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Ethno-botanical survey of medicinal plants used for the treatment of diarrhea and dysentery

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Traditional uses of medicinal plants in healthcare practices are providing clues to new areas of research; hence their importance is now well recognized. However, information on the uses of indigenous plants for medicine is not well documented from many rural areas of Tamil Nadu including Kanyakumari District. The study aimed to look into the diversity of plant resources that are used by local people for curing diarrhea and dysentery. Questionnaire surveys, participatory observations and field visits were planned to elicit information on the uses of various plants. It was found that 50 plants species are commonly used by the local people for curing diseases. In most of the cases (27.57%) leaves were used. The knowledge on the total number of medicinal plants available in that area and used by the interviewees was positively correlated with people's age, indicating that this ancient knowledge tends to disappear in the younger generation.

Key words: Indigenous plants, traditional uses, questionnaire, diarrhea, dysentery.

INTRODUCTION

India is one of the 12 mega biodiversity countries in the world and has 17,000 flowering plants of the designated 25 hotspots in the world - the Eastern Himalaya and the Western Ghats are 2 of such hot spots in India. In India 550 ethnic tribes have rich traditional and indigenous knowledge on the use of medicinal plants (Alagesaboopathi, 2011). The western-ghats region of Kanyakumari district is a great emporium and treasure house of ethno-botanical wealth. Traditional medicines offer a vast scope for medicinal research. With the rapid intrusion of modern civilization the ancient tribal tradition and culture is on the verge of extinction. Based on the ethno-botanical studies, many alkaloids and other important chemicals are being isolated from plants by using better techniques of chemical analysis and isolation methods (Rajith and Ramachandran, 2010). Medicinal plants have been used as sources of medicine in

virtually all cultures (Baquar, 1995). During the last decade, the use of traditional medicine (TM) has expanded globally and is gaining popularity. It has continued to be used not only for primary health care of the poor in developing countries, but also in countries where conventional medicine is predominant in the national health care system (Lanfranco, 1999).

According to WHO, herbal medicines serve the health needs of about 80% of the world's population, especially for millions of people in the vast rural areas of developing countries (WHO, 2001). Plants have formed the basis of sophisticated traditional medicine systems that have been in existence for thousands of years and continue to provide mankind with new remedies.

Despite the fact that a large number of clinical agents have been developed by the pharmaceutical industry, indigenous phytotherapy is still practiced in many rural areas, using treatments handed down from generation to generation. The World Health Organization (WHO) has emphasized the importance of the traditional indigenous medicines, since a large majority of rural people in the developing countries still use these medicines as the first

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defense in health care (Goleniowski et al., 2006). Globally, about 85% of all medications for primary health care are derived from plants (Farnsworth, 1988).

Out of the total 4, 20,000 flowering plants reported from all over the world (Govaerts, 2001) more than 50,000 are used for medicinal purposes (Schippmann et al., 2002). In India, more than 43% of the total flowering plants are reported to be of medicinal importance (Pushpangadan, 1995). Utilization of plants for medicinal purposes in India has been documented long ago in ancient literature. However, organized studies in this direction were initiated in 1956 (Rao, 1995) and of late, such studies are gaining recognition and popularity due to fading of traditional knowledge and reducing plant population.

The present study investigates the medicinal efficacies and methods of plant utilization in the forest areas of Kanyakumari District. The results add new data to the ethno-pharmacological literature and provide information that could be essential for the development of food medicine and new drugs. Finally, this study should stimulate interest in ethno-pharmacological studies.

MATERIALS AND METHODS

Study area

Kanyakumari Forest Division constitutes the southern tip of Western Ghats. The total area under Reserved Forest area is 1, 684 km² with a total area of 1, 67,214 ha, where forests occupy an area of 50,486 ha, which is 30.2% of the total geographical area of the district. The forest consists of soaring lofty trees, deep valleys, rippling waterfalls, rich flora and fauna and ideal picnic spots. The Western Ghats is one of the biodiversity hot spots in the world.

