ETHNOBOTANICAL STUDY OF KNOWLEDGE AND MEDICINAL PLANTS USE BY THE KURUMBA TRIBES IN CHEMMANKARAI, NILGIRI DISTRICT, TAMIL NADU

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ABSTRACT
The present study initiated with an aim to highlight and document the traditional knowledge and medicinal plants used by the Kurumba tribes inhabiting at Chemmankarai area of Nilgiri district, Tamilnadu. During the study selected study area was visited frequently and information was collected through semi directive, open ended interview among the informants of Kurumba tribes. The details on vernacular name of the plant, mode of diagnosis, disease they treat, usage of plants, mode of application were collected. The plants were identified and deposited at the herbaria of Nirmala College for Women, Coimbatore. The results revealed that the total 56 plant species belonging to 31 families and 47 genera have been documented in the present study. The highest number plants being used for fever and wound healing (7), Insect bite, migraine, bath, ulcer, immunity and throat pain (4) followed by joint pain, tooth ache and asthma (3). The habit of the species showed that 68 % of the drugs were obtained from the herbs compared with the other habit plants. The reported potential ethnomedicinal plants could be conserved and further validation need for better utilization and provisions of the documented knowledge.

Keywords: Ethnobotany, Kurumba tribe, traditional knowledge and Nilgiri District.

1. INTRODUCTION
India is rich in ethnic diversity and indigenous knowledge that has resulted in exhaustive ethanobotanical studies (Uma priya et al 2011). According to the World Health Organization (WHO) about 65-80% of the world’s population in developing countries depends essentially on plants for their primary healthcare due to the poverty and lack of access to modern medicine (Sharma et al., 2010). In Indian medicine systems, Ayurveda, Sidha and Unani entirely and Homeopathy partially depend either on plant materials or their derivatives for treating human ailments (Joseph and Justinraj, 2011).

The Western Ghats of India is one such high bio-cultural diversity region, which is one of the global biodiversity hot-spots (Myers et al., 2000). The Nilgiri district has variegated plants propagating both exotic and native flora of substantial recuperative utility. It consists all in all six ethnic groups of anthropological interest. They are Todas, Kotas, Kurumbas, Irulas, Paniyas and Kattunayakas (Rajan and Sethuraman,1991). Every tribal group in this country is unique in the sense that they are characterized with certain special knowledge and skills about medicinal plants used in their traditional system of medicine to cure a wide range of disease (Rajan et al 2003). They subsist on food such has honey, fruits and tubers besides other variety of cereals. New medicinal uses of plant have been continuously reported by several workers in different localities (Ranjith and Ramachandran, 2010). The present work is an effort to document and analyze the traditional knowledge regarding the practice and use of plants in treatment for various ailments by Kurumba tribes of Chemmankarai, Nilgiri District, Tamilnadu.

2. METHODOLOGY
2.1. Study Area
Blue mountains are some of the most picturesque mountain ranges situated in Southern India. It is located in North Western corner of Tamil Nadu, South India and the district has geographical area of 2,543 sq. kms. Chemmankarai area situated in Coonoor Taluk of the Nilgiri district, Tamil Nadu, India at altitude of 800 to 830 metres above mean sea level (Fig. 1). The places cover a large area of thick forest vegetation which habitats wild animals such as Black panther, Elephants, Deer, Bear, Bison etc. In view of exploitation and conservation of tribal knowledge an attempt has been made to study the ethanobotanical aspect from Chemmankarai area in Coonoor.

2.2. Kurumba Tribe
Kurumba tribes are found in the forest area of Chemmankarai, Nilgiri district. They are skilled people in honey collection, food harvesting and
medicine preparation. They collect medicinal plants from the deep forest area and utilize it efficiently. These people live in forest area in habitat of wild animals and they are able to sense the smell of the animals nearby or on the way. They make money by selling jack fruits, citrus, Guava, coffee bean cultivation, wild chillies etc., to the Burliar shops on the way to Mettupalayam to Ooty. These people build their houses with stones and red soil.

