

A comparative note on the ethnomedicinal plants used by the Kattunaikka and Paniya tribes of Nilambur forest, Malappuram district, Kerala, (India)

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An ethnobotanical survey was conducted to explore the indigenous knowledge of the Kattunaikka and Paniya tribes of Nilambur forest, Malappuram District, Kerala, India and to highlight the uses of the diverse flora. This paper provides information about 79 medicinal plant species used by the two tribes to manage 38 ailments conditions, either as single plant remedies or in combination. Of the 79 species recorded, 64 species

(81%) were found to be used in the Ayurvedic system of medicine and 65% for similar conditions. The indigenous knowledge of these tribal traditional healers has been disappearing due to lack of followers for this valuable knowledge, as well as their migration to places outside of the forest. Use of plants among the two tribes reflects their interest in ethno-medicine and further investigation on under-explored species may lead to the discovery of novel pharmaceutical products.

Key Words: *Ayurveda; Ethnomedicine; Kattunaikka; Paniya; Nilambur forest*

INTRODUCTION

The Indian subcontinent represents one of the greatest treasures of ethnobotanical knowledge. Kerala state of India, at the southernmost boundary of the Malabar coast, has Western Ghats on the east and Arabian Sea on the west and has a land area of 38,863 Km². Malappuram district lies in northern Kerala and is bounded on the north by Wayanad and Kozhikkode districts, on the northeast by Tamil Nadu state, on the southeast and south by Palakkad district, on the southwest by Thrissur district, on the west by the Arabian Sea and on the northwest by Kozhikkode district. Nilambur, a municipality and a taluk in the Malappuram district, is situated close to the Nilgiris range of the Western Ghats on the banks of the Chaliyar river. Nilambur is inhabited by indigenous tribal groups. The scheduled tribes of Nilambur area are about 0.56% of the total population and it comes to 22,990 people. As per the 2011 census, the Kattunaikkan population was estimated at 1629 individuals, spread over 452 households. Out of the 35 scheduled tribes notified in the state, Paniyan is the most populous tribe with a population of 81,940, forming 22.5 percent of the total tribal population of the state [1].

Ethnobotanists could play very useful roles in rescuing disappearing knowledge and returning it to local communities. Several wild medicinal plants are declining in number due to the destruction and unscientific collection of plants from forests. Except for the documentation of the ethnobotanical knowledge in the Malappuram district by Thomas et al., [2-5] not much work is being done in this area. There is a very limited and scattered scientific record of the traditional medicines, used by the Kattunaikka and Paniya tribes of Malappuram district. The aim of this study was (1): To document the knowledge on ethnomedicines of Kattunaikka and Paniya tribes of Nilambur forest and (2): To find out whether traditional usages of medicinal plants by these tribals for treatment of various ailments has similarity with the uses in Ayurvedic medicine or the tribal medicinal plants were totally distinctive from Ayurveda.

MATERIALS AND METHODS

Study area

The study was conducted in the Nilambur taluk of Malappuram district,

Kerala (India), an area adjacent to the tropical mountain forests of Nilgiris, significant for floristic explorations. The valley is divided into three forest ranges, viz. the Nilambur range, Chungathara range and Karulai range. Geographically, the area is located approximately between 11°26'N-11°9'N latitude and 75°48'E-76°33'E longitude with altitudes ranging from 50 to 2500 m Above Mean Sea Level (AMSL). Soil is largely loamy on the ghats, but at lower elevation it is lateritic. With an annual average rainfall of over 2500 mm, spread almost throughout the year, the climate is warm humid. The temperature ranges from 17°C to 37°C.

Ethnobotanical data collection

Several field visits were conducted between 2010 and 2016 in the study areas among the Kattunaikka and Paniya tribes to collect information on medicinal plants used by them using a questionnaire survey, interviews with key informants (knowledgeable elders, religious leaders and other individuals) and field observations. Interviews and discussions were conducted in Malayalam (the local language) using a checklist of topics. At the beginning of each interview the aim of the interview was explained to invoke clear and objective responses and then informants were asked for their consent. A range of ethnobotanical information including local names, habit and habitat, uses, parts used and mode of utilization of the plant were covered. Vegetation surveys and field observations were also conducted to substantiate these results. Vegetation surveys were carried out both in homesteads, in the wild and road sides to assess the distribution of the most frequently reported plant species. The collected specimens were cross-checked for their local names with the help of key informants and development agents. Botanical names were established by comparing specimens with those at the herbarium of Centre for Medicinal Plants Research (CMPR) and final identification was done after detailed laboratory studies, using stereomicroscopes and light microscopes or after consulting relevant floristic literature and their uses was carefully recorded in the field data book, Figure 1. The specimens are preserved in the CMPR herbarium. Medicinally important parts of some plants were collected and preserved in Formalin Acetic Acid (FAA) solution for further reference. Each species was checked for its Ayurvedic uses with the help of available literature like Ayurvedic pharmacopoeia of India and other books and similarity and dissimilarity in uses were analysed [6].