Survey

In order to assess the consumption of indigenous medicinal plants, survey was carried out during the year, 2008 to 2009 in the forest areas of Kanyakumari district. To get maximum information the survey was widened diagonally during the rainy season. The information on medicinal uses of the indigenous plants has been described after gathering it from local people, experienced aged rural folk, traditional medicine practitioners, local herbal drug sellers and comparing it with the available literature. A total of 67 inhabitants were interviewed by random selection. In addition, direct plant observation and identification was done with the help of local healers. A structured questionnaire was used to collect data on local plant names, uses, parts used, and modes of preparation and administration. Samples of

recorded herbs, twigs of shrubs and trees were identified in the field with the help of local guides and literatures.

Method of medicinal plant collection

The medicinal plants are usually collected during the seasons when they are available in plenty. For instance, tubers were collected during the Tamil month of 'Karthigai' (that is, between mid-November and mid-December). Nut and seed collection was done during the hot season when the plants fruit before the South West monsoon, between mid - February to April. Barks were collected during monsoons so that the trees will suffer least damage as they get rain and nutrition owing to rainfall, enabling the damaged areas to regenerate with in a quick span of time. Small herbal plants and creepers were collected just after the rains, when the plants are robust and healthy.

The collected items were dried usually in shade and stored in various containers. Plants were collected mostly during the morning hours as a community operation, going in groups of six to eight persons. When underground parts like rhizomes are collected, a portion of the rhizome is always left in the soil for regeneration or for replanting. Other plant parts such as leaves, barks and fruits are collected only in required quantities, thus minimizing over exploitation of natural resources.

A special mortar and a pestle made of stone or wood or dried parts of animal bones were used for preparing the medicines. The dosage and duration of treatment of these drugs vary from one to another. They strictly follow the collection time of plant material, plant part, storage technique and method of preparation.

In addition, direct plant observation and identification were done with the help of local healers known as 'Maruthuvar'. A structured feedback form (show a sample) was used to draw information from the resource persons using standard methods. Information on medicinal plants, local name, plant parts used and mode of administration for curing diseases has been recorded. Plants collected during the surveys were identified with the help of published regional flora (Gamble, 1918; Mathew, 1983).

RESULTS AND DISCUSSION

Many ethno pharmacological studies on plants used in human communities have been limited to specific geographical or administrative regions (Shinwari and Khan, 2000; Shrestha and Dhillion, 2003; Tabuti and Dhillion, 2003). Relatively few of these studies focused on communities with strong traditional cultures (De Feo, 2003; Singh et al., 2002; Giday et al., 2003). The survey

gathered information on 50 plant species reported by the informants for their medicinal use in diarrhea and dysentery (Table 1).

The collected plants were arranged in alphabetic order by providing the correct plant name followed by family, local name, parts used along with their medicinal uses. The reported species were distributed among 37 botanical families. Rutaceae (3 spp.) and Menispermaceae (3 spp.) was best represented in terms of the number of species, followed by Caesalpinaceae (2 spp), Acanthaceae (2 spp), Anacardiaceae (2 spp), Liliaceae (2 spp.), Lauraceae (2 spp.), Fabaceae (2 spp.), Euphorbiaceae (2 spp), Myrtaceae (2 spp.). All the medicinal plants were reported in their local names since the local communities know them only by their local names. Based on the life forms there are 36% herbs, 18% shrubs, 4% climbers/twiners and 42% trees (Figure 1).

The herbal specialists of this area collected the medicinal plants from their natural habitats at different seasons and prepared the plant products. The preparations range from decoction, paste, powder with the mixture of roots, tubers, leaves, stem, twigs. They were administered as respective medicine in appropriate doses in the patients. Almost all medicinal remedies were based on the preparation of a single plant, few of them in combination with other plant parts.

These people have mainly derived their livelihood from the forest since there is a high incidence of indiscriminate logging and cutting of trees and agricultural intensification as well as expansion. The threats and importance of this forest include: medium deforestation through logging for commercial purposes and firewood collection; forest grazing; crafts; medicine; rituals; shelter; and cosmetics and food, including honey gathering.