2.3. Data collection

The present investigation was carried out from Chemmankarai area of Nilgiri district to get information from the tribal practitioners and also to cross check the information provided by the practitioners during the earlier visits. The survey was conducted during June, 2016 to November, 2016. The medicinal plants growing in natural habitats of Chemmankarai forest was collected, identified and authenticated with the help of valid references (Hooker, 1875-97; Gamble and Fisher, 1935 and Matthew, 1991). At the same time plant species were collected and herbarium sheets were prepared by traditional method and were deposited in Department of Botany, Nirmala College for Women Coimbatore. The details on vernacular name of the plant, mode of diagnosis, disease they treat, usage of plants, mode of administration were collected from the tribal practitioners through direct interviews and oral conversations. The tribal practitioners have a sound knowledge about the medicinal plants around their place to treat the common diseases in family and neighbourhood.

2.4. Ailment categories

On the bases of the information gathered from the tribal healers in the study area all the reported ailments were categories (Table 1) viz., kidney stones, cancer, circulatory system, dermatological infection, endocrine disorders, eye infection, fever, gastro intestinal ailment, genito urinary infection, hair problems, piles, poisonous bite, respiratory system disorder and skeleto muscular system disorder.

3. RESULTS AND DISCUSSION

3.1. Documentation of Indigenous ethnomedicinal knowledge

The Nilgiri Biosphere Reserve is an international biosphere reserve in the Western Ghats and it is very rich in floral and faunal diversity. Many ethnobotany studies have been carried out in the Nilgiri hills, but the outcome of the study have not reached the local and scientific communities to explore further. The results of the present study revealed that the 56 plant species are used by Kurumba tribes for herbal remedy for the treatment of various ailments. These species belonging to 31 families, the most represented being Solanaceae (5), Asteraceae and Oxalidaceae (4), Malvaceae, Piperaceae, Myrtaceae and Rosaceae (3), Arecaceae, Sapindaceae, Caryophyllaceae, Zingiberaceae, Lamiaceae, Euphorbiaceae, polygonaceae, Rutaceae and Fabaceae (2). Among the genera Oxalis (3), Solanum, Piper, Leucas and Rubus (2) are the most represented genera in the studied plants (Table 2).

| Ailment Categories        | Biomedical terms                         | Tamil Terms                              |
|---------------------------|------------------------------------------|------------------------------------------|
| Cancer                    | Cancer                                   | Putru noi                                |
| Circulatory system        | Blood clotting, blood purification, cholesterol| Ratham kattu, Rayha suthigaripu, kozhuppu. |
| Dermatological infection  | Cuts, wounds, itching, skin irritation, burning injury | Vettukayam, aripu, thol noi, arinja pun. |
| Endocrine disorders       | Diabetes                                 | Neer elivu noi                           |
| Eye infection             | Eye infection                            | Kan vedanai                              |
| Fever                     | Fever, malaria fever                     | Kachal, Kosu kadi kachal                 |
| Gastro intestinal ailment | Ulcer, dysentery, pitta                  | Kudal pun, pittam                        |
| Genito urinary infection  | Sexual weakness, menstrual problems, post natal care. | Mada vidai kolaru,                       |
| Hair disease              | Hair disease                             | Thala mudi noi                           |
| Kidney stones             | Kidney stone                             | Kal                                      |
| Liver problem             | Jaundice                                 | Manja kamalai                            |
| Piles                     | Hemorrhoids                              | Mulam                                    |
| Poisonous bite            | Snake bite, centipede bite, bee bite, insect bite | Pambu kadi, pooran kadu, then poochi kadi, poochi kadi. |
| Respiratory system disorder| Cold, bronchitis, pneumonia fever        | Jaladosham, nenju Sali,                 |
| Skeleto muscular system disorder| Arthritis, inflammation, muscular pain. | Vatham, veekam, chadai pidipu            |
| S. No. | Binomial Name                  | Family        | Vernacular name | Life form | Chemical constituents | Mode of administration | Parts Used | Medicinal Uses                                                                                                                                                                                                                           |
|--------|--------------------------------|---------------|----------------|-----------|-----------------------|------------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1      | *Abutilon indicum* Sweet       | Malvaceae     | Thuthi          | Shrub     | Abutilin A(1)         | Oral and External      | Leaves     | Leaf decoction taken orally in empty stomach for 48 days to cure bleeding piles. Leaf paste and turmeric are mixed with heated coconut oil and heated for 15 -20 min, filtered and applied externally for piles. |
| 2      | *Achyranthes aspera* L.        | Amaranthaceae | Naayuruvi       | Herb      | Triterpenoid saponin  | Oral                   | Root and Leaves | Root decoction taken orally for stomach upset. Leaves are cooked as greens and used to reduce fever. The pulp is collected and mixed with coconut oil, filtered and used for external application for wounds. The pulp is taken raw orally to control white discharge in women. The plant is cut and applied on insect sting to avoid swelling and itching. The paste of tuber is used as antidote for veterinary purposes. |
| 3      | *Aloe vera* (L.) Burm.f.       | Liliaceae     | Kathalai        | Herb      | Anthraquinone         | Oral and External      | Leaves     | The leaves are crushed and applied on cut wounds for clotting of blood. The plant juice is applied on the injured part and also for bleeding. Plant paste is applied on forehead for migraine. Used as herbal bath for babies. Crushed leaves are tied over wounds to improve healing. |
| 4      | *Arisaema tortuosum* (Wall.) Schott | Araceae      | Naga chedi      | Herb      | Arisaimenone         | External               | Tuber      | The leaves are crushed and applied on cut wounds for clotting of blood. The plant juice is applied on the injured part and also for bleeding. Plant paste is applied on forehead for migraine. Used as herbal bath for babies. Crushed leaves are tied over wounds to improve healing. The plant is collected and boiled with pepper water taken to reduce joint pain and strengthen bones. The leaves are grinded into paste with *Cissus quadrangularis* and |
9. *Catharanthus roseus* (L.) G. Don