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Figure 1 Herbarium specimens of selected ethnomedicinal plants. (1): *Pancratium triflorum* Roxb.; (2): *Calotropis gigantea* (L.) Dryand.; (3): *Saraca asoca* (Roxb.) de Wilde.; (4): *Cyclea peltata* (Lam.) Hook.f. and Thoms.; (5): *Cassia fistula* L.; (6): *Indigofera tinctoria* L.; (7): *Elephantopus scaber* L.; (8): *Momordica charantia* L.; (9): *Catharanthus roseus* (L.) G. Don.; (10): *Rauwolfia serpentina* (L.) Benth. ex Kurz.; (11): *Piper longum* L.; (12): *Asparagus racemosus* Willd.; (13): *Emilia sonchifolia* (L.) DC.; (14): *Plumbago zeylanica* L.; (15): *Strychnos nux-vomica* L.

RESULTS AND DISCUSSION

Level of knowledge about plant resources among the informants

The study revealed that the level of knowledge differs in extent among the two tribes, gender and age groups. Though not much difference was recorded between the two tribes in the number of plant species used and the number/nature of ailments mentioned by them, Paniya tribe possessed comparatively higher knowledge about ethno-botanically useful plants than the Kattunaikka in terms of number of species used for a particular ailment/condition (details on differences are mentioned under the section ethnobotanical uses). Similarly, male informants had more knowledge than women. Among the men, elders were more aware than the younger members of the community. The lack of availability of elderly informants was experienced during the study. Narayanan et al., [7] has conducted ethnobotanical studies in the Wayanadu district, Kerala and documented information on 165 edible plants used by Kattunaikka, Paniya and Kuruma tribes. They report that the Paniya tribal community possesses knowledge regarding 136 taxa of wild edible plants, with Kattunaikkas coming next with

knowledge of 97 taxa and Kurumas are at the bottom of the knowledge-ladder with knowledge of 42 taxa of wild edible plants. The study supports our view that Paniya community of Nilambur area is rich in their knowledge on medicinal value of plants.

Taxonomic and ethanobotanical information

The present study documented taxonomical status and ethnobotanical usages of 79 plant species belonging to 76 genera and 45 families, used by the two tribes along with botanical name, family, vernacular name, plant parts used and mode of use (Tables 1-3). According to their life form, the greatest proportion of useful plants recorded at the locality included shrubs (32%), trees (29%), herbs (28%) and climbers (11%). The four most important families in terms of their number of taxa were *Fabaceae* with nine, *Apocynaceae* with seven, *Asteraceae* with five and *Lamiaceae* with four taxa. Two families were represented by three taxa each and nine families were represented by two taxa each. Rest of the 30 families consisted of only one taxa each. Use of plants for medicinal purpose by the two tribes from a wide variety of families was a point of interest.

TABLE 1

List of plant species used as single plant remedies by Paniya tribes for various ailments/conditions

