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Traditional Uses of Medicinal Plants of Asclepiadaceae by Rural People In Madurai District, Tamil Nadu, India

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Abstract: Ethnobotanical studies were conducted to collect information about medicinal plants of Asclepiadaceae used in the treatments of various ailments and to identify the knowledgeable traditional healers among different communities in rural areas of Madurai district, Tamil Nadu, India. Information presented in this document was gathered from different community people involving in the traditional practices using standardized questionnaires. 25 informants including both male and female with different age groups were interviewed on the medicinal uses of local plants of Asclepiadaceae in this study area during October 2010-September 2011. A total of 27 plant species belonging to the family Asclepiadaceae have been reported to be in use among the rural people of different community of the study area. Among them *Tylophora indica*, *Pergularia daemia*, *Sarcostemma acidum*, *Gymnema sylvestre*, *Hemidesmus indicus*, *Caralluma adscendens* and *Calotropis gigantia* are leading species frequently used for a variety of health problems. As reported by informants, leaves are the most important part used for herbal preparations followed by whole plant, root, stem, latex, tuber and seed. The study revealed that rural people irrespective of community other than tribals do have a great faith in the traditional healing system and they rely on medicinal plants for treatment of various illnesses. Scientific investigation of many species of Asclepiadaceae may lead to invention of novel bioactive compounds to use them efficiently in phytotherapies. Moreover, standardized agro-techniques for pharmaceutically valuable species of Asclepiadaceae are yet to be developed for sustainable utilization.

Key words: Asclepiadaceae, Apocynaceae, medicinal plants, traditional knowledge, rural people, Madurai district

INTRODUCTION

Globally, about 85% of the traditional medicines used for primary healthcare are derived from plants (Franthworth, 1988). According to WHO, over 4.3 billion people rely upon such traditional plant based systems of medicine to provide them with basic preventive measure for several health problems. Traditional medicine and ethnobotanical information play an important role in scientific research, particularly when the literature and field work data have been properly evaluated (Ali *et al*., 2004). In many countries, scientific investigations of medicinal plants have been initiated because of their contribution to healthcare. India is one of the twelve mega-biodiversity countries of the World having rich vegetation with a wide variety of plants with medicinal value. In India, the traditional healers use 2500 plant species as medicine for basic preventive and curative healthcare since time immemorial. Herbal drugs obtained from plants are believed to be much safer; this has been proved in the treatment of various ailments (Matthew, 1983). In developing countries, the traditional medicines are widely used by all sections of people either directly or indirectly in the pharmaceutical preparations. It has been estimated that 25% of the medicinal drugs are based on plants and their derivatives (Principe, 1991).

Even today many local and indigenous communities meet their basic needs from the products including crude herbal drug they manufacture and sell based on their traditional knowledge. Due to less communication means, poverty, ignorance and unavailability of modern health facilities, most people especially rural people are still forced to practice and depend on traditional medicines for their common day ailments. Most of these people form the poorest link in the trade of medicinal plants (Khan, 1994). A vast knowledge of how to use the plants against different illnesses may be expected to have accumulated in areas where the use of plants is still of great importance (Diallo *et al*., 1999). During the few decades there has been an increasing interest in the study of medicinal plants and their medicinal uses in different parts of India. But ethnobotanical studies reported in several parts of

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India focused the necessity to protect the traditional knowledge from disappearing (Anis *et al*., 2000; Harsha *et al*., 2003; Jain, 2001; Mahapatra and Panda, 2002; Natarajan *et al*., 2000; Pushpangadan and Atal, 1984; Vijayasankar *et al*., 2012). In recent days, researchers have initiated scientific programs towards strategies for restricted utilization and have also developed methods of resource management which may be fundamental to the conservation of some of the medicinal plant resources. In many earlier investigations made in southern parts of India, it has been reported that Asclepiadaceae (presently treated as Subfamily *Asclepiadoideae* under the family Apocynaceae, as per the APG III system of classification), is one among the dominant families that includes plants with potential curative values for many health problems (Ganesan *et al*., 2006; Jeeva and Femila, 2012; Lingaraju *et al*., 2013; Reddy *et al*., 2009). Moreover, the possession of unique knowledge about medicinal plants and their traditional uses by different rural communities other than Paliyan tribes and few rural communities are not fully understood (Ganesan *et al*., 2006; Jeeva and Femila, 2012). Therefore, the objective of this study was to assess the richness of ethnomedicinal plant species of family Asclepiadaceae and to document the traditional medicinal practices of the different communities dwelling in the rural areas of Madurai district, Tamil Nadu, Southern India.