**Family:** Apocynaceae  
**Common Name:** Nithya kalyani  
**Type:** Herb  
**Active Component:** Limonene  
**Form of Use:** Oral  
**Whole plant**  
The plant extract is grinded with rhizome of turmeric and pinch of salt and given internally to cure ulcer. Flower petals are boiled and regularly intaken to cure cancer.

10. *Centella asiatica* (L.) Urban

**Family:** Apiaceae  
**Common Name:** Vallarai  
**Type:** Herb  
**Active Component:** Siddiqi BS(1)  
**Form of Use:** Oral  
**Leaves**  
The leaf paste is mixed with goat milk to increase memory power. Leaf powder is mixed with *Solanum nigrum* to control mouth ulcer. Leaf powder with empty stomach is taken to control white discharge in women.

11. *Cestrum aurantiacum* Lindl.

**Family:** Solanaceae  
**Common Name:** Pnari elai  
**Type:** Shrub  
**Active Component:** Paraquai  
**Form of Use:** External  
**Leaves**  
The leaves are crushed and applied on cut wounds.

12. *Colacasia esculenta* (L.) Schott

**Family:** Araceae  
**Common Name:** Chaman keerai  
**Type:** Herb  
**Active Component:** B-Sitosterol  
**Form of Use:** Oral  
**Leaves**  
The leaves and tubers are Cooked with fruit of *Tamarindus indica*.

13. *Commelina benghalensis* L.

**Family:** Commelinaceae  
**Common Name:** Amala chedi  
**Type:** Herb  
**Active Component:** Anthocyanin  
**Form of Use:** Oral  
**Leaves**  
The leaf juice with *Piper nigrum* are orally intaken to reduce fever. The plant with cumin is boiled in water and taken regularly every day morning in empty stomach to cure digestive disorders. The leaf paste is applied externally on broken bones. The leaves are boiled in hot water and used for bath to get rid of body pain. The plant extract is applied externally to odemas in small children.