In this study, various parts of the plants were utilized in the preparation of herbal remedies used for the treatment of diarrhea and dysentery in this area. In majority of the species (27.57%) the medicine was obtained from the leaves and (17.24%) roots (Figure 3). Similar observations had already been recorded for other communities near forested areas, where vegetation is always green and leaves are abundant (Di Stasi and Hiruma-Lima, 2002). On the other hand, communities in dry regions tend to focus their attention on plant parts that are continuously available, such as the bark (Almeida and Albuquerque, 2000). As the plants in these localities are regularly exposed to long periods of drought and wherein they lose their leaves, bark and roots are more often used. The use of roots poses a much greater threat to the existence of an individual plant than the use of leaves or branches (Poffenberger et al., 1992; Abebe and Ayehu, 1993). This observed difference in usage of plant parts in different areas are interesting and should be more closely investigated.

The medicinal use of plants leaves and roots in the management and treatment of diseases has been an age long practice (Sofowara, 1982). Plant derived medicines are widely used because they are relatively safer than the synthetic alternatives, they are easily available and cheaper (Iwu et al., 1999). Plant remedies were prepared mostly as infusions or decoctions (Figure 2). Infusions were prepared on delicate parts of the plants, that is, leaves, flowers and stem buds. The advantage with this method is that many active principles are extracted with almost no alteration of their chemical structure thus preserving almost all their properties (George and Pamplona, 2000). Decoctions on the other hand were used to prepare herbal teas from the hard parts of the plants (root, rhizome, seeds and stem barks). It was observed that some plants were prepared using more than one method and in some cases more than one plant part was used.

Medicinal plants and their uses in the indigenous medicine are well known to many Indian communities. The recent trend has been to blend the traditional knowledge with modern health care practices to provide effective health care services to a wider population (Chetna and Anoop, 2009). The basic ingredients in the traditional medicine are the medicinal plants, which are depleting at a faster rate due to increase in consumption and indiscriminate drawl of resources from the wild. With the changing scenario, there is a need to enhance and promote the conservation and cultivation of these natural resources especially medicinal plants. In addition to the requirement for conservation of medicinal plants it has also become essential to protect and patent the traditional knowledge (Raghupathy and Lakshmi, 2001).

Conclusion

The present study indicates that the study area (Kanyakumari District) has high biodiversity of medicinal plants. Despite gradual socio-cultural transformation, local communities still possess substantial knowledge of plants and their uses. A total of 50 medicinal plant species used to treat diarrhea and dysentery were recorded and documented. Currently, conservation of traditional knowledge is greatly menaced by many factors related to modernization of the region and lack of interest by traditional healers in transferring traditional health knowledge and technology to next generation. The biodiversity and wealth of Kanyakumari District for medicinal plants are a great legacy that deserves to be protected from undue influences.

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Table 1. Medicinal efficacies family and local names of plants.