MATERIALS AND METHODS

Description of the study area: The study area concentrates in and around Madurai district (Fig. 1) located in Tamil Nadu State in southern India. Geographically, the entire area of Madurai district lies between 9"39'-10°30' N latitude and 77"00' E-78°30' E longitude. The district is spread over an area of about 6500 sq. km and is bounded on the North and Northeast by Pudukkottai district, on South by Virudhunagar district, on the Southwest by Theni district, on the West by Dindigul district and East by Sivagangai district. There are a number of hill ranges in the study area. The hill ranges adjacent to some villages have several hamlets belonging to Paliyar tribe. Their hamlets are found in different elevations from 300 m to 2,200 MSL. Temperature ranges from 12-25°C during March-April in high hill ranges and averages between 20°C during December and 38°C during April-May. The district receives an annual rainfall in about 600-850 mm.

Rural areas of data collection: The present study was carried out in the plains and adjacent hill ranges of four taluks viz. Usilampatti Taluk (Ezhumali, Aariyapatti, Mooppaapatti, Perumaalpatti, Gopalapuram and Krishnapuarm villages), Thirumangalam Taluk (Kavundanpatti. Kondaiyampatti and Aalangulam villages), Melur Taluk (Karungalakkudi, Pallapatti, Vembarali, Kalloothu and Pattanampatti villages and Azhagar hill regions) and Madurai South Taluk (Avaniyapuarm, Parambupatti, O. Alangulam and Valyankulam villages) of Madurai district in Tamil Nadu, India.

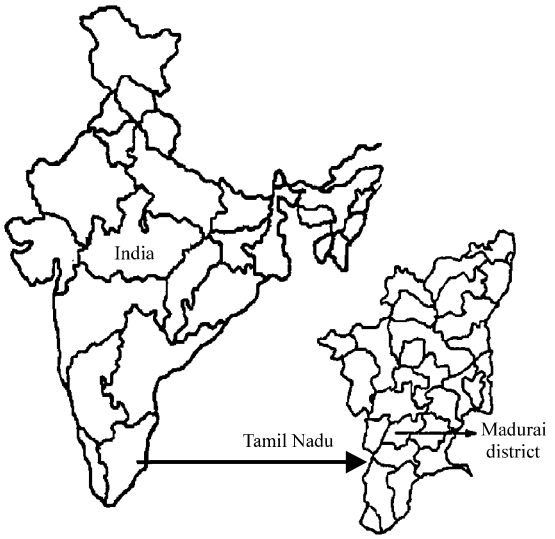

Fig. 1: Location map of the area studied in Tamil Nadu, India

Documentation of medicinal plants

Local traditional healers: Periodic field surveys for ethonobotanical exploration were undertaken during October 2010 to September 2011 in Madurai District. During the course of the study, four field trips were carried out in the study area. Methods of selecting informants (traditional healers) depended upon the distribution of local people having folk knowledge. They were requested to collect specimens of the plants they knew 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. The information was collected by conducting personal interviews with different ethinic groups, villagers and traditional healers/vaidyas who use the plants for health care practices.

Interview with traditional healers: Most of the informations included in this study was collected from a total of 25 informants from each village, comprising 16 males and 9 females who were identified between the ages of 25 and 80. They were selected based on their knowledge of medicinal plants either for self-medication or for treating others. Informants were asked to come to field and show the plants with local name; the species mentioned by the informants were taxonomically identified. Ethnobotanical data were collected according to the methodology suggested by Jain (1964). The ethnobotanical data (local name, mode of preparation, medicinal uses) were collected through questionnaire, interviews and discussions among the traditional practitioners in their local language (Tamil). Our questionnaire allowed descriptive responses on the plant prescribed, such as part of the plant used, medicinal uses, detailed information about mode of preparation (i.e., decoction, paste, powder and juice), form of usage either fresh or dried and mixtures of other plants used as ingredients. Each of the plant material was assigned field book number and documented as to botanical name, local name (Tamil), part used and medicinal uses of plants. All the informations were meticulously and sincerely entered in the field note book. The informations gathered were confirmed by the old traditional practitioners in different groups of village people of the area of investigation.

