

## Folkloric medicinal plant studies in Kalrayan Hill Eastern Ghats of Tamil Nadu, India

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### ABSTRACT

*The aim of the study is to illuminate the traditional behaviors, activities, special functions and record the medicinal system of native peoples of kalrayan hill. A standard questionnaire was used to gather the relevant information on plants and their usage of tribal people's life. Interviews and detailed documentation were carried out during July 2011 to May 2013. The traditional beliefs and customs of tribal people passed on by word of mouth were recorded. Totally 108 medicinally used plant species of 90 genera belongs to 50 families were documented with the help of tribal practitioners. The study also recorded the mode of preparations, mode of administration of medicinal plants to their corresponding ailments. The study concluded that the native peoples of kalrayan hill have good medicinal knowledge and also maintained plant based medicinal system from their ancestors. This type of study may helpful to the Ayurvedic practitioners and also plant based medicinal system.*

**Keywords:** Folklore, Ethnomedicines, Kalrayan Hill, Eastern Ghats, Tamil Nadu.

### INTRODUCTION

Traditional folk medical practices are empirical in nature; several million people in India with limited access to organized modern health care centers depend on traditional systems of medicine to cater their primary health care needs. Traditional systems of medicine (Ayurveda, Siddha and Unani) are well established in India and are widely acknowledged to be effective and safe without any side effects<sup>1</sup>. India is rich in ethnic diversity and traditional knowledge that has resulted in a considerable body of ethnobotanical research. There are over 537 different indigenous groups in India with widespread knowledge of plants<sup>2</sup>. Traditional system of medicines has been in use over thousands of years in India. Significant contributions have been made by its practitioners, particularly the primary health care providers at the community level<sup>3</sup>. Folk healers (Naattu Vaidhiyars) in remote places use local flora for treating and preventing ailments and are generally considered as healthcare resource in rural places inaccessible to modern health care services.

Since ancient times, the practitioners of the Indian system of medicine use medicinal plants for preventive and curative applications. These plants gain further importance in the regions where modern facilities are neither available nor easily accessible, particularly in tribal areas<sup>4</sup>.

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The tribal's have developed their own traditional knowledge related to plant medicine, which have become treasure trove and cultural heritage of our nation<sup>5</sup>. Almost all the people are susceptible to digestive problems, regardless of gender, ethnic or socioeconomic backgrounds<sup>6</sup>. Furthermore, ethnobiological surveys provide the rationale for the selection and scientific investigation of medicinal plants and animals, since some of these indigenous remedies have successfully been used by significant numbers of people over extended periods of time. According to the World Health Organization (WHO), about 65- 80% of the world's population in developing countries, due to the poverty and lack of access to modern medicine, depending essentially on plants for their primary healthcare<sup>7-8</sup>.

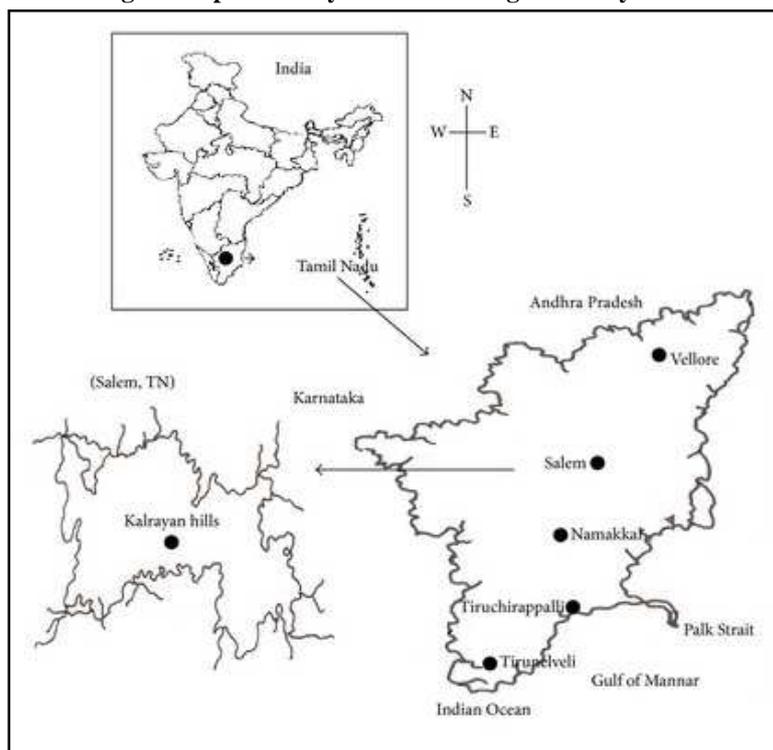
In recent years, use of ethnobotanical information in medicinal plant research has gained considerable attention in segments of the scientific community<sup>9</sup>. The vast majority of people on this planet still rely on their traditional *Materia medica* for their everyday healthcare needs. The primary benefits of using plant derived medicines are that they are relatively safer than synthetic alternatives, offering profound therapeutic benefits and more affordable treatment<sup>10</sup>. The main objective of this study was to assess the diversity of folkloric ethnomedicinal plants used by Malayali's and document the traditional medical system followed for their ailments.

