Ethnomedicinal plants used by the tribals of Kalakad-Mundanthurai Tiger Reserve (KMTR), Western Ghats, Tamil Nadu for the treatment of rheumatism

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The study has been carried out in Kalakad-Mundanthurai Tiger Reserve of Western Ghats, Tirunelveli, Tamil Nadu. Kanikkar, the predominant tribal community has their settlements in different areas in the Reserve Forest. Fifty medicinal plants belonging to 36 families are identified which have been employed by the tribal community for the treatment of rheumatism. The plants have been enumerated with botanical names followed by family name, local (Kanikkar) name, plant parts used, mode of administration and uses.

Keywords: Kanikkar, Ethnomedicine, Rheumatism, Western Ghats

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Popular knowledge of plants which can be used by humans is based on thousands of years' experience¹. It is essential to make the complete inventory of the medicinal component of the flora of any country for conservation and sustainable use. The conservation of the threatened and endangered medicinal species in the wild is indispensable². Some information on the medicinal plants used by the Kanikkars for treating rheumatism is available³–⁶. In Tamil Nadu, several tribals inhabiting Western Ghats such as Kanikkars seem to have been endowed with a rich knowledge of herbs, especially ailments like rheumatism. The study focuses on the ethnomedicinal plants used by Kanikkars settled in the forest area of the Kalakad-Mundanthurai Tiger Reserve (KMTR). The Kalakad-Mundanthurai Tiger Reserve (KMTR) Forest lies between 8° 20' and 8° 55' North latitude and between 77° 10' and 77° 35' East longitudes in Tirunelveli and Kanyakumari districts of Tamil Nadu in the southern Western Ghats of India (Fig. 1). KMTR is a part of Southwestern tip of the Western Ghats, a region that is known for its species richness, diversity and high degree of endemism. The KMTR area has been recognized as one of the hot-spots for Biodiversity conservation⁷.

The Kanikkars belong to the southern tribal zone. They are distributed along the Southeastern slopes of the Western Ghats adjoining Kanyakumari and Tirunelveli districts of Tamil Nadu. The Kanikkars are also known as kanikaran or Kani. They live in low density settlements in the southern parts of the Western Ghats. The local (Kanikkar) name for the study area is shown in Fig. 1.

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Fig. 1— Location map of the study area
altitude regions of Western Ghats in large numbers. Kanikkars means hereditary proprietor of land thus recognizing their ancient rights over the forest lands. The Kanikkars are generally very short in stature and meager in appearance (Fig. 2). Some have markedly negroid features. They are traditionally a nomadic community. They speak in their own dialect, Kanikkar Bhasha or Malampashi, which is close to the Dravidian language Malayalam. Kanikkars once practiced migratory cultivation but have now to a large extent abandoned such cultivation. Most of the Kanikkar tribals have a general knowledge of medicinal plants that are used for first aid remedies, to treat cough, cold, fever, headache, poisonous bites and some other simple ailments. Kanis still supplement their food by gathering roots and tubers from the nearby forest areas. They eat tubers like Manihot esculenta and Dioscorea oppositifolia, etc. They are also engaged in seasonal collection of honey, bee wax and some minor forest produce. They cultivate edible plants, like tapioca, banana, millets and cash crops such as pepper, areca nut and cashew nut.

Methodology

Frequent field surveys were carried out in KMTR during different seasons in 2005-2007. The ethnomedical data were collected through interviews and discussions among the herbal practitioners in and around the study area. Most of the information was gathered from the elderly people, who have a very long acquaintance with usage of plants. The information thus gathered was cross-checked adequately for reliability and accuracy by interacting with different groups of the Kanikkars from different habitats to confirm the use, mode of administration as well as dosage differences, if any. Data were also collected through questionnaires in their local language. In addition to the vernacular name and medicinal uses, detailed information about mode of preparation, form of usage was also collected. The medicinal plants were identified, photographed and sample specimens were collected for the preparation of herbarium. The identified plant specimens were confirmed and deposited in the herbarium of Ethnopharmacology unit, Research Department of Botany, VO Chidambaram College, Tuticorin, Tamil Nadu.

