

Ethnobotanical investigation on the Malayali tribes in Javadhu hills, Eastern ghats, South India

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Abstract

An ethnobotanical investigation was conducted in Javadhu hills of Eastern Ghats, Thiruvannamalai District, Tamil Nadu, South India, by collecting information from the Malayali tribes through interviews, structured questionnaires and group discussion during September 2012 to August 2013. A total of 11 Malayali tribes cooperated with the researchers to share their traditional knowledge and helped in the collection of 110 medicinal plants. The collected plants are listed with their botanical, local and family names along with the details of part(s) used, traditional use and ethnomedicinal preparation. It was found that the 110 plant species belonging to 100 genera and 51 plant families were traditionally used to cure 17 human ailments. The maximum number of plants species (26) was used for Gastro-Intestinal Diseases (GID), 16 plant species each for Dermatological Infections/Diseases (DID) and Skeleto-Muscular System Disorders (SMSD), and 11 for Respiratory System Diseases (RSD). The analysis of different plant parts used to cure diseases revealed that leaves were the most widely used plant part, which accounted for 59 species out of 110 reported medicinal plants in this study, followed by root (15 species) and fruit (12 species). The majority of the ethnomedicinal preparation type was in the form of paste from 54 plants (49%). The results showed that the Malayali tribes depended heavily on the medicinal plants of the hills inhabited by them, stressing the need for revival of interest in ethnomedicine. Documentation of ethnobotanical knowledge is the need of the hour as it may carry solution for unsolved areas like 'cancer' and 'ageing', besides adding wealth of knowledge to 'Green medicine'.

Keywords: Ethnobotany, Malayali Tribes, Medicinal Plants, Javadhu hills, Ethnomedicine.

1. Introduction

India is endowed with an enormous wealth of medicinal plants [1,2] and is rightly called the "Medicinal Garden" of world. The climatic diversity and regional topography of India accounts for the rich plant biodiversity [3-6]. India being one of the world's top 12 mega diversity nations, it harbours more than 8,000 medicinal plant species in its natural habitat. Indian Systems of Medicine (ISM) such as Siddha, Ayurveda, Unani and the Homeopathy use around 2,000 plant species.

India is sitting on the gold mine of traditionally well practiced, but ill-recorded knowledge of herbal medicine. Hence, the *ex situ* conservation measure by the creation of regional and sub-regional ethno-medicinal plant gardens, which should contain accessions of all the medicinal plants known to the different tribal communities and different regions of India, reflecting our cultural and ethno medicinal history and representing living traditions of our society's knowledge of medicinal plants, would be of great use for the posterity.

An estimate of World Health Organization (WHO) demonstrates about 80% of world population depends on natural products for their healthcare since the side effects and cost of modern medicine keeps escalating [7]. Investigations have revealed that the local inhabitants primarily depend on local medicinal plants for the treatment of many human diseases [8]. Traditional medical practices are an important part of the primary health care system in the developing countries [9]. Herbal medicines are comparatively safer than artificial drugs. Plant-based traditional knowledge has become an organized tool in research for new sources of drugs and nutraceuticals [10-13]. The

medicinal plant uses were evaluated by several researchers[14-20]. However, the traditional healers are decreasing in number over the years of modernisation. Hence, it becomes the responsibility of the scientific community to disentangle the information and to document it for availability to the entire world for the help of human beings [21].

The knowledge on medicinal plants comes from the native (or) indigenous people. In Tamil Nadu, 36 tribal communities live in several districts and practice or utilize herbal preparation for their day to day needs and survival. Malayalis form a dominant tribal community by population, live in six districts of Tamil Nadu and found living in Javadhu hills located in the southern extension of the Eastern Ghats, South India.

2. Materials and Methods

2.1. The study area

The Eastern Ghats comprises a line of hills, the Javadhu, Shevroy, Kalrayan, Pachamalai and Kollimalai between the Palar and Cauvery Rivers and linked with the end of Cuddapah in the Nagari hills of Andhra Pradesh. With its various topographical conditions, it harbours a very wealthy, and great diversity of medicinal plants [22]. The study site, Javadhu hills, is situated in both the Thiruvannamalai and Vellore districts of Tamil Nadu (Figure 1).