## MATERIALS AND METHODS

### Study area (Figure: 1)

Studies were carried out in the Kalrayan Hill are a major range of hill situated in the Eastern Ghats of the southern Indian state of Tamil Nadu. The hills range in height from 2000 feet to 3000 feet and extend over an area of 1095 square kilometers. The hill straddles a number of Tamil Nadu districts, extending northeast from the Salem District. The range serves as a boundary between the Salem and Villupuram districts. The Kalrayans are divided into two sections. The northern section, referred to as the Chinna ("little") Kalrayans, and the southern section, called the Periya ("big") Kalrayans. The Chinna Kalrayans is 2700 feet in height, while the Periya Kalrayans average 4000 feet. This is one of the places with a rich biodiversity in India. Traditional healers, called "Vaidyars" from indigenous groups were targeted for documentation of the uses of medicinal plants. The malayalis (literally meaning mountain people) are the principal inhabitants of the Kalrayan hill, and call themselves as malaikaran, malayala goundar and also believe that they originally belonging to the vellalla caste of cultivators and migrated from kanchipuram to the hill of south west Tamil Nadu a few generations ago. The term malayali has been derived from the words malai (hill), aal (person) and is used to denote hill people<sup>11</sup>.

Fig. 1: Map of Kalrayan Hill Showing the Study Area



**Data collection:**

The field survey was carried out in different villages of Kalrayan Hill (F), Salem district of Tamil Nadu, India during July 2011 to May 2013. The structured questionnaire was used for collection and documentation of the data. The questionnaire includes the age of traditional practitioners, experience and mode of preparations of ailments. At the same time the vernacular names of the medicinal plants also recorded during the interview. In this study, we interviewed elder practitioners at the age of 50 and above. The botanical names were identified using “The flora of the Tamil Nadu Carnatic”<sup>12</sup>.

**Statistical analysis:**

The data was accessed on Microsoft Excel work sheets to summarize the various proportions like plant families, habit, plant parts used, frequency of citation and disease category for medicinal plants used in the study area.

**Fidelity level (FL):**

The fidelity level (FL), the percentage of informants claiming the use of a certain plant for the same major purpose, was calculated for the most frequently reported diseases or ailments as follows:

$$FL(\%) = \frac{N_p}{N} \times 100$$

Where  $N_p$  is the number of informants that claim a use of a plant species to treat a particular disease, and  $N$  is the number of informants that use the plants as a medicine to treat any given disease<sup>13-15</sup>. Before calculating FL, reported ailments were grouped into major disease categories following the approach of Heinrich<sup>16</sup>. Generally plants which are used in a repetitive manner are more likely to be biologically active<sup>17</sup>.

## RESULTS AND DISCUSSION

**Folklore of malayali herbal practitioners:**

The traditional beliefs and customs of the malayali people were mostly passed on by word of mouth. The medicinal system of the peoples of kalrayan hill followed from their ancestors by words and they do not aware about the written document system. The younger generations of the people are not interested to learn the medicinal system as well as the medicinal plants and their uses, mode of preparations of their ailments; it leads to the end of folkloric medicinal practices. The people fully depend either directly or indirectly in and around the area of natural forest for their daily life; it includes food, medicines, architecture and economic utilities.

**The life of Tribal man in kalrayan hills – Birth to Death:****Birth and Customs:**

The newly born child and the mother who gave birth to child are carefully handled by elderly woman of the community. Most of the cases are natural birth only and they are not believing english medicinal system for the birth of child (Past days). Now a day they also changing their life style to city culture because of the development of communicative devices (Television, mobile phones etc.).

**Kayam:**

This is the important kind of supplement given to the mother who gave birth of new child. From that time beginning the medicinal plants starts the role means this supplement is the mixture of following plant products prepared by the elder woman that is; Palm jaggery, Garlic (required amount), Long pepper, Omam, Sana kuppai, Ginger, Vasambu and White pepper. All these ingredients fried and prepared like jam and given orally to mother for minimum 5 days from the date of delivery. Food also provided on restricted basis for minimum 30 days. Followed by naming, kulatheiva valipadu, schooling (if boy/girl interested), marriage etc were happened.

**Temple festival and other ceremonies:**

They have more belief on God and they prayed the following Gods, Mariamman, kaali, Perumal, Paderi, Periyannan, Sivan, Muneeswaran, Masilamani and now a days they all started praying Murugan, Ayyappa etc. For temple festival much more karma and neatness have been followed by this people like before a

week of festival “Kappu kattuthal” have been done to all the man’s of the village after that they should not allowed to go anywhere until the festival have been done. This was celebrated by all the relatives of village natives. Festival was celebrated by grant manner cultural customs and rituals. This all are the major uniqueness of these peoples. The Tamil month “Thai” is very familiar because of pongal festival. Pongal festival was celebrated very grant manner with renovation of house, painting of house, new dresses, cattle management and so on. The pongal festival is one of the special occasions of their life.

#### **Folkloric medicinally important plants:**

From the birth of a child the medicinal plant had been utilized throughout the entire life. So that the peoples of hill area mostly dependent on medicinal plants for their ailments and other purposes. Totally, 108 folkloric ethnomedicinal plants were recorded which are under 50 families representing almost 90 genera. Among these species we observed 16 forms of habits. The study documented, medicinal plants and their uses, mode of preparation of the ailment, part of the plant used and disease to be cured (Table: 1). Through this study, we noted that the leaf portion of plants, mostly accessed for ailment preparation (46.0%) and minimum used plant part is flower (3.0%) (Figure: 2). In these 50 families, Asteraceae members were utilized more (6.5%) compared to other families. The folkloric ethnomedicinal plant parts were used in the form of extract, decoction, powder, paste, raw material and juice. These plants are used to cure many diseases like cold, cough, fever, stomach ache, body ache, jaundice, ulcer, joint pains, rheumatism, cancer, antifertility and etc (Table: 1). Plants are used either alone or combined with other plants. The documented plants are used by more than two ethnic groups. The use of plants as medicines was the preferred practice of Kalrayan hill people throughout their history; the knowledge was gathered through experience and generation by generation.

