

Ethnomedical survey of plants used by Malayali community to treat coronary heart diseases in Pachamalai Hills

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ABSTRACT

Background: Tribal people are well-informed about the causative factor of various ailments and also the medicinal herbs that can cure those ailments. Pachamalai Hills is known for its richest biodiversity and it is one of the greenest mountains in Tamil Nadu. Majority of people belonging to Malayali community live here and they have good knowledge about the curing effects of medicinal herbs. **Aims and Objective:** To ascertain the medicinal use of the plants, which are used for heart diseases by the tribal people in Pachamalai Hills, Tamil Nadu, India. **Materials and Methods:** Thirteen plant species were collected once in every 3 months from Pachamalai Hills during 2013–2015. The plants were identified and confirmed with a senior plant taxonomist. **Result:** Based on the ethnomedical field survey, a total of 13 species of medicinally important plants that can cure cardiovascular diseases belonging to 11 families are distributed in 12 genera. **Conclusion:** These plants species that can cure coronary heart disease may also have great potential for research in the discovery of new drugs to prevent heart diseases.

KEY WORDS: Tribal; Ailments; Species; Pachamalai Hills

INTRODUCTION

Tribal community people are mainly the forest dwellers, who have accumulated rich knowledge on the use of various forest and forest products over centuries, and India has a total of 427 tribal communities.^[1] The indigenous traditional knowledge of medicinal plants of various ethnic communities, which has been transmitted orally for centuries is fast

disappearing from the face of the earth because of the advent of the modern technology and transformation of traditional culture.^[2] Different ethnic groups of ancient lineage and the occurrence of rich biodiversity make India one of the richest in the world of ethnobotanical knowledge. Over 53 million tribal people belonging to over 550 tribal communities coming under 227 linguistic groups inhabit the Indian subcontinent. They inhabit varied geographic climatic zones throughout the country.^[1,3]

Statistics from the World Health Organization indicate that the burden of chronic diseases, including coronary heart disease (CHD), cancer, diabetes, and obesity contributes to 59% of the 56.5 million deaths reported in 2001. With CHD ranking as the primary contributor to morbidity and mortality worldwide, it is not surprising that a great deal of research is now focused on identifying new therapeutic alternatives to prevent and treat this disease. With the caveat that the most

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consistent recommendations from a public health perspective involve multiple changes in diet and exercise, medicinal plants are also a viable option for the treatment and prevention of CHD. Although there are literally hundreds of plants traditionally around the globe for the treatment of CHD, very few of them have been thoroughly scientifically investigated.^[4]

Globally, there are literally hundreds of plant-based medicines used in the traditional system of medicine for the treatment of CHD and its sequelae. The majority of these plants are used alone or in combination with other herbs. Most of these plant-based medicines have not been scientifically investigated and there is little scientific or clinical data supporting their therapeutic use. Therefore, this study was undertaken to ascertain the medicinal value of these plants, which are used for heart diseases by the tribal people in Pachamalai Hills, Tamil Nadu, India and this traditional knowledge will be helpful to the population of the patients as well as the research community.

MATERIALS AND METHODS

Study Area

The focus of study area is situated between the two districts of Salem and Tiruchirappalli of Tamil Nadu. The hills lie between 78.31 longitude and 11.28 latitude. The study was undertaken in select areas of Pachamalai Hills, where the Malayali people live in large numbers. They live in Tenparanadu, Vayanadu, Kombi, Thalagai, Sobanapuram, and Sukkalampatti revenue villages.

Plant Collection

Plant collection on ethnobotanical knowledge was carried out every 3 months, April–June, July–September, October–December, and January–March among the traditional healers with the help of a semi-structure questionnaire and interview. Ethnobotanical data were collected during the year 2013–2015 by living in close contact with the community in the study area, following standard methods.^[5–10] With the help of semi-structured interview, guided field walk, direct observation, market survey, and group discussion with key informants and other knowledgeable member of the community, a detailed information on the medicinal plants was gathered. The major part of the interviews focused on the local names of the medicinal plants used, their habit and habitats, plant parts used, preparation methods, materials used during preparation, condition of preparation, storage method, additives/ingredients used during preparation and administration, and dosage to be administered.