Figure 1: The study area of Javadhu hills, Eastern Ghats, Tamil Nadu, south India.



It is one of the natural bioreserves of Eastern Ghats in Tamil Nadu. It lies between 78°35" and 79°35" East Longitude and 12°24" and 12°55" North Latitude with an area of 2405 square km. The Javadhu hills ranges from the North to South attaining a maximum length of 64 kms and a width of 25 kms and extend within taluks of Polur, Chengam, Thirupattur, Vaniyampadi, Tiruvannamalai and Vellore [23]. It is measured to be the highest mountain in Thiruvannamalai District, which covers the eastern part of Polur Taluk. The height of the Javadhu hills is 2500 feet above sea level with peaks increasing up to 4200 feet. The forest herbs and leaves in Javadhu hills are the finest medicines for different diseases including diabetes, jaundice, etc. [23,24].

2.2. Ethnomedicinal plants survey

Periodical field visits during September 2012 to August 2013 were conducted to gather data on the medicinal plants frequently used by them. The data collected during field visits were subjected to group discussion. The medicinal plants were identified, photographed and voucher specimens were collected for preparation of herbarium [25]. Field trips were conducted periodically for ethnobotanical studies and data were recorded for analysis. There were 11 informants (9 males and 2 females) between the ages of 30 to 75 in the study area. Ethnobotanical data were collected using structured questionnaires, interviews and discussion among the Malayali tribes settled in Javadhu hills. The members responded to the interview were elderly people who have had extensive information and hands on experience and practice on use of medicinal plants for treating different diseases. The collected plants were botanically recognized/identified using the Flora of Presidency of Madras [25] and the Flora of Tamil Nadu Carnatic [26].

During the field trip stay, the daily activities of the tribes were closely observed and interpersonal contacts were recognized by participation in several of their social and religious ceremonies such as marriages, rituals and therapeutic sessions. Information on human illness treated by the plants, vernacular name, life form of plant, plant part(s) used, method of preparation, mode of management, reported risk to the convenience of medicinal plants were all recorded and the data were analysed [27,28].

3. Results and Discussion

The study indicates a high level of consensus on traditional knowledge of medicinal plants within Malayali tribes. The results of this study show that a large number of medicinal plants are traditionally used by the tribal community of Javadhu hills for the treatment of different diseases and health disorders of man. In the present study, 110 plant species were collected and arranged alphabetically by the botanical names, vernacular names in Tamil, and family name, part(s) used, mode of preparation and their administration have also been recorded (Table 1).

Table 1: Details of medicinal plants used by Malayali tribes of Javadhu hills, Eastern Ghats, south India