14. *Cynodon dactylon* (L.) Pers

**Family:** Gramineae  
**Common Name:** Arugu  
**Type:** Herb  
**Active Component:** Cyanogenic hyperoside  
**Form of Use:** Oral  
**Whole plant**  
The crushed leaves are rubbed on throat to get rid of tonsillitis.
| No. | Scientific Name                  | Family              | Common Name            | Part Used   | Use                                      | Constituent                  |
|-----|--------------------------------|---------------------|------------------------|-------------|------------------------------------------|------------------------------|
| 19  | *Hedychium spicatum* Sm.in A.Rees | Zingiberaceae       | Spiked ginger lily     | Herb        | External and Oral                        | α-Terpineol                  |
|     |                                |                     |                        |             | Leaves and Rhizomes                      |                              |
| 20  | *Hydrocotyle javanica* Thumb.    | Araliaceae          | Water penny worth      | Herb        | External                                 | Cardiac glycosides           |
|     |                                |                     |                        |             | Whole plant                              |                              |
| 21  | *Ipomoea cairica* Sweet         | Convolvulaceae      | Morning glory Thumbai   | Climber     | Oral                                     | Ergoline alkaloid            |
| 22  | *Leucas aspera* Spr.            | Lamiaceae           | Sema thumba            | Herb        | Nasal                                    | α and β sitosterol           |
| 23  | *L. hirta* Spr.                 | Lamiaceae           | Maa maram              | Tree        | Oral                                     | Coumarins                   |
| 24  | *Mangifera indica* L.           | Anacardiaceae       | Chembakam              | Tree        | Seed                                     | Mangiferin                  |
| 25  | *Michelia champaca* L.          | Magnoliaceae        | Thotta churungi Jathika| Tree        | External                                 | Liriodenine                 |
| 26  | *Mimosa pudica* L.              | Ceasalpineaceae     | Kattu kathiri          | Herb        | Root                                     | Corcetin-dimethylester      |
| 27  | *Myristica fragrans* Houtt.     | Myristicaceae       | Puli keerai            | Herb        | Oral                                     | Erythrosurinamensin         |
| 28  | *Nicandra physaloides* Gaertn.  | Solanaceae          | Puliyan keerai         | Herb        | Oral                                     | Carotenoid                  |
| 29  | *Oxalis corniculata* L.         | Oxalidaceae         | Methoxyflavones        | Oral        | Whole plant                              |                              |
| 30  | *O. latifolia*                   | Oxalidaceae         | β-Sitosterol           | Oral        | Leaves                                   |                              |

*parviflora* Cav.