#### **Fidelity value (FL):**

The FL of a plant species for a specific disease in the study area varied between 35.50% for skeleton muscular treatment and 100% for fever as shown in Table 3. The maximum FL of 100% expressed by *Pergularia daemia*, *Gymnema sylvestre*, *Ocimum Sps.*, *Phyllanthus Sps.*, *Adhatoda vasica*, *Grewia rhamnifolia* and *Rauvolfia serpentina* were used to treat fever, cold, cough, Jaundice, Poisonous bites and so on. The result indicated that *Pergularia daemia*, *Gymnema sylvestre*, *Ocimum Sps.*, *Phyllanthus Sps.*, *Adhatoda vasica*, *Grewia rhamnifolia* and *Rauvolfia serpentina* is the choice of most healers or plant practitioners for treating such diseases. Similarly 100% FL was reported in *P. amarus* for jaundice among the herbal healers in Shimoga district of Karnataka<sup>18</sup> and Malasar tribals in Velliangiri hills of Tamil Nadu, India<sup>19</sup>.

The present study focused to provide complete information’s of medicinal plants utilized by malayali peoples of kalrayan hill. Although traditional medicinal healers have used medicinal plants for treatment of ailments for hundreds of years, there has always been a lingering question in scientific circles as to the efficacy of these plants in really being effective as cures. As a consequence, the pharmacological activity of thousands of medicinal plants has been studied, even though the vast majority of medicinal plants remain to be studied for their phytochemical components and pharmacological effects<sup>20</sup>. The use of plants against medical problems practiced by people and Hakims since ancient times. For example, leaves and roots of *Achyranthus aspera* are used for toothache and abdominal pain. Similarly, *Stellaria medica* is used in plasters on broken bones. Several studies have enumerated the plants used for wound healing and skin diseases in various parts of the world<sup>33</sup>. *Vicia sativa* plant is used as anti-poison. The leaves and roots of *Trichodesma indica* are effective against snakebite. The dried and powdered plant of *Polygonum plebejum* is prescribed for pneumonia and proved a good remedy for cholera, while green leaves of *Datura stramonium* are used for softening the boils<sup>21</sup>. Similar ethnobotanical studies have been reported in many parts of India to protect the traditional knowledge from the environment<sup>22-32</sup>. Documenting the indigenous knowledge through ethnobotanical studies is important for the conservation of biological resources as well as their sustainable utilization<sup>33</sup>.

Table 1 - Medicinal Plants Utility of the Flora in the Kalrayan Hill

S. No.	Botanical Name	Family	Local Name	Habit	Plant Part Used	Ethnomedicinal uses	Mode of Administration
1.	<i>Uvaria narum</i> (Dunal) Wall. ex. Wight and Arn.	Annonaceae	Pulikkan	Stragglng shrub	Leaves	Fevers, biliousness, jaundice; also in rheumatic affections, skin diseases, women to control fits at the time of delivery	Root and leaves-used in intermittent fevers, biliousness, jaundice; also in rheumatic affects; bruised in salt water, used in skin diseases. A decoction of the root bark is given to women to control fits at the time of delivery.
2.	<i>Tinospora cordifolia</i> (Willd.) Miers	Menispermaceae	Seenthil	Climbing shrub	Leaf	Wound	Leaf paste is applied topically
3.	<i>Drymaria cordata</i> L.	Caryophyllaceae	Puliyarai	Herb	Leaf	Snake bites, appetizer, depurative, emollient, febrifuge, laxative and stimulant	The pounded leaf is applied to snake bites , The juice of the plant is used
4.	<i>Grewia rhamnifolia</i> Heyne. ex. Roth.	Tiliaceae	Tegali	Straggler	Fruit	Stomach ache and digestion problems	Fruit juice taken orally in case of stomach ache and digestion problems
5.	<i>Hiptage benghalensis</i> (L.)	Malpighiaceae	Vasantakaal a malligai	Climbing shrub	Leaves	acid, astringent, asthma	The bark, leaves and flowers are aromatic, bitter, acid, astringent
6.	<i>Tribulus terrestris</i> L.	Zygophyllaceae	Nerunchi	Herb	Whole plant	Kidney stones disorders	Extract from the thorns along with <i>Cyanodon</i> juice is taken internally for urinary infection
7.	<i>Aegle marmelos</i> (L.) Correa. ex. Roxb.	Rutaceae	Vilvam	Tree	Leaves	Diabetes	Leaves are dried and powdered used for diabetes.
8.	<i>Citrus limon</i> (L.) Burm. f.	Rutaceae	Elumichai	Small tree	Bark	Skin disease	Paste of bark to treat skin disease
9.	<i>Glycosmis pentaphylla</i> , Corr.	Rutaceae	Kula pannai	Small tree	Root	Antidote for snake bite	Root paste as antidote for snake bite
10.	<i>Zanthoxylum limonella</i> (Dennst.) Alston	Rutaceae	Ashvaghra	Tree	Seed	Cholera	A tincture of the seeds is used in cholera
11.	<i>Commiphora caudata</i> Engl.	Burseraceae	Mullukiluvai	Tree	Leaves	Rheumatism, Stomach ache	The externally are used to latex to Paste, Leaves are crushed and mix with lime juice 2 times a day for 2 days