Plant Identification

Voucher specimens were collected for each plant species during the guided field walk with the informants. At times, the field activities included taking notes on plants and the associated indigenous knowledge with preliminary identification of the plants to family and sometimes to species levels. Photographic records were also taken in the field to capture the field sites. The specimens were dried, deep-frozen, and determinations were made in the Department of Botany, Bishop Heber College, using taxonomic key descriptions given in the relevant volumes of the Flora of the Presidency of Madras,^[11] The Flora of the

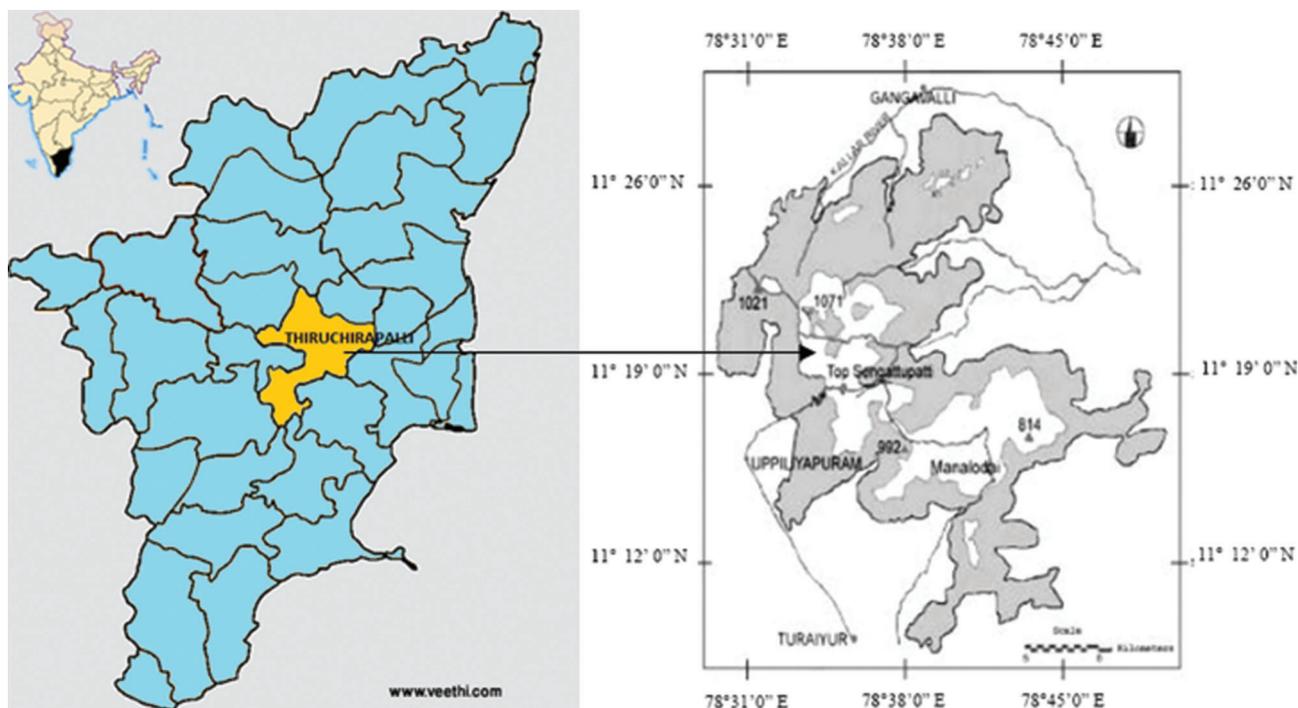


Figure 1: Top left-most India map and Tiruchirappalli District map and include Pachamalai Hills map.

Table 1: Ethno medical survey of plants used by Malayali community to treat coronary heart diseases

Name of Species/Family/Local Name	Part Used	Medicinal Uses	Preparation
<i>Allium Sativum</i> /Amaryllidaceae/ malaipoondu	Bulblis	Lowering of blood pressure, Inhibition of platelets aggregation, Enhancement of fibrinolytic activity, Lowering of cholesterol and triglyceride levels	Grind in to paste/Boiling goat or cow milk with bulb
<i>Piper nigrum</i> /piperaceae/kattu milagu	Seed	Reduce blood cholesterol/control	Powder with honey
<i>Aerva lanata</i> /Amaranthaceae/Sirupellai	Leaf	Control blood pressure	Powder is made in to decotion
<i>Centella asiatica</i> /Apiaceae/Vallarai	Plant/leave	strong a heart muscle	Powder is made in to decotion
<i>Millettia pinnata</i> /Fabaceae/pungai	Seed/root	Reduce blood cholesterol level	Powder is made in to decotion
<i>Boerhavia diffusa</i> /Nyctaginaceae /Mookarattai	Leaf	Control cholesterol levels	Powder is made in to decotion
<i>Phyllanthus emblica</i> /Phyllanthaceae /Nellikai	Seed	Reduce blood cholesterol/control	Equal/Powder is made in to decotion
<i>Terminalia bellorica</i> /Combretaceae/ thandrikkai <i>Terminalia chebula</i> / Combretaceae/kadukkai			
<i>Nymphaea alpa</i> /Nymphaeaceae /vendhamarai	Stamens/leaf	Reduce hypertension/cholesterol	Powder is made in to decotion
<i>Cinnamomum verum</i> /Lauraceae/surul pattai	Bark/flower	Reduce weight loss/blood cholesterol	Powder/paste in hot water/goat or cow milk
<i>Terminalia arjuna</i> /Combretaceae/ Maruthamaram	Bark	Reduce blood cholesterol level	Powder/paste in hot water/goat or cow milk
<i>Citrus lemon</i> /Rutaceae/elumpichai	Fruit	Reduce weight loss/blood cholesterol	One fruit/with hot water orally