The leaves are burnt and the ash is applied over night to cure headache. The rhizome powder is mixed with goat milk and used in treating asthma. The plant juice with ash is mixed and used to treat fever. The paste of plants is used to treat wounds and boils. Root decoction taken internally for urinary infection. 1-2 drops of fresh leaf juice are dropped inside the nose to cure one side head ache. Root decoction is used to treat bronchial diseases. Seed powder is given in empty stomach to get rid of stomach worms. Leaves and bark are boiled in water and used for bath during fever. Root decoction taken orally to cure kidney stones. The fruit are collected and flesh is made into pickles to cure digestion problems. The seed is scraped with breast milk and given to new born babies to increase immunity. Decoction of seed is used to treat fever. The infusion of the plant is said to be a remedy for hook worm. The intake of leaf juice of plant treats urinary infection.
| No. | Scientific Name       | Family       | Common Name               | Part    | Active Ingredients          | Route | Usage                                                                 |
|-----|-----------------------|--------------|---------------------------|---------|-----------------------------|-------|----------------------------------------------------------------------|
| 31  | *O. tuberosa*         | Oxalidaceae  | Neer puli                 | Herb    | Fructooligosaccharides      | Oral  | Leaves One hand full of leaves is boiled with one glass of water to reduce fever. |
| 32  | *Peperomia tetraphylla* | Piperaceae   | Othu chedi                | Epithytic herb | Aristolactam AII(1)       | External | Leaves Leaf paste are applied on fore head to cure migraine          |
| 33  | *Phyllanthus amarus* Schum. and Thonn. | Euphorbiaceae | Keezhanalli               | Herb    | Phyllanthine                | Oral  | Leaves The leaves are grinded with fresh goat milk and taken internally every morning in empty stomach to cure jaundice. |
| 34  | *Physalis peruviana* L. | Solanaceae   | Thol thakkali             | Herb    | Cuscohygrine                | Oral  | Fruits Fruits edible                                                  |
| 35  | *Phytolacca octandra* | Euphorbiaceae | Poke weed                 | Herb    | Phytolaccic acid           | Oral  | Roots One gram of dried root powder have been used as laxtative.     |
| 36  | *Piper mulesua*       | Piperaceae   | Kattu milagu              | Climber | Piperine                    | Oral  | Seeds Seed powder is mixed with honey and taken to cure throat infection and cold. |
| 37  | *P. nigrum* L.        | Piperaceae   | milagu                    | Climber | α-tocopherol               | Oral  | Leaves The leaf, seed decoction are used to treat cough, cold, indigestion. |
| 38  | *Polygonum chinense* L. | Polygonaceae | Climbing knot weed       | Herb    | Squalene                   | Oral  | Stem The stem is directly broken and chewed to get rid of dysentery.   |
| 39  | *Psidium guajava* L.  | Myrtaceae    | Koija                     | Small tree | Pentacyclic triterpenoid guajanoic α-tocopherol | Oral  | Leaves Leaves are chewed with close to get rid of tooth ache.         |
| 40  | *Rhodomyrtus tomentosa* W. | Myrtaceae | Thavuthu palam           | Shrub    | α-tocopherol               | External | Leaves Fresh leaves are crushed and applied externally on the inflammation to treat tooth ache. |
| 41  | *Ricinus communis* L. | Euphorbiaceae | Amma nakku               | Small tree | Ricinolein                 | Oral  | Seeds Pregnant women intake oil in size of 50 paise coin every day. The oil is applied on boils. The oil with neem is applied on hair to get rid of ring worm disease in head which causes hair fall. |
| 42  | *Rubia cordifolia* L. | Rubiaceae    | Pambu vada                | Climber | Rubiadin                   | Oral  | Stem Dried stem powder is mixed with honey and taken for insect bite. |
| 43  | *Rubus ellipticus* Sm. | Rosaceae     | Mullu palam              | Climber | β- Carotene                | Oral  | Fruit The fruits are regularly taken by pregnant women as it increase the hemoglobin count in mother and fetus. |
| 44  | *R. racemosus* Roxb. | Rosaceae     | Sema mullu                | Climber | Anthocyanin                | Oral  | Young Shoot & Fruits are consumed to increase blood count. Shoots edible. |
| No. | Species                        | Family              | Plant Type | Compound          | Route  | Part(s)       | Uses                                                                 |
|-----|--------------------------------|---------------------|------------|-------------------|--------|---------------|----------------------------------------------------------------------|
| 45  | *Rumex nepalensis* Spr.        | Polygonaceae        | Herb       | Anthraquinone     | External| Leaves        | The leaves are dipped in heated castor oil and placed on swollen wounds and tied over night to reduce swelling. |
| 46  | *Ruta graveolance* L.         | Rutaceae            | Herb       | Sesuiterpene hydrocarbon | External| Leaves and fruits | The leaf paste applied on skin externally to cure skin diseases. The fruits are threaded as chain and tied in hands of new born babies for protect from infection. The leaf decoction is taken for 7 days in empty stomach to cure irregular menstruation. Plant decoction is taken internally to cure rheumatism. |
| 47  | *Saraca asoca* (Roxb.) de Wilde | Caesalpiniaceae     | Tree       | *Catechin*       | Oral   | Leaves        | The leaf decoction is taken for 7 days in empty stomach to cure irregular menstruation. |
| 48  | *Sida rhomboidea* Mast.        | Malvaceae           | Herb       | Cryptolepinone    | Oral   | Whole plant   | Fresh leaves are taken raw to cure mouth ulcer. Leaf decoction is mixed with pepper to reduce fever. Fruits edible. |
| 49  | *Solanum nigrum* L.            | Solanaceae          | Herb       | Gentisic acid     | Oral   | Leaves        | The leaves are dipped in heated castor oil and places on swollen wounds and tied over night to reduce swelling. |
| 50  | *Solanum sisymbrifolium* Lam.  | Solanaceae          | Herb       | β-sitosterol      | Oral   | Fruits        | The whole plant is cooked and consumed as body cooler. The flowers are crushed and placed in place of tooth ache. The seed powder are dried and taken regularly to have control on diabetics. Boiled with cumin and taken in empty stomach to cure ulcer problem. |
| 51  | *Spergula arvensis* L.         | Caryophyllaceae     | Herb       | -                 | Oral   | Whole plant   | The whole plant is cooked and consumed as body cooler. The flowers are crushed and placed in place of tooth ache. The seed powder are dried and taken regularly to have control on diabetics. Boiled with cumin and taken in empty stomach to cure ulcer problem. |
| 52  | *Spilanthes clava W. Skeels*   | Asteraceae          | Herb       | Spilanthol        | External| Flowers       | The flowers are crushed and placed in place of tooth ache. The seed powder are dried and taken regularly to have control on diabetics. Boiled with cumin and taken in empty stomach to cure ulcer problem. |
| 53  | *Syzygium cumini* (L.) Skeels  | Myrtaceae           | Tree       | Anthocyanins      | Oral   | Seeds         | Boiled with cumin and taken in empty stomach to cure ulcer problem. |
| 54  | *Trifolium repens* L.          | Fabaceae            | Herb       | -                 | Oral   | Whole plant   | The twig is cut and soaked in water for few days and fibre is obtained. The leaves are grinded and applied on inflammation to reduce pain. Rhizome juice is mixed with honey to cure throat infection. |
| 55  | *Urena lobata* L.              | Malvaceae           | Herb       | -                 | External| Whole plant   | The twig is cut and soaked in water for few days and fibre is obtained. The leaves are grinded and applied on inflammation to reduce pain. Rhizome juice is mixed with honey to cure throat infection. |
| 56  | *Zingiber officinale* Rosc.    | Zingiberaceae       | Herb       | Gingerol          | Oral   | Rhizome       | The twig is cut and soaked in water for few days and fibre is obtained. The leaves are grinded and applied on inflammation to reduce pain. Rhizome juice is mixed with honey to cure throat infection. |
### Table 3. Ingredients added for the preparation of herbal medicines by the Kurumba Tribes.