Enumeration

Plants used by the Kanikkars for the treatment of rheumatism are enumerated as follows:

Abras precatorius (Fabaceae), Kundrimani

Warm seed paste is applied over the affected joints twice a day until relieved from stiffness of joints.

Actinopteris radiata (Sw.) Link. (Actinopteridaceae), Mayilosa

Fresh leaves are boiled in coconut oil on a low flame for 15 minutes; oil is filtered after cooling; affected joints are massaged with the lukewarm oil. Soft pressure is applied and sprayed with lukewarm water until relieved.

Aloe barbadensis Mill. (Liliaceae), Chothu Kathalai

A longitudinal cut is made on a leaf of Chothu Kathalai in such a way as to expose the mesophyll. The exposed part is heated for a while on a low flame. Warm mesophyll content is rubbed on the affected part and is repeated for thirteen days to reduce the swelling in the joints.

Anisomeles indica (L.) kuntze (Lamiaceae), Vaathaneer patchilai

Fresh leaves are boiled in neem oil over a low flame until the oil extracts the complete essence of the drug. The affected part is massaged with the lukewarm oil, specifically, in the direction from the limbs to the upper portion applying soft pressure. Hot water bath is administered after a few hours, until there is relief from the rheumatic complaint.

Anisomeles malabarica (L.) R. Br. Ex Sims (Lamiaceae), Perunthumbai

Fresh leaves and young stem are boiled in neem oil along with poppy seeds and garlic in an earthen pot for 15-20 minutes on a low flame. The filtered oil is applied externally on the joints of the hands and legs. A gentle massage is applied for 20 minutes and hot bath is advised after this application. Consumption of fish, egg, meat and sexual activity are prohibited for 3 weeks. A handful of leaves are boiled in steam and used to treat the affected parts until there is relief from rheumatic pain.

Aristolochia kryagathra Sivaranjan & Pradeep (Aristolochiaceae), Karudakodi (Fig. 4)

Equal quantity of Root and leaves are boiled in coconut oil for about 15-20 minutes over a low flame. The oil is filtered after cooling and applied on the
head once in a day as the treatment for rheumatism. The therapy is used to reduce excessive heat of the body.

**Asystasia travancorica** Bedd. (Acanthaceae), *Aathu Urinji* (Fig. 5)

Paste of leaves and flowers of *Asystasia travancorica* Bedd. mixed with honey is taken orally, twice a day, for 3 weeks for the treatment of rheumatism. The use of tamarind, fish and egg is avoided.

**Azadirachta indica** A. Juss. (Meliaceae), *Vembu*

Seed oil is massaged over the joints to reduce rheumatic pain. Stem bark decoction is taken orally for 3 weeks to treat rheumatic complaints.

**Begonia malabarica** Lam. (Begoniaceae), *Kalsirupuli*

The warm paste of the aerial part is applied externally on the leg once a day for 14 days to treat rheumatic complaints.

**Calotropis gigantea** (L.) R. Br (Asclepiadacea), *Erukku*

A poultice of roasted leaves is applied on the rheumatic joints for one week or more to reduce pain and swelling.

**Capsicum annuum** L. (Solanaceae), *Kaanthaari milagai*

Paste made from fruits of *Capsicum annuum* L., ginger and garlic is given orally to women after delivery. This is followed by the administration of gingelly oil or honey to prevent rheumatic complaints.

**Cardiospermum halicacabum** L. (Sapindaceae), *Mudakkaathan Keerai*

Fresh leaf juice is taken orally with palm sugar (*Borassus flabellifer* L.) for 7 days for the treatment of rheumatism. The use of tamarind, meat, fish and egg is avoided. Soup prepared by boiling fresh leaves of *Cardiospermum halicacabum* L., cumin seeds, crushed onion and a pinch of salt is taken orally twice a day. Leaf juice of *Cardiospermum halicacabum* L. kept in sun light for 3 days is boiled in *neem* oil together with garlic, mustard seeds, cumin seeds and crushed stem bark of *Moringa pterygosperma* Gaertn. over a low flame for 20-30 minutes. It is, then, cooled, filtered, stored and applied twice a day. A hot water bath is administered after each application. Sexual activity is prohibited. *Dosai* (pancake) prepared from paste of fresh leaves, rice, black gram, common salt and water is eaten to prevent the possibility of any rheumatic complaint.