Tamilnadu Carnatic,^[12] Society of Ethnobotany,^[13] Field and Herbarium Methods,^[14] Dictionary of Medicinal Plants,^[15] and by visual comparison with authenticated herbarium specimens. Finally, the accuracy of identification was confirmed with a senior plant taxonomist Dr. S Sebastian Rajasekaran, and the voucher herbarium specimens with labels were deposited at the Department of Botany, Bishop Heber College (Autonomous), Tiruchirappalli for future reference.

RESULT

This ethnomedical survey documented CHD uses of 13 plant species representing 12 genera and 11 families. The collected data were listed alphabetically with the name of species, family, local name, part used, medicinal uses, and preparation as provided in Table 1. These medicinally important plants are observed in Amaryllidaceae, Piperaceae, Apiaceae, Fabaceae, Nyctaginaceae, Phyllanthaceae, Combretaceae, and Nymphaeaceae. Malayali tribes are knowledgeable in medicinal plants particularly those which cure cardiovascular diseases. Some plants such as *Cinnamomum verum*, *Aerva lanata*, *Boerhavia diffusa* were not available in Pachamalai Hills, and they were collected from the nearest herbal store (Nattumarunthukadai) in Thuraiyur, Tiruchirappalli District. Most of the Malayali tribes have good knowledge of herbal medicine that is used to treat fever, headache, poisonous bites, cough, cold, and wounds. They are also well-informed about cardiovascular diseases. This investigation is reported in Table 1. The medicinal plants that can be made into powder are as follows: *Piper nigrum*, *Aerva*

lanata, *Centella asiatica*, *Millettia pinnata*, *Boerhavia diffusa*, *Phyllanthus emblica*, *Terminalia bellorica*, *Terminalia chebula*, and *Nymphaea alba*. Some plants are used in the form of powder and paste such as *Terminalia arjuna* and *Cinnamomum verum*. The bulbils of *Allium sativum* are ground into paste with cow and goat milk. The seeds of *Phyllanthus emblica*, *Terminalia bellorica*, *Terminalia chebula* are used to make powder.

DISCUSSION

This study of the Pachamalai Hills is entirely different from the other literature on the plants in Pachamalai Hills. The auxiliary studies focus on prevailing diseases.^[16-21] The results of the present study have been observed that similar to the previous studies.^[22,23] Apart from this, some studies focused on specialized diseases.^[24-26] The report stated here is quite different from those auxiliary studies because Malayali tribes are very well-informed with plants that relieve CHDs. The tribes are economically very poor. They collect honey in deep forest. They cultivate rice, tapioca, pineapple, banana, millets, and *Psidium guajava*. As there is a big need for ethnomedicinal plants, Malayali tribes are motivated to conserve and cultivate these plants.

CONCLUSION

This study concludes that the information gathered from the local people may be useful to other researchers in the field of

pharmacology and biotechnology. The study also points out a model for studying the relationship between human and plants within the contexts of ethnomedicinal system. The medicinal plants of Pachamalai Hills pave way for the novel treatment of the cardiovascular diseases. Plants such as *Allium sativum*, *Piper nigrum*, *Nymphaea alba*, *Cinnamomum verum*, and their formulations are very useful for the treatment of CHD. Research should identify specific molecules from the plants that can be bound with Low Density Lipoprotein (LDL) receptor using docking studies. The particular investigation of the medicinal plants and their constituents for their pharmacological actions will help in the development of new molecules for the treatment of heart diseases.