12.	<i>Azadirachta indica</i> A. Juss.	Meliaceae	Vembu	Tree	Leaf	Small pox	Leaf paste is applied topically on the body to treat smallpox.
13.	<i>Cansjera rheedii</i> J.Gmel.	Opiliaceae	Minnaikkali	Climbing shrub	Whole plant	Body ache, fever	The plant extract for the treatment of post-natal pain and intermittent fever
14.	<i>Celastrus paniculatus</i> Willd.	Celastraceae	Mal kangani	Tree	Seed	Memory loss	Seeds are used to sharpen the memory and the seed oil is used as a tonic for memory loss
15.	<i>Salacia chinensis</i> L.	Celastraceae	Cherukuranti	Herb	Root	Antioxidant, anti-caring, antiulcer, anti-etic, hypoglycemic, antiobesity and skin lightening agent	The root extract shows various activities like, antioxidant, anticaries, antiulcer, antidiabetic, hypoglycemic, antiobesity and skin lightening agent
16.	<i>Sageretia filiformis</i> (Schult.) Don.	Rhamnaceae	Gunger	Tree	Root	Asthma, jaundice and scanty urination	Fresh root decoction is taken orally with water twice a day for 7-8 days for treating asthma, jaundice and scanty urination.
17.	<i>Scutia myrtina</i> (Brum. f.) Kurz	Rhamnaceae	Sudali	Stragglng shrub	Leaves	Indigestion	Leaves are cooked and eaten
18.	<i>Ventilago madraspatana</i> Gaertn.	Rhamnaceae	Vambadam kodi	Liana	Root	Relief stomach disorders and fever.	Root bark is used
19.	<i>Cayratia pedata</i> (Lam.) A. Juss. ex. Gagnep.	Vitaceae	Pannikodi	Liana	Leaves	Scabies Ulcer	Leaves crushed with salt and ginger and applied externally Leaf paste mixed with milk applied internally
20.	<i>Cissus quadrangularis</i> L.	Vitaceae	Perandai	Shrub	Leaf	Stimulant, bone fracture	Stem and leaf paste is used to cure bone fracture and root paste used
21.	<i>Cardiospermum halicacabum</i> L.	Sapindaceae	Mudakattan	Vine	Leaf	Joint pain	Leaf juice taken orally for a period of 2 days.
22.	<i>Derris scandens</i> (Roxb.) Benth.	Fabaceae	Tubili	Climber	Stem	Muscle pain	Powder of stem to capsule taken internally
23.	<i>Glycyrrhiza glabra</i> Linn.	Fabaceae	Athi mathuram	Herb	Root	Cough and cold	Root is boiled with water and taken orally to treat cough and cold.
24.	<i>Mucuna pruriens</i> (Linn.) DC.	Fabaceae	Poonai kali	Vine	Leaf	Urinary diseases	Decoction of leaves to take internally

25.	<i>Pterocarpus marsupium</i> Roxb.	Fabaceae	Vengai maram	Tree	Stem	Stomachache	Decoction of the stem and bark.
26.	<i>Cassia tora</i> L.	Caesalpinaceae	Thagarai	Herb	Leaf	Skin disease	Paste of leaves is applied on skin
27.	<i>Delonix elata</i> L.	Caesalpinaceae	Vadanarayan	Tree	Leaves	Anti-inflammatory Activity	Fresh leaves were carefully cleaned, dried in shade, powdered stored to use
28.	<i>Pterolobium hexapetalum</i> (Roth.) Sant and Wagh.	Caesalpinaceae	Peenjhan	Herb	Leaves	Diarrhea	Leaf and fruit paste is used in the treatment of diarrhea
29.	<i>Acacia leucophloea</i> (Roxb.) Wild.	Mimosaceae	Vellavelan	Tree	Bark	Skin diseases	Paste of bark is applied to apically to treat Skin diseases
30.	<i>Acacia tora</i> Roxb.	Mimosaceae	Seeva keerai	Rambling shrubs	Leaves	Stomachache	Leaves cooked with onion taken as food
31.	<i>Kalanchoe pinnata</i> Lam. Pers.	Crassulaceae	Kutti podum chedi	Herb	Leaves	Scorpion bite	Leaf paste for external application
32.	<i>Combretum albidum</i> G. Don.	Combretaceae	Karlan kodi	Climber	Fruit	Diarrhoea and dysentery, jaundice	The decoction of the fruit used to diarrhoea and dysentery, stem barks used in jaundice
33.	<i>Terminalia arjuna</i> (DC) W&A	Combretaceae	Marutham	Tree	Leaves	Menstrual problem Dysentery, ear ache	The juice made of the leaves was also once used as a cure
34.	<i>Terminalia bellirica</i> Roxb.	Combretaceae	Thanrikkaai	Tree	Seed	Dysentery	Fresh powder used
35.	<i>Terminalia chebula</i> Retz.	Combretaceae	Kadukkai	Tree	Fruit	Digestive, antiseptic and diuretic	Fruits are used.
36.	<i>Eugenia caryophyllus</i> (Sprengel) Bullock & Harrison	Myrtaceae	Lavanga	Tree	Flower	Tuberculosis, anti fungal disease	Both the doses of clove extract showed good anti-stress effect in all the tested models
37.	<i>Lawsonia inermis</i> L.	Lythraceae	Maruthani	Shrub	Leaf	Foot cracks	Leaves are ground and prepared of Maruthani applied to foot cracks to cure it.
38.	<i>Centella asiatica</i> (L.) Urban.	Umbelliferae	Vallarai	Herb	Leaf	Wound	Decoction applied topically along with coconut oil
39.	<i>Alangium salvifolium</i> L.f.	Alangiaceae	Alangi	Tree	Root	Fever, Stomach Problems	Boiled with water and bark filtrate is taken orally once a day for stomach pain