| Botanical names          | Other plants added in medicinal preparation | Other ingredients added |
|-------------------------|---------------------------------------------|------------------------|
| *Abutilon indicum*      | *Curcuma longa*                             | Coconut oil            |
| *Aloe vera*             | --                                          | Coconut oil            |
| *Catharanthus roseus*   | *Curcuma longa*                             | Salt                   |
| *Centella asiatica*     | *Solanum nigrum*                            | Goat milk              |
| *Colacassia esculenta*  | *Tamarindus indicus*                        | --                     |
| *Commelina benghalensis*| *Piper nigrum*                              | --                     |
| *Cynodon dactylon*      | *Cuminum cyminum*                           | --                     |
| *Emilia Sonchifolia*    | --                                          | Salt                   |
| *Hedychium spicatum*    | --                                          | Goat milk              |
| *Hydrocotyle javanica*  | --                                          | Ash                    |
| *Myristica fragrans*    | --                                          | Breast milk            |
| *Phyllanthus amarus*    | --                                          | Goat milk              |
| *Piper mulesua*         | --                                          | Honey                  |
| *Psidium guava*         | *Syzygium aromaticum*                       | --                     |
| *Rhodomyrtus tomentosa* | *Syzygium aromaticum*                       | --                     |
| *Ricinus communis*      | *Azadirachta indica*                        | --                     |
| *Rubia cordifolia*      | --                                          | Honey                  |
| *Rumex nepalensis*      | --                                          | Castor oil             |
| *Solanum nigrum*        | *Piper nigrum*                              | --                     |
| *Trifolium repens*      | *Cuminum cyminum*                           | --                     |
| *Zingiber officinale*   | --                                          | Honey                  |

Fig. 1. Showing the study area of Chemmankarai, Nilgiri District, Tamilnadu.

Fig. 2. Showing some medicinal plants used by the Kurumba tribes of Chemmankarai, Nilgiri District, Tamilnadu. A- *Arisaema tortuosum*, B- *Hedychium spicatum*, C- *Rubia cordifolia*, D- *Spilanthes clava*, E- *Rubus ellipticus*, F- *Rhodomyrtus tomentosa*. 
Fig. 3. Analysis of habit with respect to no. of species.

Fig. 4. Statistics of plant parts used.

Fig. 5. Status of the plants in the study area.

Fig. 6. Categories of Kurumba tribes mode of utilization for the preparation of medicine.