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REFERENCES

- Solavan A, Paulmurugan R, Wilsanand V, Ranjith sing AJA. Traditional therapeutic uses of animals among tribal population of Tamil Nadu. *Indian J Tradit Knowl.* 2004;3(2):2206–7.
- Ramachandran VS, Nair NC. Ethnobotanical observation on Irulars of Tamil Nadu, India. *J Econ Taxon Bot.* 1981;2:183–90.
- Ayyanar M, Ignacimuthu S. Traditional knowledge of Kani tribals in Kouthalai of Tirunelveli hills, Tamil Nadu, India. *J Ethnopharmacol.* 2005;102(2):246–55.
- Lokhande PD, Jagdale SC, Chabukswar AR. Natural remedies for heart diseases. *Indian J Tradit Knowl.* 2006;5(3):420–7.
- Farnsworth NR, Fong HHS, Mahady GB. *Folium Cynarae. WHO Monographs on Selected Medicinal Plants*, Volume IV, WHO Traditional Programme. Geneva, Switzerland: WHO, 2005.
- Cooton CM. *Ethnobotany: Principles and Applications*. Chichester, New York: John Wiley and Sons, 1996.
- Martin GJ. *Ethnobotany: A Method Manual*. London, UK: Chapman and Hall, 1995.
- Cunningham AB. *Applied Ethnobotany: People, Wild Plant Use and Conservation*. London, UK: Earthscans Publication, 2001.
- Harsha VH, Hebbar SS, Shripathi V, Hegde GR. Ethnomedicobotany of Uttara Kannada District in Karnataka, India--plants in treatment of skin diseases. *J Ethnopharmacol.* 2003;84(1):37–40.
- Ignacimuthu S, Sankara Sivaraman K, Kesavan L. Medico-ethnobotanical survey among Kanikar tribals of Mundanthurai Sanctuary. *Fitoterapia.* 1998;69(5):409–14.
- Gamble JS. *Flora of the Presidency of Madras*. London West, UK: Newman and Adlard, 1935.
- Matthew KM. *The Flora of the Tamilnadu Carnatic*. Rapinat Herbariu. Tiruchirappalli, India: St Joseph College: Botany, 1984.
- Jain SK. *Methods and Approaches in Ethnobotany*. Lucknow, India: Society of Ethnobotanists, 1989. pp. 1–192.
- Jain SK, Rao RR. *A Handbook of Field and Herbarium Methods*. New Delhi, India, Today and Tomorrow's Printers and Publisher; 1977.
- Balasubramanian A. *Dictionary of Medicinal Plants*, 2nd edn., India: ABS Botanical Conservation Publishers. 2010.
- Abu-Rabia A. Urinary diseases and ethnobotany among pastoral nomads in the Middle East. *J Ethnobiol Ethnomed.* 2005;1:4.
- Kasirajan B, Maruthamuthu R, Gopalakrishnan V, Arumugam K, Asirvatham H, Murali V, et al. A database for medicinal plants used in treatment of asthma. *Bioinformation.* 2007;2(3):105–6.
- Ganesan S, Suresh N, Kesavan L. Ethnomedicinal survey of lower Palni Hills of Tamil Nadu. *Indian J Tradit Knowl.* 2004;3(3):299–304.
- Sandhya B, Thomas S, Isabel W, Shenbagarathai R. Ethnomedicinal plants used by the Valaiyan community of Piranmalai hills (reserved forest), Tamil Nadu, India: a pilot study. *Afr J Trad CAM.* 2006;3(1):101–14.
- Karthik V, Raju K, Ayyanar M, Gowrishankar K, Sekar T. Ethnomedicinal uses of pteridophytes in Kollo hills, Eastern Ghats of Tamil Nadu, India. *J Nat Prod Resour.* 2011;1(2):50–5.
- Vaidyanathan D, Salaisenthil K, Sisubalan N, Ghouse Basha M. Studies on ethnomedicinal plants used by Malayali Gounder Tribes in Pachamalai of Eastern ghats, Tamil Nadu, India. *Adv Appl Sci Res.* 2014;5(1):244–53.
- Gritto MJ, Aslam A, Nandogopalan V. Ethnomedicinal survey of threatened plants in Pachamalai hills, Tiruchirappalli district, Tamil Nadu, India. *Int J Res Ayur Pharm.* 2012;3(6):844–6.
- Amazad Basha K, Ghouse Basha M. Survey of medicinal plants of Pachamalai hills, a part of Eastern ghats, Tamil Nadu. *Int J Curr Res.* 2013;5(12):3923–9.
- De Wet H, Nciki S, van Vuuren S. Medicinal plants used for the treatment of various skin disorders by a rural community in northern Maputaland, South Africa. *J Ethnobiol Ethnomed.* 2013;9:51.
- Tabassum N, Hamadani M. Plants used to treat skin diseases. *Pharmacogn Rev.* 2014;8(15):52–60.
- Egharevba RKA, Ikhatua MI. Ethno-medicinal uses of plants in the treatment of various skin diseases in Ovia north east, Edo State, Nigeria. *Res J Agric Biol Sci.* 2008;4(1):58–64.

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