Botanical name	Local name	Family	Part(s) used	Medicinal use	Preparation type
<i>Acalypha fruticosa</i> Forsskal	Chinni	Euphorbiaceae	Leaves	Wounds	Paste
<i>Actiniopteris radiata</i> J.koenig	Visirisedi	Pteridaceae	Whole plant	Diarrhoea and Mosquito repellent.	Paste
<i>Aegle marmelos</i> (L.) Corr.Serr.	Vilvam	Rutaceae	Fruit exocarp	Blood production	paste
<i>Alangium salvifolium</i> (L.f.) Wang.	Alingi	Alangiaceae	Leaves	Dog bite, Wounds	Paste
<i>Albizza amara</i> . (Roxb.) Boiv.	Kattuvagai	Leguminosae	Stem, Bark	Pain relief	paste
<i>Allium sativum</i> L.	Poondu	Amaryllidaceae	Bulb	Stomach ache	Roasted bulb
<i>Aloe vera</i> (L.) Burm. f.	Sotrukatrzhai	Liliaceae	Whole Plant	Ulcer	Paste
<i>Alternanthera sessilis</i> (L.) R.Br	Ponnankanni	Amaranthaceae	Whole plant	Ulcer	Paste
<i>Amarantus viridis</i> L.	Kuppaikerai	Amaranthaceae	Leaves	Constipation	Raw
<i>Andrographis paniculata</i> (Burm.f.) Nees	Nilavembu	Acanthaceae	Whole plant	Dog bite, Snake bite and Diabetes	juice
<i>Argemone mexicana</i> L.	Brammansedi	Papaveraceae	Latex	Wounds, Skin infection and Scabies	raw
<i>Aristolochia bracteata</i> Retz.	Aduthinnapalai	Aristolochiaceae	Root	Snake bite, Normal delivery	juice, powder
<i>Artocarpus heterophyllus</i> Lam.	Palaa	Moraceae	Leaves	Dog bite	Paste
<i>Asparagus racemosus</i> Willd	Thaneervitan kizhangu	Liliaceae	root	Diabetes	Raw
<i>Azadirachta indica</i> A. Juss.	Vempu	Meliaceae	Leaves, Bark	Removes Intestinal worms, Parasites and Menstrual problem	Raw and paste
<i>Benkara malabarica</i> Tirv. (Lam.)	Kozhikundu	Rubiaceae	Root	Scorpion bite and Snake bite	Powder
<i>Borassus flabellifer</i> L.	Panai	Arecaceae	Endosperm	Constipation and Reduce body Heat	Raw
<i>Cadaba indica</i> Lam.	Velansedi	Capparaceae	Leaves	Fever, cough and cold	Paste
<i>Caesalpinia bonduc</i> . (L.) Roxb.	Kazharchikai	Leguminosae	Leaves and Seed	Reduce Swelling and Hydrocele	Paste
<i>Calotropis gigantean</i> (L.) R.Br	Earukku	Asclepiadaceae	Latex	Swelling	Raw
<i>Cardiospermum halicacabum</i> L.	Mudakkathan	Sapindaceae	Whole plant	Antivatha Diuretic and Anti inflammatory	Decoction

<i>Carica papaya</i> L.	Papali	Caricaceae	Leaves	Ear pain and Migraine	Raw
<i>Carissa spinarum</i> L.	Kalakasedi	Apocynaceae	Leaves	Skin infection	Paste
<i>Cassia fistula</i> L.	Konnaimaram	Leguminosae	Seed	Cure Digestive problem and Appetite for Cattle	Raw
<i>Cassia siamea</i> Lam.	Seemaigathi	Leguminosae	Leaves	Skin infection	Extract
<i>Catharanthus roseus</i> (L.) Don.	Sudukattumalli	Apocynaceae	Flower ,root	Reduce Blood Pressure and Skin infection	Powder
<i>Centella asiatica</i> (L.) Urban	Vallarai	Apeaceae	Leaves	Improve Memory power	Raw
<i>Cipadessa baccifera</i> (Roth) Miq.	Periyanaikothu	Meliaceae	Leaves	Ulcer and Over bleeding for Women	Paste
<i>Cissus quadrangularis</i> L.	Perandai	Vitaceae	Whole Plant	Piles	Roasted stem
<i>Citrus acida</i> Roxb.	Narthangai	Rutaceae	Fruits and Leaves	Diarrhoea and intestinal Worms	Juice and Paste
<i>Citrus limon</i> (L.) Burm.f.	Elumichai	Rutaceae	Fruits	Stomach ache, Nail infection and Reduce body heat	Juice
<i>Cleistanthus collinus</i> (Roxb.) Benth.	Ottanthazhai	Euphorbiaceae	Leaves	Highly poisonous	Paste
<i>Cleome gynandra</i> L.	Naivelan	Capparaceae	Whole plant	Mosquito, Bees repellent	Raw
<i>Cleome monophylla</i> L.	Naikadugu	Capparaceae	Leaves	Throat pain and infection	Raw
<i>Clitoria ternatea</i> L.	Sangupoo	Leguminosae	Root and seed	Diuretic, Fever and Head ache	paste
<i>Coccinia indica</i> Wight & Arn.	Kovaikai	Cucurbitaceae	Leaves and Furit	Skin infection and Asthmatic troubles	Paste and Juice
<i>Coleus aromaticus</i> Benth.	Karpuravalli	Lamiaceae	Leaves	Kidney stone, cold and cough	Raw
<i>Crotalaria juncea</i> L.	Peimerati	Leguminosae	Leaves	Depression	Paste
<i>Croton bonplandianus</i> Baillon	Melagapondu	Euphorbiaceae	Leaves and stem	Wounds	Latex
<i>Cucurbita maxima</i> Duch.	Posanaikodi	Cucurbitaceae	Leaves	Gastric	Decoction
<i>Curculigo orchioides</i> Gaertner	Nilapanaikizhang u	Amaryllidaceae	Root	Dental problem	Powder
<i>Cuscuta reflexa</i> Roxb.	Veppamaravathandai	Convolvulaceae	Whole plant	Fever	Paste
<i>Cynodon dactylon</i> (L.) Pers.	Arugampul	Poaceae	Leaves	Diabetes	Juice
<i>Cyperus rotundus</i> L.	Korai	Cyperaceae	Root	Diarrhoea	Raw
<i>Delonix elata</i> (L) Gamble	Vathanarayanan	Leguminosae	Leaves	Gas trouble and Joint pain	Paste
<i>Diospyros peregrine</i> (Gaertner.) Guerke.	Thumbigamaram	Ebenaceae	Leaves, Stembark	Fracture	Paste
<i>Dalbergia latifolia</i> Roxb.	Eetee	Leguminosae	Bark	Wounds	Paste
<i>Emblica officinalis</i> Gaertner	Nellikai	Euphorbiaceae	Fruits	Diabetes	Raw