S/N	Botanical name	Family	Local name	Parts used	Use
1.	<i>Acorus calamus</i> , linn	Araceae	Vasambu	Rhizome	Infusion of rhizome is given to children to cure diarrhea and dysentery. Decoction of rhizome is given for stomach pain. Rhizome cut in to small pieces, roasted made into paste with honey and orally to cure diarrhea.
2.	<i>Adenanthera pavonina</i> , Linn	Caesalpiniaceae	Manjadi, Yanai kunthumani	Heart wood	Decoction of the heart wood given to dysentery.
3	<i>Adhatoda zeylanica</i> , Medik Us	Acanthaceae	Adhatodai	Leaves	Infusion of leaf juice is given orally for diarrhea and dysentery.
4	<i>Aegle marmelos</i> , (L) Corr.Serr.	Rutaceae	Vilvam, Koovalam	Fruits	Unripened fruits ground, juice extracted and given for diarrhea and dysentery.
5	<i>Albizia lebeck</i> , (Durazz.) Benth	Mimosaceae	Vakai	Bark	Decoction of bark and seeds are used for diarrhea. Fresh decoction of bark is used 3 times daily in stomach trouble and dysentery
6	<i>Alternanthera sessilis</i> , (L). R.Br.ex.DC	Amaranthaceae	Ponnankanni keerai	Whole plant	Decoction of the whole plant is used for the treatment diarrhea.
7	<i>Anacardium occidentale</i> , Linn	Anacardiaceae	Kollavu	Bark	Infusion of the bark is given as a remedy to diarrhea.
8	<i>Andrographis paniculata</i> , (Wall), Nees	Acanthaceae	Nilavembu	Root	Infusion of the dried roots and stem is given for dysentery and diarrhea.
9	<i>Annona squamosa</i> , Linn	Annonaceae	Munthiri	Fruit	The unripe fruits ground with water, juice extracted and given for dysentery.
10	<i>Asparagus racemosus</i> , Willd	Liliaceae	Satavari	Tuber	Infusion of tuber mixed with milk is used for diarrhea and dysentery
11	<i>Artocarpus heterophyllus</i> , Lam.	Moraceae	Plamaram	Root	Decoction of the roots are given in case of diarrhea
12	<i>Bombax ceiba</i> , Linn	Bombacaceae	Elavu	Gum	Gum is used to treat diarrhea and dysentery
13	<i>Cannabis sativa</i> , Linn	Cannabinaceae	Raja mooly	Leaves	Decoction of the leaves are useful in abdominal disorders and diarrhea
14	<i>Canthium coromandelicum</i> , (Burm.f) Alston	Rubiaceae	karachedi	Leaves, root	Decoction of the leaves and roots are used for the treatment diarrhea
15	<i>Cinnamomum travancorium</i> , Gamble	Lauraceae	Elavanga pattai	Bark	Decoction of the bark is used for diarrhea
16	<i>Cinnamomum verum</i> , Prest	Lauraceae	karuvapattai	Bark	concoction made from bark and unripe fruits of areca catechu is supposed to cure dysentery
17	<i>Cissampelos pareira</i> , Linn	Menispermaceae	Malathangi pacchilai	Root	Infusion of root is given for diarrhea and dysentery
18	<i>Cleome viscosa</i> , Linn	Capparaceae	Naikkaduku	Seed	Infusion of seeds is useful in diarrhea
19	<i>Cyclea peltata</i> , (Lam). Hook f. and Thoms.	Menispermaceae	Pada thazhi	Tuber	Tubers of padathazhi along with tubers of Curcuma zedoria ground into paste and given for dysentery
20	<i>Cynodon dactylon</i> , (L) pers.	Poaceae	Arukampullu	Root	An infusion of root are given in case of diarrhea and dysentery
21	<i>Desmodium triflorum</i> , (L) DC.	Fabaceae	Thazhi	Leaf	Leaves used against diarrhea and dysentery
22	<i>Elephantopus scaber</i> , Linn	Asteraceae	Anachavuttadi	Leaf	Decoction of leaves and roots are used as a remedy for diarrhea and dysentery
23	<i>Emblia officinalis</i> , Gaertn	Euphorbiaceae	Kattu nelli, Nellikkai	Fruit	Powdered dry fruit is used in the treatment of diarrhea and dysentery

Table 1 Contd.