S. no	Botanical name, family, local name, part used	Tribal use	Mode of administration	Ayurvedic uses	Similar (S)/Dissimilar (D)
1	<i>Asparagus racemosus</i> Wild. Asparagaceae, Satavari, tubers	Gynecological diseases	Tuber decoction twice a day for one month	Women health, galactagogue, rejuvenative	S
2	<i>Boerhavia diffusa</i> L. Nyctaginaceae, Tazhuthama, whole plant	Cardiac disorders	Plant decoction is taken internally once a day for 5 weeks	Diuretic, heart tonic and jaundice	S
3	<i>Calycopteris floribunda</i> Lam Combretaceae, Pullani, leaves	Skin diseases	Leaf paste external application	Skin diseases	S
4	<i>Curculigo orchoides</i> Gaertn. Hypoxidaceae, Nilappana, tubers	Piles	Root decoction is taken internally and root paste is applied externally	Aphrodisiac, appetizer, piles, fever and poisonous affections	S
5	<i>Cyclea peltata</i> (Lam.) Hook.f. and Thoms. Menispermaceae, Padakizhangu, roots	Postpartum health	Root decoction to improve body vigor and to retain health	Skin diseases and poisonous affections	D
6	<i>Datura stramonium</i> L. Solanaceae, Vella ummam, fruit	Leprosy, skin diseases and dandruff	Crushed fruit paste is used externally.	Whooping cough, asthma, painful menstruation Leprosy, dandruff, skin diseases	S
7	<i>Elephantopus scaber</i> L. Compositae, Anachuvadi, leaves	Child birth	Fresh leaves mixed with starch water decoction to deliver placenta especially animals	-	-
8	<i>Ficus exasperata</i> Vahl. Moraceae, Parakam, whole plant	Cuts and wounds	Whole plant is applied externally 4-5 times	-	-
9	<i>Gloriosa superba</i> L. Colchicaceae, Menthonni, rhizomes	Cancer	Tuber decoction is taken internally twice a day	Ulcer, intestinal worms, infertility, wounds and other skin problems	D
10	<i>Hemidesmus indicus</i> (L.) R.Br. var. <i>indicus</i> Apocynaceae, Nannari, roots	Refreshing drink	Root paste mixed with lime. Root used to make pickles	Rejuvenating drug, diuretic, digestive, blood diseases	S
11	<i>Holostemma ada-kodien</i> Schult. Apocynaceae, Adapathian, roots	Postpartum vigor, eye diseases	Root decoction for youthful vigor, used against eye diseases	Eye diseases, Improves health and vigor	S
12	<i>Hydnocarpus pentandrus</i> (Buch-Ham.) Oken. Achariaceae, Marotti, seeds	Skin diseases and hair loss	Seed oil applied externally	Skin diseases, rheumatism and leprosy	S
13	<i>Indigofera tinctoria</i> L. Leguminosae, Neelaamari, whole plant	Skin diseases, jaundice, hair tonic	Whole plant, oil from leaf	Hair tonic, ascites, skin affections	S
14	<i>Lantana camara</i> var. <i>camara</i> Verbenaceae, Kongini, flowers	Cuts and wounds	A paste made up of flowers is applied externally	-	-
15	<i>Naravelia zeylanica</i> (L.) DC. Ranunculaceae, Vathamkodi, whole plant	Leprosy	Plant decoction is used internally	Skin diseases, leprosy, inflammations, intestinal worms, wounds and ulcers	D
16	<i>Pantratum triflorum</i> Roxb Amaryllidaceae, Kattu ulli, bulbs	Achene foot diseases	Heated bulbous portion applied to affected area, repeat it for 7 days	-	-
17	<i>Piper longum</i> L. Piperaceae, Thippali, fruits and roots	Joint pain	Root paste is applies on effected portion two times daily	Powerful stimulant, digestive, cardiac and respiratory problems	D
18	<i>Plectranthus ambonicus</i> (Lour.) Spreng. Lamiaceae, Kannikoorka, leaves	Infantile fever	Leaf decoction is taken internally	Infantile cough, cold, fever	S
19	<i>Ricinus communis</i> L. Euphorbiaceae, Avanakku, leaves, roots and seeds	Asthma, joint pain	A decoction made up of roots taken internally, seed oil for joint pain	Piles, cough, worm troubles, leprosy, colic, rheumatism	S
20	<i>Rotula aquatica</i> Lour. Boraginaceae, Kallur vanchi, roots	Piles	Root decoction is taken internally and root paste applied externally	Piles, kidney and bladder stone, and uterine disorders.	S
21	<i>Schleichera oleosa</i> (Lour.) Oken. Sapindaceae, Poovam, seeds	Snake bite	Bark is crushed and applied externally	-	-
22	<i>Senna tora</i> (L.) Roxb. Leguminosae, Pollamthavara, leaves	Skin diseases	External application of leaf paste	Skin diseases	S
23	<i>Solanum violaceum</i> Ortega ssp. <i>violaceum</i> Solanaceae, Puthirichunda, roots	Cardiac disorders	Root decoction is taken internally	Respiratory and cardiac disorders, skin ailments	S
24	<i>Wrightia tinctoria</i> (Roxb.) R. Br. Apocynaceae, Kutakappala, Bark, seeds	Burning sensations	Seed oil is applied	Skin diseases, hair growth	D

TABLE 2

List of plant species used as single plant remedies by Kattunaikka tribes for various ailments/conditions