Fig. 7. Plants used for treating various diseases

In the present study more than a single plant used for same ailment, for example Achyranthes aspera, Commelina benghalensis, Hydrocotyle javanica, Michelia champaca, Nicandra physaloides, Oxalis tuberosa, Solanum nigrum (fever), Bidens pilosa, Cardamine africana, Cestrum aurantiacum, Hydrocotyle javanica, Rumex nepalensis, Aloe vera (wound) likewise single plant is used for more than 1 disease Achyranthes aspera (fever and stomach problems), Aloe vera (wound, white discharge and insect sting), Biophytum intermedium (bleeding and migraine), Cardamine africana (bath and wound healing), Cardiospermum halicacabum (joint pain and fracture), Catharanthus roseus (stomach ulcer and cancer), Centella asiatica (increase memory, white discharge and mouth ulcer), Dodonaea viscosa (fracture and body pain), Hedychium spicatum (Head ache and body pain), Hydrocotyle javanica (fever, boils and wounds), Myristica fragrans (digestive disorder and immunity), Ricinus communis (Ring worm disease and boils), Ruta graveolance (skin disease and immunity) and Solanum nigrum (mouth ulcer and fever). Several studies have reported the plants used for wound healing, fever, stomach problem, itching, skin irritations and other skin diseases in various parts of the world (Harsha et al., 2003; Ayyanar and Ignacimuthu, 2005; Chah et al., 2006 and Saikia et al., 2006) (Table 2 and Fig. 2).

3.2. Life form and parts used

Analysis of habit forms indicates 38 plants were herbs, 7 plants were trees, 7 plants were climbers and 4 plants were shrubs (Fig. 3). Observations were made earlier studies on ethnobotany have also been reported that the herbs are the dominant life form in their study area (Ayyanar and Ignacimuthu, 2005; Xavier et al., 2014; Kalaiselvan and Gopalan, 2014 and Kannadhasan et
al 2016). According to medicinal preparation of plant parts used, leaves are the most preferable part to prepare medicine (39%) followed by whole plant (21%), root (13%), seeds and fruits with 10%, stem (5%) and bark and flowers with 1% (Fig. 4). Similarly Xavier et al. 2014 found that leafy crude drug preparations are mostly recommended for ethnomedicine. Fig. 5 shows the number plants used for treating various diseases.

3.3. Method of preparation and mode of administration of plants

The preparation and usage of plant parts were categorized as decoction and raw 12% followed by paste 11%, powder 8%, cooked and juice 7% and raw (5%) of the raw materials of plant parts such as fruits, leaf etc. (Fig. 6). The decoctions were prepared by boiling the plants in water and the water level reduce to about required amount. The preparation of decoction is one of the common ailments practices among some tribal in Tamil Nadu (Ranjith and Ramachandran, 2010; Thirumalai et al., 2012). The paste was prepared by grinding the fresh leaves in water or milk. The mode of administration routes were oral (58%), external application (41%) and Nasal (1%). External application were used to treat piles, skin, wound healing, migraine, broken bones, body pain, head ache, asthma and hairfall. Internal application were preferred to treat fever, ulcer, stomach upset, memory power, digestive disorder, urinary infection, stomach worm, jaundice, cold, tooth ache, rheumatism, diabetics, throat infection and nasal application was for head ache (Fig. 7). The utility of the same was mentioned earlier by Upadhyya et al., 2012.

3.4. Ingredients added

The medicines were prepared by the Kurumba tribal healers use more than one plants and other ingredients such as honey, goat milk, breast milk, coconut oil, castor oil, salt and ash to improve the tolerability and medicinal property of certain remedies (Table 3). Xavier et al. 2014 have supported the present findings. Honey and Goat milk are used while intake of prepared medicine in powder forms. Oral medicines are prepared mostly using water, goat milk, breast milk and honey based on the needs.

4. CONCLUSION

The tribes of Chemmankarai area have been using numerous medicinal plants for therapeutic purpose since immemorial times. The people depend on these medicinal herbs for the treatment of various diseases such as fever, kidney stone, white discharge in women, asthma, skin disease etc, these plants are used readily as on when needed and so there is need for documentation and conservation of such Medicinal plants.

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