<i>Erythrina stricta</i> Roxb.	Kalyanamurungai	Leguminosae	Leaves ,Bark	Reduce body heat	Paste
<i>Eucalyptus tereticornis</i> Smith	Thayalamaram	Myrtaceae	Leaves	Cold, cough and Headache	Paste
<i>Euphorbia hirta</i> L.	Ammanpacharisi	Euphorbiaceae	Leaves ,root	Jaundice and Ulcer	Powder
<i>Ficus bengalensis</i> L.	Alamaram	Moraceae	Latex	Wounds	Raw
<i>Ficus racemosa</i> L.	Athimaram	Moraceae	Root	Ulcer and dysmenorrhoea	Latex
<i>Gmelina asiatica</i> L.	Mullisedi	Lamiaceae	Leaves, Flower	Diabetes	Decoction
<i>Gymnema sylvestre</i> (Retz.) R.Br. & Schultes	Sirukurijan	Lamiaceae	Root	Diabetes	Paste
<i>Hemidesmus indicus</i> . (L.) R.Br.	Nannari	Asclepiadaceae	Root	Cold, cough and fever	Juice
<i>Hemionitis arifoli</i> (Burm.) Moore	Manthamarai	Hemionitidaceae	Leaves	Scorpion bite, Snake bite and Dog bite	Juice
<i>Hibiscus rosa-sinensis</i> L.	Semberuthi	Malvaceae	Leaves, Flower	reduce hair falling and cooling agent	Paste
<i>Holoptelea integrifolia</i> (Roxb.) Pl.	Avimaram	Ulmaceae	Bark	Nail infection	Paste
<i>Jasminum angustifolium</i> Vahl.	Kattumalli	Oleaceae	Leaves ,Flower	headache, migraine and body heat	Paste
<i>Jatropha curcas</i> L.	Soppukai	Euphorbiaceae	Leaves	Diarrhoea	Decoction
<i>Jatropha gossypifolia</i> L.	Kattukotampuli	Euphorbiaceae	Leaves	Reduce blisters and Wounds	Paste
<i>Kalanchoe lanceolata</i> (Forsk.) Pers. var. <i>glabra</i> (Clarke) Srinivasan.	Ranakalli	Crassulaceae	Leaves	Reduce Swelling and bone joints	Paste
<i>Lawsonia inermis</i> L.	Marutahani	Lythraceae	Leaves	Nail infection and increases hair growth	Paste
<i>Leucas aspera</i> (Willd.) Link.	Thumabai	Lamiaceae	Whole plant	Migraine, headache and skin infection	Decoction/Paste
<i>Limonia acidissima</i> L.	Kattuvilamaram	Rutaceae	Leaves ,Fruits	Gastric problem and coolant	Raw
<i>Madhuca indica</i> J.G.	Elupai	Sapotaceae	Seed	Gas trouble and Pain relief	Oil
<i>Mimosa pudica</i> L.	Sinnungisedi	Leguminosae	Leaves	Hydrocele	Paste
<i>Momordica charantia</i> .L.	Pavakai	Cucurbitaceae	Fruits ,seed	ulcer, gas problem and reduce blood sugar	Raw
<i>Morinda tinctoria</i> .Roxb.	Nunamaram	Rubiaceae	Leaves and bark	Stomach ache and Stomach ulcers	Paste
<i>Moringa oleifera</i> .Lam.	Murungai	Moringaceae	Leaves ,Flower	Improve eye sight, stimulation and cough	Raw/ Powder
<i>Mukia maderaspatna</i> (L.) M.R.	Musumusukai	Cucurbitaceae	Leaves	Fever and cough	Juice