24	<i>Evolvulus alsinoides</i> , (Linn.) Linn	Convolvulaceae	vishnukranthi	Whole plant	Decoction of the plant is used against dysentery
25	<i>Kalanchoe pinnata</i> , (Lam) pers	Crassulaceae	Malam chodakku	Leaves	Leaf extract is useful in diarrhoea and dysentery
26	<i>Kyllinga nemoralis</i> , (Forster) Dandy ex. Hutch	Cyperaceae	Velutta nirpasi	Tuber	Decoction of tubers are useful in diarrhea
27	<i>Lantana camara</i> , Linn	Verbenaceae	Appattai	Leaf	Leaf juice is used to treat dysentery
28	<i>Limonia acidissima</i> , Linn	Rutaceae	Vilankai	Leaves, gum	Gum obtained from the trunk and branches of the tree is useful in diarrhea and dysentery
29	<i>Mangifera indica</i> , Linn	Anacardiaceae	Mavu	Kernel	Decoction of the kernel is generally prescribed against diarrhea
30	<i>Maranta arundinacea</i> , Linn	Marantaceae	Kua	Tuber	The flour obtained from rhizome mixed with water boiled to form a conjee and given for diarrhea and dysentery
31	<i>Marsilea quadrifolia</i> , Linn	Marsileaceae	Nirarai	Whole plant	Decoction of whole plant is useful in diarrhea
32	<i>Murraya koenigii</i> , (Linn) Spreng.	Rutaceae	Karriveppu	Leaves	Fresh green tender leaves are eaten raw against dysentery Decoction of leaves and petiole is given against diarrhea
33	<i>Myristica fragrans</i> , Houtt	Myristicaceae	Jathikkai	Fruit	Decoction of the fruit taken orally for dysentery
34	<i>Naregamia alata</i> , Wight and Arn	Meliaceae	Nilavilathi, Nilanarakam	Root	Decoction of the roots are used as the treatment of dysentery
35	<i>Ocimum americanum</i> , Linn	Lamiaceae	Naithulasi	Leaves	Decoction of the tender leaves are used in the treatment of dysentery
36	<i>Phyllanthus niruri</i> , Linn	Euphorbiaceae	Keela nelli	Tender leaves	Decoction of the tender leaves are useful in dysentery
37	<i>Piper betle</i> , Linn	Piperaceae	lalaikkodi	Whole plant	Decoction of the whole plant is useful in diarrhea
38	<i>Psidium guajava</i> , Linn	Myrtaceae	Koyya	Tender leaves root	Infusion of roots are useful in diarrhea and dysentery especially in children Decoction of the tender leaves are used in diarrhea
39	<i>Punica granatum</i> , Linn	Punicaceae	Madulai	Fruit, bark	Fruit ground with mango seeds and the paste obtained and given orally in empty stomach as a remedy to dysentery Outer layer of the fruit is powdered and is used for diarrhea and dysentery Bark powdered is boiled in water and the decoction is given orally to cure diarrhea and dysentery
40	<i>Santalum album</i> , Linn.	Santalaceae	Chanthanam	Wood	Sandal wood oil is used in the treatment of diarrhea. Sandal wood is used in the treatment of dysentery
41	<i>Saraca indica</i> , Linn	Caesalpiniaceae	Pungu, Asokamaram	Flowers	A fluid extract of the flower is used for the treatment of dysentery
42	<i>Sesamum orientale</i> , L.	Pedaliaceae	Ellu	Leaves	Extraction of leaves are useful in dysentery
43	<i>Sida cordifolia</i> , Linn.	Malvaceae	Palampasi	Leaves, root bark	Root bark is powdered, mixed with milk and sugar and given for chronic dysentery
44	<i>Smilax zeylanica</i> , Linn	Liliaceae	Kattukodi	Root	Decoction of root is given for dysentery
45	<i>Solanum anguivi</i> , Lam.	Solanaceae	Kantharimilagu	Root	Crushed roots used for curing diarrhea

Table 1 Contd.

46	<i>Syzygium cumini</i> , (L.) Skeels	Myrtaceae	Naval	Leaves, bark	Juice of leaves is given for dysentery Decoction of bark is used for diarrhea and dysentery
47	<i>Tectona grandis</i> , Linn	Verbenaceae	Thekku	Wood, bark	Decoction of bark is used for dysentery Infusion of wood is used in the treatment of dysentery
48	<i>Tephrosia purpurea</i> , (L) pers	Fabaceae	Kozhinchi	Leaves	Decoction of leaves used for diarrhea
49	<i>Terminalia bellirica</i> , Roxb.	Combretaceae	Thani	Fruit	Mature and dry fruit is used for diarrhea and dysentery
50	<i>Tinospora cordifolia</i> , (Willd) Miers ex. Hook. F, and Thoms	Menispermaceae	Amirha valli	Whole plant	The infusion of plant with long pepper and honey is given for chronic dysentery