**Cissus quadrangularis** L. (Vitaceae), *Pirandai kodi*

Tender shoot paste is consumed for the treatment of rheumatism.

**Curculigo orchioides** Gaertn. (Hypoxidaceae), *Nilappani Kizhangu* (Fig. 6)

Chopped roots are boiled in coconut oil together with cumin seeds on a moderate flame for 15-20 minutes; oil is massaged for half an hour and warm water bath is taken once for 14 days as treatment for rheumatism.

**Cymbopogon citratus** (DC.) Stapf. (Poaceae), *Chukkunaari pullu*

Whole plant decoction in water is used during bath twice a day for 12 days as treatment for rheumatism. Few fresh filtered leaf juice is given orally as an effective management of rheumatism.

**Datura metel** L. (Solanaceae), *Oomathai*

*Datura metel* L. leaves soaked in boiling water are bandaged over the affected part to get relief from rheumatic pain. The boiled leaves are also used for fomentation on the rheumatic swelling for 15-20 minutes.

**Diospyros melanoxylon** Roxb. (Ebenaceae), *Vaatha beedi*

Fresh leaf paste warmed on low flame is applied over the knee twice a day for 5-6 days to get relief from joints pain. A bath with warm water boiled with fresh leaves is used to treat the parts affected by rheumatism.

**Drynaria quercifolia** (L.) J. Sm. (Drynariaceae), *Aattukkaal malai vahan* (Fig. 8)

Rhizome decoction in water is taken orally along with a teaspoon of cumin powder twice a day, for 7 days to obtain relief from rheumatic complaints. Rhizome paste is applied on the part of the body which is affected by rheumatic pain twice a day for a week.

**Eclipta prostrata** (L.) L. (Asteraceae), *Karisalankanni*

Stem and leaves boiled in coconut oil is cooled, filtered and applied on head for an hour before bath to reduce body heat.

**Entada pursaetha** DC. (Mimosaceae), *Parandai kodi* (Fig. 7)

Thick seed paste applied over the affected and inflamed swellings to reduce pain. To strengthen the
joints in infants, the paste is applied over the leg once a day for 10 days. Warm water bath is administered each time.

_Erythrina variegata_ L. (Fabaceae), _Kalyanamurungai_

Stem bark boiled in _neem_ oil together with poppy seeds and garlic is massaged over the affected joints twice a day until relieved from rheumatic pain. Leaves boiled in an earthen pot are used for fomenting the affected parts after massage.

_Erythropalum scandens_ Bl, Bijdr. (Erythropalaceae), _Vaathavallikkodi_ (Fig. 9)

The chopped tender shoots are boiled with water; bath is taken with the warm water until relieved from the rheumatic complaint. Fresh leaf paste mixed with one teaspoon of honey is given orally twice a day for treating rheumatism. Consumption of fish, egg, tamarind, liquor, salt and sexual activity is prohibited during the course of the treatment.

_Eugenia singampattiana_ Bedd. (Myrtaceae), _Kattu koraandi_ (Fig. 11)

Powder made from equal quantity of shade dried leaves, flowers and tender fruits is consumed with honey for the treatment of rheumatism. Consumption of fish and egg is avoided.

_Goniothalamus wightii_ Hk. f. & Thoms. (Annonaceae), _Kaattunaraipatchilai_

Paste made from equal quantity of leaves and tender fruits is taken orally twice a day for 5-10 days for relief from rheumatic pain.

_Hemidesmus indicus_ (L.) R. Br. var. _indicus_ (Periplocaceae), _Nannari_

Fresh roots boiled in coconut oil with cumin seeds for 15-20 minutes over a moderate flame. The oil is massaged on the affected joints as a liniment during rheumatism.

*_Justicia adhatoda_ L. (Acanthaceae), _Aadathodai*_

A handful of leaves is cooked and used for a fomentation on the affected joint to alleviate rheumatic pain. Fresh leaf juice of *Justicia adhatoda* and _Pergularia daemia_ battered with egg white is taken orally for 10-12 days to treat rheumatic complaint.