<i>Musa paradisiaca</i> L.	Vazhaimaram	Musaceae	Stem	Removes kidney stones, stomach ache and Fire burns	Raw/Juice
<i>Ocimum basilicum</i> L.	Thirunettrupathiri	Lamiaceae	Leaves and seed	Ear pain	juice/Paste
<i>Ocimum canum</i> Sims.	Siruthulasi	Lamiaceae	Leaves	Ulcer, increases appetite, cough and cold	Decoction
<i>Opuntia dillenii</i> (Ker G.)Haw.	Kallisedi	Cactaceae	Fruits	stomach ache and diarrhoea	Raw
<i>Oxalis corniculata</i> L.	Boomisakarai	Oxalidaceae	Root	Diabetes and blood sugar	Paste
<i>Pavonia odorata</i> Willd.	Vellaithutthi	Malvaceae	Leaves	Foot infection and fever	Paste
<i>Phyllanthus amarus</i> Schum & Thonn.	Kezhanelli	Euphorbiaceae	Leaves	Jaundice	Paste
<i>Polygala arvensis</i> Willd.	Cirianangai	Polygalaceae	Leaves	scorpion bite and snake bite	Juice
<i>Pongamia glabra</i> Vent.	Poongaimaram	Leguminosae	Leaves, Seed	Manure, fungal infection of skin and reduce body heat	Paste
<i>Psidium guajava</i> L.	Goyyamaram	Myrtaceae	Fruits	Diarrhoea	Raw
<i>Psydrax dicoccos</i> Gaertn.	Cippukora	Rubiaceae	Bark	Indigestion and gas trouble	Paste
<i>Pterolobium hexapetalum</i> (Roth.) S & W.	Earimulli Earangimulli	Leguminosae	Leaves	Reduce gastritis	Decoction
<i>Punica granatum</i> L.	Mathuram	Punicaceae	Fruit exocarp	Diarrhoea and intestinal worms	Paste
<i>Rauwolfia serpentina</i> (L.) Benth.	Pampukala	Apocynaceae	Leaves	Poisonous bites	Juice
<i>Santalum album</i> L.	Santhanamaram	Santalaceae	leaves	Cold, cough and headache	Decoction
<i>Sarcostemma brunonianum</i> Wight & Arn.	Pachamaravathandai	Asclepiadaceae	Stem	Body pain	Paste
<i>Sida acuta</i> Burm. f.	Thodappamsedi	Malvaceae	Leaves	Boils and blisters	Paste
<i>Solanum erianthum</i> D.Don	Vellaipulansedi	Solanaceae	Leaves	Intestinal worms and headache and cold	Paste/Decoction
<i>Solanum nigrum</i> L.	Manathakali	Solanaceae	Leaves	Mouth wounds, ulcer, gas trouble and cancer	Raw
<i>Spondias mangifera</i> Willd.	Kattuma	Anacardiaceae	Leaves	Indigestion	Juice
<i>Strychnos nux-vomica</i> L.	Eattikaimaram	Loganiaceae	Leaves	Reduce swelling	Paste
<i>Syzigium cumini</i> (L.) Skeels	Navalmaram	Myrtaaceae	Bark ,fruits	Skin irritation and allergies	Paste/Raw
<i>Tamarindus indica</i> L.	Puliamaram	Leguminosae	Leaves ,fruits and bark	Intestinal worms, bile, vomiting and joint pains	Raw/ paste
<i>Tephrosia purpurea</i> (L.) Pers.	Avurisedi	Leguminosae	Leaves, root	stomach-ache and snake bite	Paste/powder
<i>Terminalia arjuna</i> (DC.) Wight & Arn.	Savattaimaram	Combretaceae	Stem bark	Bleeding disorders	Decoction
<i>Terminalia chebula</i> Retz.	Kadukai	Combretaceae	Fruit exocarp	Eye infection, Headache and indigestion	Paste