40.	<i>Gadenia gummifera</i> L.	Rubiaceae	Kambil	Small tree	Whole plant	Digestive problems	This species can be helpful in treating digestive problems
41.	<i>Oldenlandia umbellata</i> L.	Rubiaceae	Muthakasu	Herb	Root	Arrest bleeding	The root paste is applied topically to arrest bleeding.
42.	<i>Rubia cordifolia</i> Linn.	Rubiaceae	Sevalaikodi	Climber	Stem	Diabetes, wounds	Fresh roots or fresh tender shoot is made into paste; paste is applied externally
43.	<i>Ageratum conyzoides</i> L.	Asteraceae	Pulkuri	Herb	Whole plant	Allergic rhinitis and sinusitis	The juice of the fresh plant, or an extract of the dried plant, is used in the treatment of allergic rhinitis and sinusitis
44.	<i>Artemisia nilagirica</i> (C.B. Clarke) Pamp.	Asteraceae	Masipattari	Herb	Leaf	Antileprotic	Juice of the leaves to taken to internally
45.	<i>Calendula officinalis</i> L.	Asteraceae	Mari kollundhu	Herb	Flower	Stomachache	Decoction flowers used to treat stomachache
46.	<i>Eclipta alba</i> (L.) Hassk	Asteraceae	Manchal karisalan kanni	Herb	Whole plant	Snake bite	Whole plant juice is given orally to treat
47.	<i>Eclipta prostrata</i> L.	Asteraceae	Karisalan kanni	Herb	Leaf	Hair dose	Leaf paste is applied externally to treat
48.	<i>Pluchea indica</i> (L.) Less.	Asteraceae	Andhi mandari	Herb	Seed	Body cooling	Seed and Flower are used to taken internally
49.	<i>Wedelia calendulacea</i> Less	Asteraceae	Ponniraichi	Herb	Whole plant	Antioxidant,	Antioxidant enzymes activity were greatly protected, besides reducing lipid peroxidation by the herbal extract, showing that this plant is a better remedy for any diseases of the liver
50.	<i>Plumbago zeylanica</i> L.	Plumbaginaceae	Chithira moolam	Herb	Root	Piles	Root past is mixed with gingili oil and applied topically to cure piles.
51.	<i>Madhuca longifoila</i> (L.)	Sapotaceae	Ellupai	Tree	Leaf	Skin disease	Paste of the leaves to use externally
52.	<i>Jasminum ritchiei</i> Clarke	Oleaceae	Karumullai	Climbing shrub	Leaves	Tooth ache	Powder of leaf to used toothache

53.	<i>Jasminum sessiliflorum</i> Vahl.	Oleaceae	Kuruvilan kodi	Climber	Leaves	Diahhroea	The leaf is boiled in water and taken with food
54.	<i>Azima tetracantha</i> Lam.	Salvadoraceae	Sangumullu	Shrub	Root	Snakebites	Applied directly to snakebites.
55.	<i>Aganosma cymosa</i> (Roxb.) G. Don.	Apocynaceae	Sellakkodi	Climber	Whole plant	Bronchitis and ophthalmia	Whole plant is used as anthelmintic, emetic and used in the treatment of bronchitis. Flowers are useful in ophthalmia.
56.	<i>Ichnocarpus frutescens</i> (L.) R. Br.	Apocynaceae	Udarkodi	Climbing shrub	Leaves	Diuretic, fever, dyspepsia	Leaves are used to diuretic, fever
57.	<i>Rauwolfia serpentina</i> L.	Apocynaceae	Sarpagandha	Shrub	Root, tuber	Snake bite	Tuber is made into a paste and applied topically to cure all types of Snake bite.
58.	<i>Gymnema sylvestre</i> (Retz) R. Br.	Asclepiadaceae	Sirukurinja	Twining shrub	Leaf	Diabetes	Leaf powder is mixed with cow's milk and taken orally to treat diabetes.
59.	<i>Hemidesmus indicus</i> (L.) R.Br.	Asclepiadaceae	Nannari	Twining shrub	Root	Fever	Juice extracted from the root is taken Internally
60.	<i>Pergularia daemia</i> (Forssk.) Chiov.	Asclepiadaceae	Veliparutthi	Straggler	Leaf	Fever, Stomach ache and ulcer	Leaf juice is mixed with egg and taken orally to cure stomach ache and ulcer.
61.	<i>Secamone emetica</i> (Retz.) R.Br. ex. Schultes	Asclepiadaceae	Angaravalli	Climbing shrub	Leaves	Rheumatism and traumatic injury, emetic	The root and leaves are used
62.	<i>Strychnos nux-vomica</i> L.	Loganiaceae	Etti	Tree	Seed	Snake bite, Poison reliever	The decrease in strychnine amount was best when the seeds were immersed for detoxification in excess of water for 5 days, in milk for 2 days followed by their boiling in milk.
63.	<i>Swertia chirata</i> (L.) Ham.	Gentianaceae	Chirayata	Herb	Whole plant	Bitter tonic, stomachic, febrifuge and anthelmintic, laxative, alterative, antidiarrhoeic and antiperiodic, skin rashes	Chiretta decoction can be added to a bath to help skin rashes.