Preservation of plant specimens: During field survey, the plants have been collected in their flowering and fruiting stages as far as possible from the natural habitats. Standard method was followed with regard to collection of plant materials, drying, mounting, preparation and preservation of plant specimens (Muthukumarasamy *et al*., 2003). Voucher specimens of medicinal plants in triplicates were collected, prepared and identified. Plants with their correct nomenclature were arranged alphabetically by scientific name, vernacular name and ethnomedicinal uses. In this observation important medicinal plants were photographed and the photographs were also affixed in appropriate places in the enumeration of data to support the present study. The plant specimens were identified using relevant Floras (Gamble, 1935; Matthew, 1983, 1991). The identifications were then verified and confirmed at the Botanical Survey of India, Southern Circle, Coimbatore, India. All the herbarium specimens were deposited at the Herbarium of Department of Botany, Saraswathi Narayanan College, Madurai, India.

RESULTS

The present investigation highlighted 27 medicinally valuable plant species belonging to Asclepiadaceae family were distributed and were used for primary health care practices as reported by informants of different communities in rural areas of Madurai district. These species are reported here with their botanical name, habit, vernacular name, part used, methods of herbal preparation, mode of administration and medicinal uses.

Details of ethnomedicinal uses of plants of the family Asclepiadaceae:

- ***Calotropis gigantea* (L.) W.T.aiton (Tamil name: Erukku). Shrub:** The extracts prepared from different parts of the plant are of much healing value. The whole plant is dried, boiled and the filtered extract is consumed as a good health tonic, anthelmintic and expectorant. Root powder is orally taken to cure bronchitis, asthma, leprosy, eczema and elephantiasis. The bark latex is used to treat vertigo, baldness, hair fall, tooth ache and wounds
- ***Calotropis procera* (Aiton) W.T.aiton (Tamil name: Vellerukku). Shrub:** The whole plant is processed and used in the commercial preparation of eye tonics. Root is used to carminative treatment of dyspepsia
- ***Caralluma adscendens* (Roxb.) R.Br. var. *adscendens* (Tamil name: Eluvan):** Herb. Crude extracts of tubers of *C.adscendens* are given orally to reduce blood glucose level. Sliced stem with salt taken orally for diuretic condition. Stem segments are crushed to prepare chutney and orally given to recover from chest pain and general weakness
- ***Caralluma adscendens* var. *attenuata* (Wight) Gravely and Mayur (Tamil name: Kallimulayan). Herb:** The plant extract obtained from chopped stem is given orally for diabetes. The crushed juice from tender stem is mixed with pepper powder and taken orally for treatment of migraine. Fresh tender stems are chewed thrice a day for three days to get relief from cold
- ***Caralluma umbellata* Haw. (Tamil name: Paraikalli). Herb:** The tender stems are burnt in direct fire and eaten for five days regularly in empty stomach for ulcer problem
- ***Ceropegia bulbosa Roxb.* (Tamil name: Chitlankodi). Climber:** The decoction obtained from tubers is taken orally to get rid of urinary bladder stone. Raw tubers are cooked and eaten by ladies to enhance fertility and viability
- ***Ceropegia candelabrum* L. (Tamil name: Perunkodi). Climber:** The leaves are ground and applied as paste on forehead to cure head ache. The

roots are powdered coarsely made into a decoction and given in a dose of 100 mL two times a day to recover from diarrhea