<i>Thevetia peruviana</i> (Pers.) Merr.	Aaralisedi	Apocynaceae	Seed	Poisonous bites	Paste
<i>Tinospora cordifolia</i> (Willd.) H. f. & T.	Sinthil	Menispermaceae	Stem	Diabetes	Juice
<i>Toddalia aculeate</i> (L.) Lam.	Vellattangodi	Rutaceae	Leaves	Skin allergy	Paste
<i>Vitex negundo</i> L.	Nochchi	Verbenaceae	Leaves	Cold and headache	Decoction
<i>Vitex peduncularis</i> Wall.	Malainochi	Verbenaceae	Leaves	Malaria	Juice
<i>Wattakakka volabilis</i> (L.F) T.Cooke	Onangodi	Asclepiadaceae	Stem Latex	Bone setter and reduce swelling	Paste
<i>Wedelia chinensis</i> (Osbeck) Merr.	Manjal karisilakanni	Asteraceae	Leaves	Jaundice	Paste
<i>Withania somnifera</i> (L.)Dunal.	Asvaganthi	Solanaceae	Root	Improve fertility	Powder
<i>Wrightia tinctoria</i> (Roxb.)R.Br.	Palaemaram	Apocynaceae	Leaves	Stomach pain	Paste
<i>Zingiber officinale</i> Rosco.	Enji	Zingiberaceae	Rhizome	Indigestion	Juice
<i>Zizyphus jujube</i> (L.) Gaertner, non miller.	Elanthai	Rhamnaceae	Root and Bark	Bruises and wounds	Paste
<i>Scilla indica</i> Roxb.	Narivangayam	Amaryllidaceae	Tuber	Seeding and sapling	Raw

The 110 species are included in 100 genera and 51 families with a highest representative of 14 species from the family Leguminosae; 8 species are represented from Euphorbiaceae, 5 species each from Apocyanaceae, Lamiaceae, and Rutaceae; and 4 species from Asclepiadaceae and Cucurbitaceae; whereas Amaryllidaceae, Apocyanaceae, Capparaceae, Malvaceae, Myrtaceae, Moraceae, Rubiaceae and Solanaceae are represented by 3 species each. The families Amaranthaceae, Combretaceae, Meliaceae, Liliaceae and Verbenaceae have two species each, while the rest of 31 families have one species each.