■ Herb
 ■ Tree
 ■ Shrub
 ■ Climber

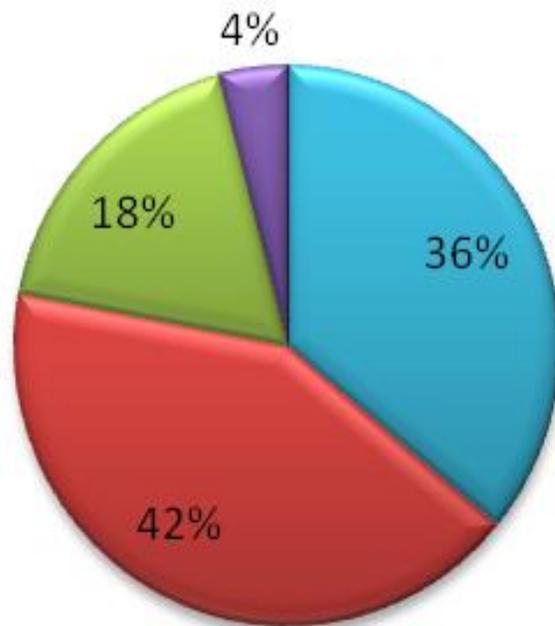


Figure 1. Life forms of plant.

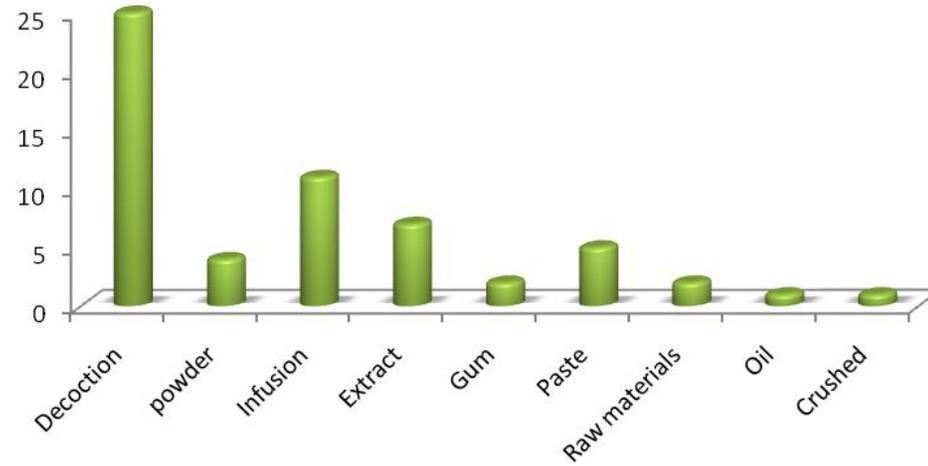


Figure 2. Mode of preparation of medicine.

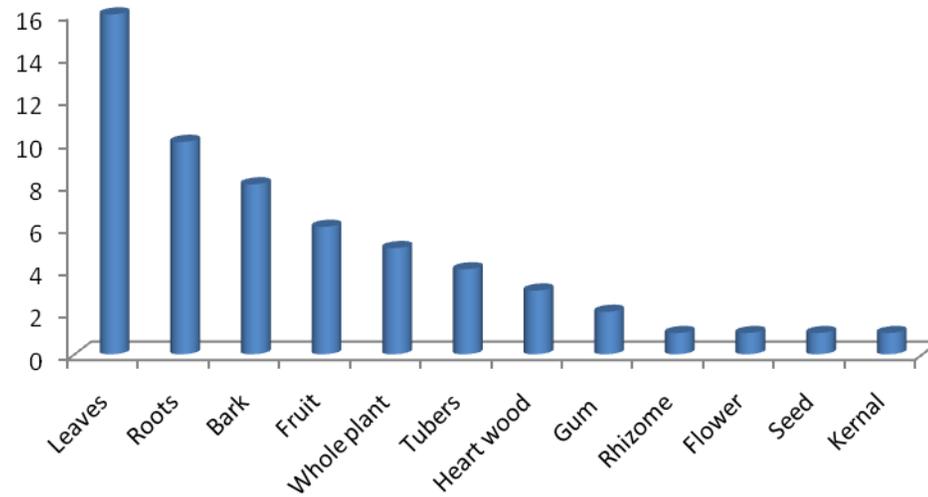


Figure 3. Parts of medicinal plants used for the treatment of Diarrhoea and dysentery.

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