- ***Ceropegia juncea*** **Roxb. (Tamil name: Pulichan). Climber:** Stem is crushed with milk and taken orally for three days to cure ulcer
- ***Cynanchum acutum*** **L. (Tamil name: Panchukkodi). Climber:** Crude extract of various plant parts are used to reduce the ulcer index. This is an effective anti-ulcer decoction
- ***Cynanchum callialatum*** **Buch.-Ham. ex Wight. (Tamil name: Vepadalkodi). Climber:** Three drops of latex added with milk and taken orally for three days to cure ulcer
- ***Dregea volubilis*** **(L.f.) Benth. ex Hook. f. (Tamil name: Kurinjan). Climber:** Root extract is given orally and root paste is applied externally for snake bite. Flowers are crushed with water and the extract is taken internally thrice a day for fifteen days to treat the diabetic patients
- ***Gymnema elegans*** **Wight and Arn. (Tamil name: Venkurinjan). Climber:** Leaf juice is applied on eye and ear to reduce the infections and irritation
- ***Gymnema lactiferum*** **(L.) R.Br. ex Schultes. (Tamil name: Kurinjan). Climber:** Leaves are made into powder and used twice a day for four weeks to treat diabetes
- ***Gymnema sylvestre*** **(Retz.) Schultes. (Tamil name: Sirukurinjan). Climber:** Leaves are powdered and taken directly for every, morning to cure diabetes and jaundice. Leaf juice is also taken orally to treat diabetes, piles and asthma. Leaf paste is applied externally on cuts and wounds. Leaf powder is orally administered twice a day for gastric trouble. Leaf juice is also used as an eye drop
- ***Hemidesmus indicus*** **(L.) W.T.Aiton (Tamil name: Nannari). Climber:** Root juice is orally taken in morning times to cure ulcer problems. Root powder is mixed with water and milk and taken internally twice a day to cure menorrhagia. The extract of plant is orally given to recover from fever
- ***Hetrostemma tanjorense*** **Wight and Arn. (Tamil name: Palakeerai). Climber:** Root paste is applied on forehead for head ache and to drive away from impacts of evil spirits
- ***Leptadenia reticulata*** **(Retz.) Wight and Arn.(Tamil name: Parurathalai). Shrub:** Pastes of seeds and leaves are used to cure the gangseene. Raw leaves (4-5) are chewed like bettle leaves 3 times a day to cure the fever like typhoid and till complete relief is obtained
- ***Pergularia brunoniana*** **(Wight and Arn). D.Dietr. (Tamil name: Perunkurinjan). Climber:** Leaves are dried in shade and made to powder to use as remedy for diabetes
- ***Marsdenia tenacissima*** **(Roxb.) Moon. (Tamil name: Kottimuthu). Climbe:**. Roots are ground with water and made as paste. 20g of paste is mixed with a glassfull of water (for one dose) and taken orally for 5 days for diabetes. Dried powder is also prepared from roots and stored for future use.
- ***Oxystelma esculentum*** **(L.f.) Sm. (Tamil name: Oosippalai). Climber:** Decoction of whole plant is used in the treatment of ulcer, sore throat and itches. Milky juice prepared from whole plant is used as anti-periodic. Leaves are crushed and the juice is used to cure jaundice. Fruits juice is orally taken by adults to rescue muscle pain, cough and leucoderma and also given to children as astringent. Decoction of the plant is used as a gargle and mouth wash in the treatment of sore throat and ulcers
- ***Pentotropis capensis*** **(L.f.) Bullock (Tamil name: Uppilankodi) . Climber:** Slightly warmed leaf juice is used as a nasal drops to treat cold. The leaf juice is used to cure the constipation, indigestion and diarrhea
- ***Pergularia daemia*** **(Forsskal.) Chiov. (Tamil name: Velliparuthi). Climber:** Fresh leaves are boiled with water and vapour is inhaled for cold and head ache. Bath with leaves boiled in water is useful to cure body pain. Flower and fruit extract is administered twice a day for three days to recover from cold. The crude extract of aerial parts administered orally to relieve from stomach ache. Leaf juice is mixed with wheat flour and the prepared paste is applied for bone fracture and swelling
- ***Sarcostemma acidum*** **(Roxb.) Voigt (Tamil name: Kodikalli). Shrub:** Stem juice is mixed with water and taken orally in the treatment of rheumatism, arthritis and joints pain. Dry leaf powder with mustard oil is applied externally for treating ear ache and dog bite. Three drops of latex with honey taken orally thrice a day for chronic ulcer. Milky latex is used as lotion. Stem and root extract is used to treat emetic and hypodermic diseases. Root crushed with neem stem bark is given orally to act against snakebite
- ***Sarcostemma intermedium*** **Dence. (Tamil name: Kodikalli). Climber:** Latex is applied to reduce body swelling. 5-6 drops of latex is applied as antidote externally in the spot of snake bite. Root paste is applied for bone fracture
- ***Sarcostemma viminale*** **(L.) R.Br. (Tamil name: Kodikalli). Climber:** Plant extract is given to treat digestive disorders. Plant paste is applied externally to cure bone fracture