Ethnomedicinal plants listed in Table 1 were used to treat more than 17 different categories of diseases. Maximum number of species 26 were used to cure Gastro-Intestinal Diseases (GID) followed by 16 species each used in Dermatological Infections/ Diseases (DID), and Skeleto-Muscular System Disorders (SMSD), 11 species for Respiratory Systems Diseases (RSD), 8 species in Fever (Fvr), 7 species for Poisonous Bites (PB), and 5 species found used to cure Genito-Urinary Diseases (GUD).

Disease categories of Ear, Nose and Throat Problems (ENTP), General Debility (GD), Blood Related Problems (BRP) were treated with 4 species each, while 2 species each were used to cure various Hair Related Problems (HRP) and Reproductive Disorders (RD), 1 species was used to treat Circulatory System/Cardio-Vascular Diseases (CSCD) and 2 unique species were found used as Repellents (Mosquito and Bees) (Table 2).

The various plant parts used by the Malayali tribes are given in Figure 2 and Table 3.

Table 2: Different human diseases cured by Malayali tribes using the medicinal plants of Javadhu hills, Eastern Ghats, South India.

Diseases category	Biomedical terms	No. of plants used	Relative %
Gastro-Intestinal Diseases (GID)	Dysentery, Diarrhoea, Gastric complaints, Indigestion, Constipation Parasites, Intestinal worms, ulcer, dysmenorrhoea and Stomach ache.	26	23.6
Dermatological Infections/ Diseases (DID)	Foot infection Burns, inflammations, Skin irritation, Skin Allergy, Nail infection, Scalp increases, Skin infection, Bruises, Mouth Wound and Wounds.	16	14.5
Respiratory Systems Diseases (RSD)	Asthma, Cold and Cough	11	10.0
Genito-Urinary Diseases (GUD)	Abortion, Hydrocele, Diuretic, Kidney disorders, Bleeding disorder Over bleeding for Woman and Menstrual problems	5	04.5
Fever (Fvr)	Fever, Malaria	8	07.2
Skeleto-Muscular System Disorders (SMSD)	Body pain, Pain relief, Headache, Migraine, Joint pain, Bone setter, Bone joints, Fracture, Blisters and Swellings	16	14.5
Poisonous Bites (PB)	Poison bites, Scorpion sting and Snake bite	7	06.3
Circulatory system/ cardio-vascular diseases (CSCD)	Heart strength and Memory powder	1	00.9
Endocrinal Disorders (ED)	Diabetes	7	06.3
Dental Problems (DP)	Toothache	1	00.9
Hair Related Problems (HRP)	Greying of hair, Hair growth and Hair loss	2	01.8
Ear, Nose, Throat problems (ENTP)	Eye pain / infections and Throat pain	4	03.6
Reproductive Disorders (RD)	Improve fertility and stimulation	2	01.8
Liver Problems (LP)	Jaundice	3	02.7
General Debility (GD)	Body refreshment, Body strength, Body Cooling Depression and Disease resistant	4	03.6
Blood Related Problems (BRP)	Blood Sugar, Blood Pressure and Blood Production	4	03.6
Repellents (RE)	Mosquito, Bees repellent	2	01.8

Figure 2: The plant parts and number of plants used to cure various diseases by Malayali tribes in Javadhu hills, Eastern Ghats, South India.