64.	<i>Argyreia populifolia</i> Choisy	Convolvulaceae	kakkatan	Herb	Root	Swelling after dog bite.	The root of this pounded and boiled in coconut milk applied with excellent results to inflammation or swelling after dog bite.
65.	<i>Argyreia speciosa</i> (L. f.) Sweet	Convolvulaceae	Samuttra palai	Woody climber	Root	Chronic cough, cold and in consequent fever.	A paste of roots along with <i>Asparagus racemosus</i> , <i>Grewia hirsute</i> and <i>Hemidesmus indicus</i> is used for chronic cough, cold and in consequent fever.
66.	<i>Merremia hastata</i> L. (Desr.) Hallier.f.	Convolvulaceae	Talanelli	Twining herb	Whole plant	Promote hair growth	Hair oil prepared with extract of whole plant to promote hair growth
67.	<i>Solanum trilobatum</i> L.	Solanaceae	Toothuvilai	Under Shrub	Leaf	Cold	Juice of leaves is taken orally
68.	<i>Solanum surattense</i> Burm.f.	Solanaceae	Kandan kattiri	Herb	Seed	Skeletal Diseases	2-5ml seed oil with ginger juice is given once a day in rheumatic arthritis and also applied externally.
69.	<i>Withania somnifera</i> (L.) Dunal	Solanaceae	Amukkira	Sub shrubs	Leaves	Knee pains and joint pains	Dried leaves and root paste are applied externally for knee and joint pains
70.	<i>Adhatoda vasica</i> Nees.	Acanthaceae	Adathoda	Shrub	Leaves	Cough, cold and asthma	Leaf extract is taken internally as drink to cure cough, cold and asthma.
71.	<i>Andrographis echinoides</i> Nees	Acanthaceae	Malaithangi	Herb	Leaves	Chest pain	Leaf is ground into a paste and taken orally to get relief from chest pain.
72.	<i>Andrographis paniculata</i> (Burm.f.) Wall.	Acanthaceae	Nilavembu	Herb	Whole plant	Diabetes	Powdered leaf is mixed with cow or goat's milk and taken Orally to treat diabetes.
73.	<i>Asteracantha longifolia</i> L.	Acanthaceae	Golmidi	Herb	Whole plant	Rheumatism, inflammation, jaundice, hepatic obstruction, pain, urinary infections	The whole plant are extensively used in traditional system of medicine for various ailments like rheumatism, inflammation, jaundice, hepatic obstruction, pain, urinary infections

74.	<i>Clerodendrum inerme</i> (L.) Gaertn.	Verbenaceae	Piei nari sangu	Shrub	Leaf	Fever	Leaf is ground in water and the juice is taken orally to treat fever.
75.	<i>Clerodendrum serratum</i> (Linn.) Moon.	Verbenaceae	Sirutekku	Shrub	Leaf	Stimulant	Decoction of leaves and root used to treat stimulant
76.	<i>Premna latifolia</i> Roxb.	Verbenaceae	Nelli	Herb	Stem	Mosquito repellent, rheumatism	Dried stem soaked in the water are used as mosquito repellent. For rheumatism, tender leaves are used as vegetable
77.	<i>Premna tomentosa</i> Willd.	Verbenaceae	Purangai nari	Tree	Leaves	Anti-inflammatory activity	Dose of 100 mg/kg body weight exhibited significant anti-inflammatory activity in albino rats
78.	<i>Vitex negundo</i> L.	Verbenaceae	Nochi	Shrub	Stem	Intermittent fever	Stem cuttings are placed below the pillow to get rid of intermittent fever
79.	<i>Hyptis suaveolens</i> (L.) Poit.	Lamiaceae	Koulouvai	Herb	Leaves	Colic and stomachache	Crude leaf extract is also used as a relief to colic and stomachache
80.	<i>Mentha piperita</i> L.	Lamiaceae	Milagu puthina	Herb	Leaves	Indigestion, cramps, flatulence, nausea	Tea made from leaves and flowers can be an excellent remedy for treatment of indigestion, cramps, flatulence, nausea
81.	<i>Ocimum basilicum</i> L.	Lamiaceae	Tiruneetru pachilai	Herb	Leaf	Cold	Leaf juice is used as drops in ear pain.
82.	<i>Ocimum sanctum</i> L.	Lamiaceae	Thulasi	Herb	Leaf	Cold	Leaf juice given as tonic.
83.	<i>Plectranthus amboinicus</i> (L.) Spreng.	Lamiaceae	Navara pachilai	Herb	Leaves	Head to control running nose and cough	Leaf is boiling with coconut oil and applied on head to control running nose and cough.
84.	<i>Rosmarinus officinalis</i> L.	Lamiaceae	Agavu	Shrubby herb	Leaves	Cold, scurf and dandruff	An infusion of the dried plant (both leaves and flowers) combined with borax and used when cold, makes one of the best hair washes known
85.	<i>Boerhavia erecta</i> L.	Nyctaginaceae	Mookaratai	Herb	Root	Hydrocele	Root paste is applied topically to treat Hydrocele.

