duration and the illnesses treated were recorded in this part. Furthermore, the informants were asked to describe the symptomatology of illnesses.

2.3. Herborization

All the species cited as medicinal were collected from the field at reproductive stage, with the help of informants in duplicate. A field sheet was recorded with collectors name, vernacular name, local abundance and ecological parameters. The herbarium samples were dried, processed, identified taxonomically and the names were confirmed with the help of regional floras (Nair and Henry, 1983; Henry et al., 1987, 1989; Gamble, 1997; Mathew, 1999) and International Plant Names Index (2010). The voucher specimens were deposited in the herbarium of Pushpam Herbarium Cabinet, A.V.V.M Sri Pushpam College, Poondi, Thanjavur.

2.4. Analysis of data

2.4.1. Conversion of data into use reports (UR)

The data gathered in the field were translated into English in the laboratory. Then, the data were converted into a basic structure, UR.

UR can be described as informant (i) mention the use of a species (s) for the treatment of a use (illness) category (u). In the present study we have followed the following method to convert the data into use report. If species 'A' was recommended for the treatment of illness category '*x*'. It was considered as one UR. If species 'A' was recommended for the treatment of illness categories '*x*' and '*y*' then it was considered as two reports. If a mixture of species 'A' and 'B' was used for the treatment of illness category '*x*', it was considered as two reports (i.e. species 'A' for the treatment of '*x*' and species 'B' for the treatment of '*x*'). If a mixture of species 'A' and 'B' was used for the treatment of illness categories '*x*' and '*y*', it was considered as four (2×2) use reports. By this way, all the data were converted into UR. The URs were then abstracted into claims. The definition of 'claim' is similar to that of UR, but it does not include the factor 'informant' (*i*). If a species 'A' was mentioned for the treatment of an illness category '*x*' by two informants, it was considered as two UR, but as one claim.

The illnesses reported by the informants were grouped on the basis of their *emic* perceptions. *Vadha* (musculoskeletel) ailments consist of illnesses such as paralysis, polio myelities and arthritis regardless of their etiology. The illness category, *pitha* includes ailments such as hypertension, giddiness, vomiting, insomnia, restlessness and burning sensation. The illness category, *kapha* includes diseases of pulmonary and respiratory origin (Murugesa mudhaliar, 2006).

The illness category, *Megha* includes different kinds of genitourinary diseases mainly of infectious origin. The illness category, ailments of women, included various disorders of female reproductive system. Gastrointestinal ailments included the medicines used for gastrointestinal problems other than that prescribed as appetizers. According to the healer's perceptions, skin allergies were considered to be caused by the presence of toxins due to unknown bites of some insects in childhood. But, in this study we have grouped skin allergies under dermatological ailments, because it seems to be more appropriate. After the conversion of the data into use reports, quantitative analysis was carried out on two indices.