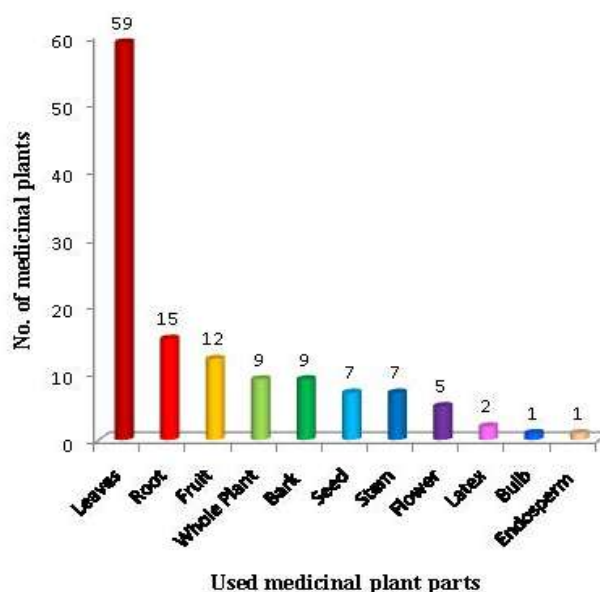


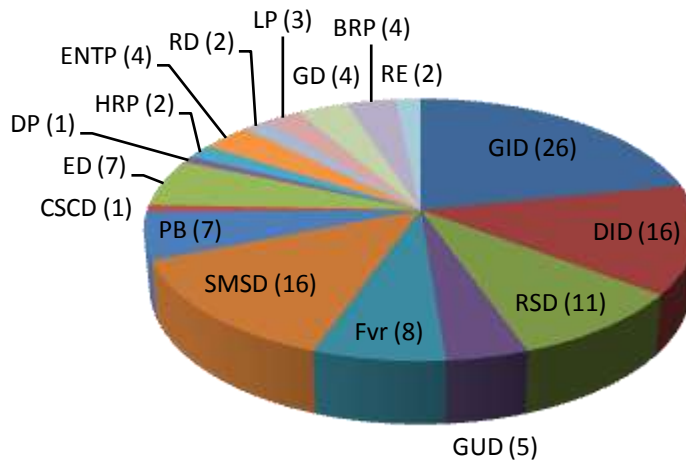
Table 3: The preparation types, number of medicinal plants used in treatment and their relative contribution (%) in human disease cure by Malayali tribes

Preparation type	Number of Plants used	Relative %
Paste	54	49.0
Raw	24	21.8
Juice	18	16.3
Decoction	11	10.0
Powder	8	07.2
Roasted stem/bulb	2	01.8
Oil	1	00.9

The leaves were the most preferred (59 plants; 53.6 %), followed by roots (15 plants; 13.6 %), fruit (12 species), bark and whole plant (9 species), stem and seed (7 species), flower (3 species), latex (2 species), and endosperm and bulb (1 species) in the different ethnomedicinal preparations. Nevertheless, the plant parts used by these communities varied from plant to plant. Further, herbal medicines prescribed by tribal healers were also found as either preparation based on a single plant part or a combination of several plant parts as revealed in the studies [29].

Of the 110 plants, the majority of the ethnomedicinal preparations were in the form of paste from 54 plants (49%), raw drugs form 24 plants (22%), juice form 18 plants (16%), etc. (Figure 3).

Figure 3: Different categories of human diseases and the number of medicinal plants (given in parentheses) used by Malayali tribes, Eastern Ghats, south India. (For the complete names of the disease abbreviations used in the figure, please refer Table 2)



The paste was usually prepared by pounding or crushing the plant parts in a stone made mortar and pestle. Water was mostly used to dilute the juice. The plant materials were used in fresh form or in dried form and most plants to be used as a remedy were stored for later use in the dry state, which allowed their utilization throughout the year as studied in [30].

However, the therapeutic uses of plant species reported here are having less information on their phytochemical study. So, further studies on chemical and pharmacological action are suggested to validate the claim. The present data on the ethnomedicinal plants will aid in conservation, cultivation of traditional medicine and economic welfare of population as discussed by [31].

The study shows a high degree of ethnobotanical innovation and the use of plants among the Malayali tribes in the Eastern Ghats of south India, and stresses the need for revival of interest in traditional folk medicine.

4. Conclusion

The present study provides ethnobotanical records and analysis on the medicinal plants used by the Malayali tribes of Javadhu hills, Eastern Ghats, south India to cure different diseases. Although the results of the study encourage practical use of medicinal plants, investigations are required on the pharmacological efficacy of various ethnomedicines used by them. Also, many medicinal uses of plants are found endemic to certain tribes. Consequently, considerable attention has been given to utilization of eco-friendly plant based products for the prevention and cure of different human diseases. The tribal knowledge on medicinal uses of plants still remains as an unexploited area.

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