86.	<i>Alternanthera sessilis</i> (L) R.Br. ex. Dc.	Amaranthaceae	Ponnonkanni	Herb	Leaf	Burning sensation, diarrhoea, leprosy, skin diseases and fever	The leaves are used as a vegetable
87.	<i>Aristolochia bracteata</i> Lam.	Aristolochiaceae	Aaduthinna chedi	Herb	Leaf	Fungal diseases	Leaf paste applied over the scalp to relieve Dandruff and Fungal infection.
88.	<i>Aristolochia tagala</i> Cham.	Aristolochiaceae	Keradalum	Climbing shrub	Whole plant	Stomachache	Decoction of the plants to taken to orally
89.	<i>Piper attenuatum</i> Buch. Hamex Miq.	Piperaceae	Irenukai	Climber	Whole plant	Headache	The plant has an intense rube facient effect and is used in poultices of headache
90.	<i>Piper longum</i> L.	Piperaceae	Thippili	Under shrub	Fruit	A tonic for tuberculosis	Fruit Powder is taken in dosage of 1/2-1gm
91.	<i>Piper nigrum</i> L.	Piperaceae	Milaku	Climber	Flower	Snake bite	Flower paste with ghee, orally
92.	<i>Cinnamomum iners</i> Reinw. ex Blume	Lauraceae	Kattu karuveppillai	Tree	Root	Fever	Root are boiled into a decoction taken to treat fever
93.	<i>Cinnamomum tamala</i> Nees & Eberm.	Lauraceae	Lavangapata i	Tree	Leaf	Diaphoretic	Decoction of leaves and bark to taken internally
94.	<i>Cinnamomum zeylanicum</i> Breyn.	Lauraceae	Pattai	Tree	Bark	Stimulant	Decoction of bark to taken internally
95.	<i>Santalum album</i> L.	Santalaceae	Santhanam	Tree	Stem	Body cooling	Shoot paste applied externally
96.	<i>Cleistanthus collinus</i> (Roxb.) Benth. and Hook.f.	Euphorbiaceae	Oduvan	Tree	Leaves	Poisonous purpose	Leaves are used as insect repellant in agricultural fields and fruit used
97.	<i>Phyllanthus debilis</i> L. (Klein ex Willd)	Euphorbiaceae	Keelanelli	Herb	Whole plant	Jaundice	Whole plant parts are ground into a paste and taken orally 3 times a day for 3days to treat jaundice
98.	<i>Phyllanthus madrassetensis</i> L.	Euphorbiaceae	Nilanelli	Herb	Whole plant	Jaundice	Powder from dried plant material mixed with milk is drunk to treat jaundice
99.	<i>Sebastiania chamaelea</i> (L.) Muell Arg.	Euphorbiaceae	Eli-amanaku	Herb	Leaves	Antidiarrhoeal activity	Aqueous leaf extracts of S.chamaelea at 100-200 mg/kg b.w showed most effective antidiarrhoeal activity

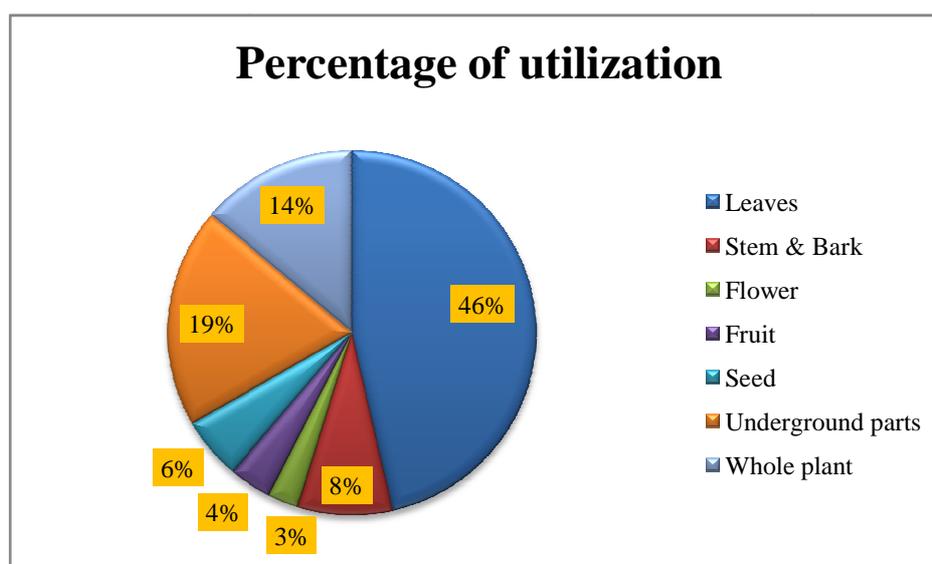
100.	<i>Tragia involucrata</i> L.	Euphorbiaceae	Kancharai kodi	Herb	Leaves	Jaundice, Diarrhea	Decoction of whole plant is given twice a day for 7 days to improve digestion and to cure constipation alternated
101.	<i>Plecosperrum spinosum</i> Tree.	Moraceae	Ekkimullu	Shrub	Root	Checks cholera, colds, cough, syphilis	Decoction of roots used for colds, cough, syphilis
102.	<i>Alpinia officinarum</i> Hance.	Zingiberaceae	Chitrattai	Herb	Rhizome	Phlegm	Powder of rhizome taken to internally
103.	<i>Aloe vera</i> (L.) Burm.f.	Liliaceae	Sotthu katthalai	Herb	Leaf	Body cooling	Eaten raw to cool the body.
104.	<i>Asparagus racemosus</i> Willd.	Liliaceae	Thaneervitan kizhangu	Shrub	Root	Uterine disorder	Root powder mixed with taken internally for increasing lactation and uterine disorder
105.	<i>Gloriosa superba</i> L.	Liliaceae	Kalappai kilangu	Climber	Leaf	Skin disease	Powdered paste from leaves applied to externally
106.	<i>Acorus calamus</i> L.	Araceae	Vasambu	Shrub	Rhizome	Stomachache	Rhizome To heat and take internally
107.	<i>Amorphophallus campanulatus</i> , Bl.	Araceae	Karunaik kizhangu	Herb	Tubers	Snake bite	The tubers are crushed and applied in wounds of snake bite
108.	<i>Vetiveria zizanioides</i> L.	Poaceae	Vettiver	Herb	Root	Reduce the dandruff, and hair falling	Dried roots are mixed with coconut oil to reduce the dandruff, and hair falling.