S. no	Botanical name, family, local name, part used	Ailment/condition	Mode of administration	Ayurvedic uses	Similar (S)/Dissimilar (D)
1	<i>Aegle marmelos</i> (L.) Corr. Rutaceae, Koovalam, leaves	Diabetes	Leaf decoction twice a day for 3 months	Diabetes, diarrhoea and gastritis	S
2	<i>Anamirta cocculus</i> (L.) Wight & Arn. Menispermaceae, Kollakkaya, dry fruits	Skin diseases	Water boiled with the dry fruits is used for bathing twice a day for one month	Skin diseases	S
3	<i>Aristolohia indica</i> L. Aristolochiaceae, Karalam, roots	Snake bite	Root decoction is taken internally twice a day for 7 days	Snake poison, blood purifier, skin diseases	S
4	<i>Azadirachta indica</i> A. Juss., Meliaceae, Aryaveppu, bark and leaves	Rheumatism	Water boiled with bark and leaves of this plant are used for bathing once a day for 21 days	Rheumatism, skin diseases	S
5	<i>Bacopa moneri</i> (L.) Pennell, Plantaginaceae, Bhrami, whole plant	Epilepsy	Whole plant decoction is taken internally twice a day for 2 months and also is used as a brain tonic	Epilepsy, improves memory, anti-ageing, bronchitis, coughs, tonic for heart and nerves	S
6	<i>Calotropis gigantea</i> (L.) R.Br. Apocynaceae, Erikku, flowers	Asthma	10 ml of flower decoction is taken internally 2 times a day for one month	Asthma, promote digestion, piles, skin diseases	S
7	<i>Clitoria tematea</i> L. Leguminosae, Sankhupushpam, whole plant	Pitta	Whole plant decoction is taken internally twice a day	Pitta, uterine disorders, skin and eye diseases	S
8	<i>Cycas circinalis</i> L. Cycadaceae, Eenthru, fruit	Postpartum health	Dried fruit is crushed and boiled with water and is consumed	-	-
9	<i>Desmodium gangentium</i> (L.) DC. Leguminosae, Orila, whole plant	Cardiac diseases	Root decoction is taken internally early morning	Cardiac disorders, burning sensations, fever and cough	S
10	<i>Emilia sonchifolia</i> (L.) DC. Compositae, Mualchevi, roots and bark	Flatulence and colic	Mixed decoction of root and bark is taken internally	Colic, fever, tonsillitis and eye diseases	S
11	<i>Euphorbia nivulia</i> Buch. Ham. Euphorbiaceae, Kalli, roots and leaves	Abdominal disorders	Decoction of roots and leaves mixed with starch water is taken internally	Stomachic, purgative, abortifacient, jaundice	S
12	<i>Gymnema sylvestre</i> (Retz) R.Br.ex Schult., Apocynaceae, Chakkarakolli, roots and leaves	Diabetes	Dried leaves and root decoction is taken internally twice a day for one month	Diabetes	S
13	<i>Hemigraphis colorata</i> (Blume) Hall.f. Acanthaceae, Murikootti, leaves	Wounds	Leaf paste is applied to affected portion	-	-
14	<i>Ixora coccinea</i> L. Rubiaceae, Thechi, whole plant	Dermatitis	Whole plant paste is applied externally twice a day for 3 days	Skin affections like itches, scabies, boils etc.	S
15	<i>Kalanchoe schweinfurthii</i> Penzig, Crassulaceae, Ilamulachi, leaves	Diarrhoea	Leaf juice is taken internally once daily in 7 days	-	-
16	<i>Melia azedarach</i> L. Meliaceae, Malaveppu, bark and leaves	Headache	Bark and leaf paste external application	Eye and skin affections, carminative, leprosy	D
17	<i>Mesua ferrea</i> L. Calophyllaceae, Churuli, flowers and leaves	Postpartum health	Decoction made up of flower and leaf is taken internally twice daily for one month to improve body vigor and to retain health	Diseases of urinary bladder, sore throat, bronchitis, cough and constipation	D
18	<i>Myristica malabarica</i> Lam. Myristicaceae, Pathiri, seeds	Burning sensation	External application of seed paste for seven days	Burning sensation	S
19	<i>Naringi crenulata</i> (Roxb.) Nicolson Rutaceae, Kattu narakam, seeds	Hair tonic	Oil from seeds is applied against hair loss	-	-
20	<i>Nothapodytes nimmoniana</i> (J. Graham) Mabb. Icacinaceae, Peenari, heart wood	Epilepsy	water boiled with heart wood is used for bathing	-	-
21	<i>Nyctanthes arbor-trists</i> L. Oleaceae, Pavizhamulla, roots	Uterine disorders	Root decoction is taken internally twice a day	-	-
22	<i>Oxalis corniculata</i> L. Oxalidaceae, Puliyaarila, leaf	Vomiting	Leaf paste along with starch water is taken internally twice a day for 2 days	Stomachic, digestive stimulant, skin problems	S
23	<i>Plumbago zeylanica</i> L. Plumbaginaceae, Vellakoduveli, roots	Bronchial asthma	Root decoction is taken internally in empty stomach once daily in one month	Skin conditions, blood purifier	D
24	<i>Premna serratifolia</i> L. Lamiaceae, Munja, whole plant	Back pain and body pain	Whole plant decoction is taken internally once daily for two months	Rheumatism, cough, cardiotonic, anti-inflammatory	S
25	<i>Pterocarpus santalinus</i> L.f. Leguminosae, Rakthachandanam, heart wood	Blood purifying and removing scars	A paste made up of heart wood is taken internally as a blood purifier and externally for removing scars	Purifies blood and cures skin diseases and poisonous affections	S
26	<i>Saraca asoca</i> (Roxb.) de Wilde. Leguminosae., Ashokam, bark	Uterine disorders	Decoction made up of bark is taken internally once daily for 7 days	Uterine disorders, burning sensations	S
27	<i>Steriospermum suaveolens</i> Roxb. DC. Bignoniaceae, Padiri, seeds	Burning sensation	External application of seed paste	Cardiotonic, diuretic and pain relief	D
28	<i>Vernonia anthelmintica</i> (L.) Willd, Compositae, Kattujeerakam, seeds	Inflammation against lice	Seed paste is applied to affected portion, used externally to kill lice	Cure ulcers, vata, kapha and roundworms	D