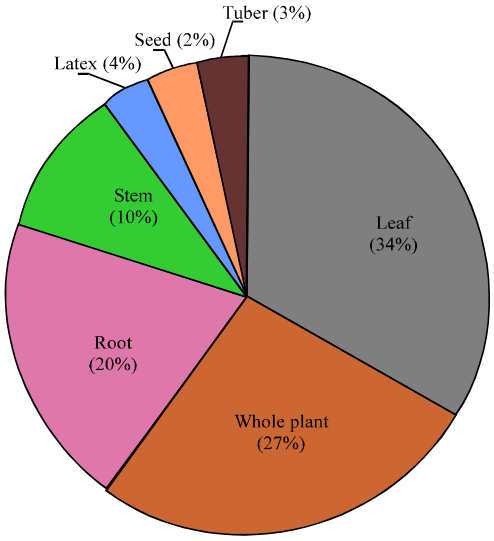

Fig. 2: Percent usage of parts of medicinal plants of Asclepiadaceae

- ***Secamone emetica* (Retz.) R.Br. ex Schultes. (Tamil name: Angaravalli). Climber:** Leaf juice is mixed with milk and taken orally for 15 days to cure nervous disorders
- ***Tylophora indica* (Burm.f.) Merr. (Tamil name: Nansaruppan). Climber:** Root and leaf are used to cure the various diseases like cough, asthma, bronchitis, dysentery, diarrhea, wounds, ulcer and hemorrhoids. Tender stem extract (1-2 tea spoons) is taken thrice in a day for retention of urine. Root extract is given orally for snake bite and root pieces are used as necklace. Leaf crushed with stem bark is used for curing fever. Fresh leaves crushed with pudding is taken orally to nullify the poison effects

Ailments treated by medicinal plants: The traditional healers of rural areas of Madurai District mainly using the herbal preparations of different genus of Asclepiadaceae to cure several human diseases viz. ulcer, diabetes, head ache, diarrhea, asthma, cold, bronchitis, arthritis, joint pain, jaunties, eczema, leprosy, elephantiasis, urinary disorders, eye diseases, piles and cough. The preparation also used to heal tooth ache, migraine, fever, wounds, swelling and bone fracture and to serve as antidote for snake bite. The extracts obtained from some plants are used as astringent, anti periodic, anthelmintic, mouth wash and to improve fertility and digestive disorders. Herbal oil prepared from selective genera can also be used to delay hair fall.

Parts used and forms of herbal preparations: The rural communities used different parts of the medicinal plants

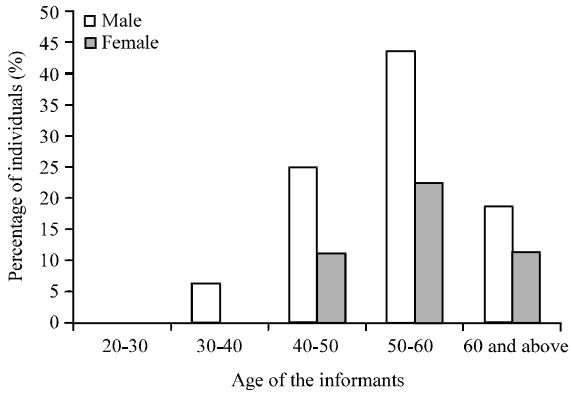

Fig. 3: Percentage of male and female possesses knowledge of traditional medicines

and they are prepared in different forms with respect to their curative potential and their mode of administration. The herbal preparations by rural people are in the form of extracts, decoction, juice, paste, dried powder, oil, boiled, or in raw forms. The leaf (34%) of species of Asclepiadaceae is mostly useful for herbal remedies followed by whole plant (27%), root (20%), stem (10%), latex (4%), tuber (3%) and seeds (2%). The latex is used by mixing with milk and honey (Fig. 2).