_Kingiodendron pinnatum_ (Roxb. ex DC.) Harm. (Caesalpiniaceae), _Kulavu_

The resin obtained by piercing the trunk is applied on the affected joints before going to bed along with a soft massaging in circular motion. In the morning, lukewarm water is poured over the joints. The oil is also applied on the fissured foot for 5-7 days to get relief.

_Leea indica_ (Burm. f.) Merr. (Leeaceae), _Kaattuvalaripatchilai_

Paste made from an equal quantity of leaves and flowers of mixed with honey is taken twice a day for 16 days as treatment for rheumatism.

*Mallotus philippensis* (Lam.) Muell. Arg. (Euphorbiaceae), _Kaatu thakadi_ (Fig. 12)

Paste made from an equal quantity of leaves and tender fruits mixed with honey are taken orally twice a day for 13 days to get relief from rheumatism. During this period, consumption of salt, spicy food and tamarind is avoided.

*Mimus pudica* L. (Mimosaceae), _Thottar Vaadi_

Lukewarm oil prepared from fresh leaves crushed and boiled in a mixture of gingham oil (_Sesamum indicum_ L.) and _neem_ oil on a low flame is massaged on the affected parts. Hot water bath is administered. The whole plant paste is applied on the inflamed joints once in a day.

*Murraya paniculata* (L.) Jack (Rutaceae), _Kaattu Vembu_

Fresh leaf paste prepared with a little water is warmed for few minutes and bandaged on the affected part in the morning and the patient is advised hot water bath in the evening.

_Pergularia daemia_ (Forssk.) Chiov. (Asclepiadaceae), _Veli Paruthi_

Fresh roots and an equal quantity of fresh leaves crushed together with stem bark of _Erythrina_
variegata L. and poppy seeds are boiled for 25-30 minutes on a low flame in an earthen pot or brass vessel. The filtered oil is massaged on the joints and the affected parts twice a day for 10-15 days. A hot water bath is administered during the course of the treatment. The use of chicken, pork, fish and sexual activity is to be avoided.

*Piper nigrum* L. (Piperaceae), *Milagu*

Leaves with shoot are boiled in water together with tender shoots of *Bambusa arundinacea* and *neem*.
leaves. Hot water bath is taken twice a day with this water for 12 days or more. 

_Pleiospermium alatum_ (Wall. ex Wt & Arn.) Swingle. 

(Rutaceae), _Malai Naarathai_

Juice extracted from fresh leaves of _Pleiospermium alatum_ and lemon grass (_Cymbopogon citrates_) is boiled in _neem_ oil in a low flame for 20 minutes. The oil is applied on the joints, shoulders and the other affected parts. Hot water is sprinkled to get relief from rheumatic complaints. 

_Plumbago zeylanica_ L. (Plumbaginaceae), _Venkoduveli_

Fresh root paste with a few drops of water boiled in an earthen pot for few minutes is applied on the swollen knee once in a day for 7-12 days for soothing the pain and for reducing swelling. 

_Psychotria nilgiriensis_ Deb. & Gang. (Rubiaceae), _Odai kaapi patchilai_ (Fig. 13)

Tender fruit paste of is consumed along with honey once a day for 12 days or more for the treatment of rheumatism. 

_Psychotria nudiflora_ Wt & Arn (Rubiaceae), _Kalpoo_

Paste made from an equal quantity of leaves and flowers is consumed along with honey once a day for the treatment of rheumatism. 

_Pterocarpus marsupium_ Roxb. (Fabaceae), _Vengai_

Stem resin soaked in water for about 12 hrs is applied externally on the knee twice a day to get relief from joints pain. 

_Rauwolfia densiflora_ (Wall.) Benth. ex. Hk. f. Apocynaceae), _Paarisirunilapatchilai_

Paste made from an equal quantity of leaves and flowers is consumed twice a day for 5 days to treat rheumatic complaints. 

_Sansevieria roxburghiana_ Schultes & Schultes f. (Agavaceae), _Marul_

Chopped leaves, garlic, onion, _Moringa pterygosperma_ bark and mustard seeds is boiled in _neem_ oil on a low flame. The lukewarm oil is massaged by applying medium pressure on hands and legs to get relief from pain. 