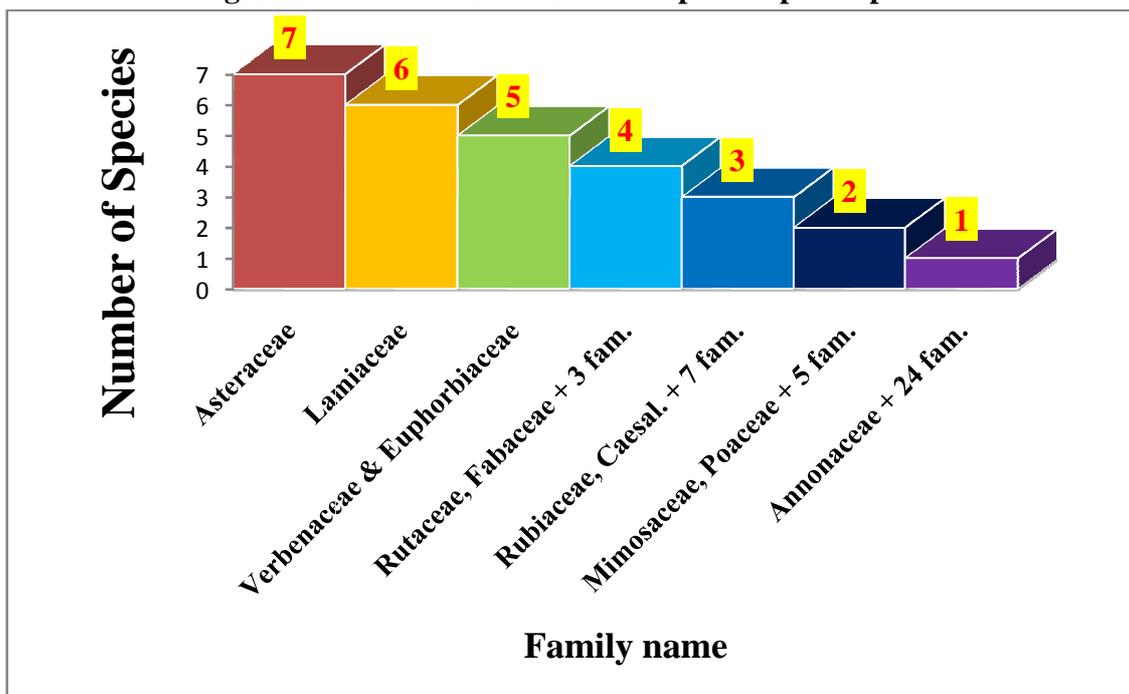
**Table – 2: Distribution of plants under different forms of habit**

<b>S.NO.</b>	<b>HABIT</b>	<b>NO. OF SPECIES</b>
1.	Herb	41
2.	Tree	24
3.	Shrub	11
4.	Climber	8
5.	Climbing shrub	7
6.	Vine	2
7.	Straggler	2
8.	Sub shrub	1
9.	Stragglng shrub	2
10.	Twining shrub	2
11.	Under shrub	2
12.	Shrubby herb	1
13.	Liana	2
14.	Rambling shrub	1
15.	Twining herb	1
16.	Woody climber	1
	<b>TOTAL</b>	<b>108</b>

**Table-3: Fidelity Level (FL) values for common medicinal plants used by kalrayan traditional healers by ailment category**

Ailment Category	Most preferred species with specific ailment	FL %
Cooling Agent	<i>Aloe vera</i>	100.00
Dental care	<i>Jasminum ritchiei</i>	65.00
Dermatological infections/ diseases	<i>Gloriosa superba</i> (Skin diseases),	78.50
Ear, Nose, Throat problems	<i>Tinospora cordifolia</i> (Wound)	45.50
	<i>Terminalia arjuna</i> (Ear ache),	90.00
	<i>Aganosma cymosa</i> (ophthalmia)	70.00
Endocrinal disorders	<i>Gymnema sylvestre</i> (Diabe.),	100.00
Fever/Cold	<i>Aegle marmelos</i> (Diabe.)	55.65
	<i>Pergularia daemia</i> (Fever),	100.00
	<i>Ocimum</i> species (All)	100.00
Gastro intestinal ailments	<i>Vitex negundo</i> (fever, cough)	75.00
	<i>Grewia rhamnifolia</i> ,	100.00
Hair care	<i>Commiphora caudata</i>	45.50
	<i>Vetiveria zizanioides</i> (Dandruff)	95.75
Liver Problems (Jaundice)	<i>Uvaria narum</i> ,	70.00
	<i>Tragia involucrate</i> ,	75.00
Poisonous bites	<i>Phyllanthus</i> sps.	100.00
	<i>Rauvolfia serpentina</i> (Snake bite),	100.00
	<i>Strychnos nux-vomica</i> (Snake bite),	75.00
Respiratory System diseases	<i>Adhatoda vasica</i> (Asthma),	100.00
	<i>Plecosperrum spinosum</i> (Cough),	75.00
Skeleto-muscular system disorders	<i>Premna latifolia</i> (Rheumatism)	35.50

**Fig. 2: Percentage of plant part utilization**

**Fig. 3: Name of the families with respective plant species**

### CONCLUSION

In conclusion the local peoples of kalrayan hill a part of Eastern Ghats of Tamil Nadu, India, has much knowledge of using plants as a medicine throughout their lifespan as well as passed their knowledge to generations. Up to date they still following their customs and beliefs. This kind of research studies may helpful to explore the knowledge and utilization of medicinal plants without affecting the plant. The peoples belong to the kalrayan area still rely on the medicinal plants and using those medicinal plants in their daily beliefs. And there is an urgent need to document all information's about the uses of medicinal plants by the tribal for future research.

### Conflict of interest:

We have no conflict of interest

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