Traditional healers of rural areas: The data revealed that the predominant communities involving in the traditional herbal practices are Pillaimars (vellalar), Piramalai kallars, Thottianaickers, Kattunaickers, Kampalathunaickers, Okalika kowders, Paraiyars, Valaiyars, Akamudaiyars, Yadvars and Pallars and their distribution is varying in the studied rural areas of Madurai District. It is observed that these communities found to have the knowledge of folklore medicines to treat various ailments in the rural areas. However, as reported by informants the number of males between the age group of 50-60 are in practice of traditional medicines but with less frequency (43.75%). In some areas females from families who involve in traditional practices do have traditional knowledge but they are lesser than males (Fig. 3). These traditional healers distributed in rural areas follow the healthcare practices only with locally available medicinal plants of Asclepiadaceae and the species of other families for treating various ailments. As reported by informants the vernacular name, useful part, mode of preparation and administration are mostly common but varying from community to community distributed in different rural areas of Madurai district.

DISCUSSION

The survey of medicinal plants of Asclepiadaceae was done at rural areas of Madurai district, Tamil Nadu, India and 27 important medicinal plants were observed and listed in this study. The plants were reported with its scientific name, habit, vernacular name, parts used, mode of preparation and their medicinal properties. The traditional healers of rural areas using different morphological useful parts such as leaves, root, stem, bark, tuber, seed and latex for their health care but the leaves and whole plant were largely used for herbal preparations. These collected medicinal plants are used for the treatment of several diseases like ulcer, diabetes, head ache, diarrhea, asthma, arthritis, cold, bronchitis, leprosy, elephantiasis, urinary disorders, eye diseases, piles, joint pain, jaundice and cough. The preparations also used to heal tooth ache, migraine, digestive problems, eczema, fever, wounds, swelling and bone fracture and to serve as antidote for snake bite. It is noticed that *Calotropis gigantea, Caralluma adscendens, Gymnema sylvestre, Hemidesmus indicus, Pergularia daemia, Sarcostemma acidum* and *Tylophora indica* are the leading species used as remedies against a variety of health problems. The informants feed back during the interviews revealed that the plants of Asclepiadaceae are used for many common health problems viz., diabetes, diarrhea, ulcers, jaundice, asthma, arthritis, cough and digestive disorders. The medicinal plants are subjected to various processes to prepare extract/decoction, powder, paste and are then administrated to the patients. The vernacular name, useful parts and the mode of administration are mostly common but in some rural areas vary from community to community and also from individual to individual within the different communities.

The survey indicated that the study area has plenty of medicinal plants in the plain regions of rural areas to treat a wide spectrum of human ailments. It is evident from the interviews conducted in different villages that the knowledge of medicinal plants is limited to traditional healers, herbalists and elderly persons who belong to various communities living in rural areas. The elderly people of study area have a strong belief in the efficacy and success of plant based therapies. But the knowledge of traditional medicines is lacking among the younger generation due to their tendency to migrate to cities for remunerative jobs. It may be concluded that there is a possibility of losing this wealth of knowledge in the rural areas in the near future. In general, the study focused that there is enormous scope for traditional medicines from species of Asclepiadaceae in the villages of many parts of India as the rural communities collect the curative plant resources in and around their dwelling areas and rarely from hill regions. Thus, the documentation of traditional system of medicines practiced by non tribal communities in other regions of our country is necessary to harness the fruits of medicinally valuable plants and to adopt suitable conservation programme for sustainable utilization. Moreover, scientific validation of many species of Asclepiadaceae in terms of characterization of bioactive principles and their efficiency in treating various ailments are yet to be explored.

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