_Scoparia dulcis_ L. (Scrophulariaceae), ___Sakkarai vembu___

Powdered mixture of shade dried leaves of _Scoparia dulcis, neem_ leaves and a piece of turmeric is consumed with honey on an empty stomach before breakfast to treat rheumatism. Use of tamarind should be avoided. 

_Sonerila tinnevelliensis_ Fischer (Melastomataceae), _Kalpuli_

Decoction of fresh leaves is consumed on an empty stomach once in a day to get relief from rheumatic complaints. 

_Tinospora cordifolia_ (Willld.) Miers ex Hk. f. & Th. (Menispermaceae), _Seenthil Kodi_

_Tinospora cordifolia_ juice is boiled in _neem_ oil together with seeds of cumin, pepper and mustard, dried ginger, garlic and crushed stem bark of _Moringa pterygosperma_ on a low flame for 15-20 minutes. The lukewarm medicated oil is massaged on the affected part by applying soft pressure for 30 minutes for 7-12 days. Hot water bath is administered after the massage. 

_Toddalia asiatica_ Lam. var. _asiatica_ (Rutaceae), _Milagarani_

Shade dried stem bark powder is taken after meals with honey thrice a day to get relief from rheumatic pain. 

_Ventilago madraspatana_ Gaertn. (Rhamnaceae), _Vembadanpatchilai_

Stem bark of _Ventilago madraspatana_ and _Pergularia daemia_ roots coarsely powdered and mixed with _neem_ oil heated on a low flame is massaged on the joints twice a day. This is followed by fomentation with hot boiled leaves of _Justicia adhatoda_ to alleviate rheumatic pain. 

_Vitex negundo_ L. (Verbenaceae), _Notchi_

Fresh leaves decoction is taken orally. A poultice of cooked leaves is used to foment the affected joints to disperse swelling in acute rheumatism. 

**Results and discussion** 

The investigation reveals that the _Kanikkar_ tribes of KMTR Western Ghats region use 50 plant species belonging to 36 families for the treatment of rheumatism. Among them, 15 are herbs, 14 are shrubs, 11 are climbers and 10 are trees. Of the investigated plants, 2 plants belong to Pteridophytes and the remaining 48 to Angiosperms. The _Kanikkar_ tribe use 20 plant species exclusively for rheumatism and the other plants are used both for rheumatism and for common diseases like cough, cold, skin diseases, diabetes, urinary disorders, etc. Medicines are prepared in the form of oil extracts, paste, powder, decoction and juice. In the study, some of the ethnomedicinal plants are endemic to KMTR, Western Ghats. _Asystasia travancorica, Eugenia singampattiana, Goniothalamus wightii, Psychotria_
nudiflora and Sonerila tinneveliensis are endemic medicinal plants. Of these, Eugenia singampattiana and Sonerila tinneveliensis are endangered plants. It is well established that an identical use of the same plant by different tribal groups indicates its established curative property and therapeutic significance\(^1\). The comparison of medicinal claims between different cultural groups in the same region or neighbouring regions has proved to be very rewarding. Comparative studies on the medicinal uses of plants among different cultural groups showed similarities and dissimilarities also in uses.

In the investigation, the medicinal claims made by the Kanikkars are compared with the claims of 3 other numerically predominant Indian tribal groups living in the central and western zones of the India, viz. the Bhils, Gonds and Santals and two other predominant tribes of Tamil Nadu, the Palliyars and Irulars\(^2\). Anisomeles indica, Calotropis gigantea, Erythrina variegata, Justicia adhatoda, Plumbago zeylanica, and Tinospora cordifolia are administered by the Bhils; Eclipta prostrata, Hemidesmus indicus, and Murraya paniculata are administered by the Gonds; Calotropis gigantea, Entada purseaetha and Jatropha gossypifolia are used by the Santals; Cardiospermum halicacabum by the Irulars and Pterocarpus marsupium is administered by the Palliyars to treat rheumatism. It is not only essential to conserve such a wealth of information and wisdom found among the tribes but will also be rewarding to enumerate such details and devise a modern biomedical system to meet the ever increasing clinical requirements of modern living. Hence, the need for documenting the medicinal knowledge of the tribes is often stressed. In such a context these plants can be subjected to intensive clinical and pharmacological trials and their efficacy may be evaluated on scientific basis.

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