TABLE 3

List of plant species used by Kattunaikka and Paniya tribes in combined form for various ailments/conditions

S. no	Botanical name, family, local name, part used	Tribes	Tribal use	Ayurvedic uses	Similar (S)/ Dissimilar (D)
1	<i>Ageratum conyzoides</i> L. Compositae, Kattappa, leaves	P	Wounds	-	-
2	<i>Allium sativum</i> L. Amaryllidaceae, Vellulli, bulbs	K	Cough, cold and fever	Antithrombic, upper respiratory tract infections	S
3	<i>Alpinia galanga</i> , Zingiberaceae, Peraratha, rhizome	P	Rheumatism	Rheumatism	S
4	<i>Aristolochia tagala</i> Aristolochiaceae, Eshwara mulla, whole plant	K	Snake bite	-	-
5	<i>Asparagus racemosus</i> * Asparagaceae, Satavari, tubers	K	Postpartum vigor	Gynoeological problems, galactagogue	S
6	<i>Cassia fistula</i> Leguminosae, Kanikonna, tender root	P	Rheumatism, snake bite	Purgative, febrifugal, astringent	D
7	<i>Catharanthus roseus</i> Apocynaceae, Ushamalar, whole plant	K	Tuberculosis	-	-
8	<i>Cocos nucifera</i> Arecaceae, Thengu, coconut milk	P	Lactation	Urinary disorders, gastroenteritis	D
9	<i>Coix lacryma-jobi</i> Poaceae, Kakkapalungu, seeds	P	Postpartum vigor	Diuretic	D
10	<i>Cuminum cyminum</i> Apiaceae, Jeeraka, seeds	P	Lactation, kidney stone and abdominal disorders	Diuretic	D
11	<i>Curcuma longa</i> Zingiberaceae, Manjal, rhizome	P, K	Postpartum vigor, snake bite, wounds	Anti-inflammatory, anti-bacterial, gastroprotective effects	S
12	<i>Desmodium gangetium</i> * Leguminosae, Orila, roots	K	Postpartum vigor	Laxative and nervine tonic, galactagogue	S
13	<i>Eclipta alba</i> Compositae, Kanjunni, whole plant	P	Hair fall	Hair fall	S
14	<i>Gmelina arborea</i> Lamiaceae, Kumbil, bark	K	Cough and stomach pain	Stomach pain	S
15	<i>Holostemma ada-kodien</i> * Apocynaceae, Adapathiyam, tuberous roots	K	Tuberculosis	Laxative, rejuvenative	D
16	<i>Justicia gendarussa</i> Burm.f. Acanthaceae, Vathamkolli, whole plant	P	Rheumatism	Oedema and rheumatism	S
17	<i>Lawsonia inermis</i> Lythraceae, Mailanchi, dried leaves	P	Hair fall	Hair fall	S
18	<i>Momordica charantia</i> Cucurbitaceae, Kaipakka, leaves	P	Snake bite	Anthelmintic	D
19	<i>Ocimum sanctum</i> Lamiaceae, Tulsi, whole plant	K	Cough, cold and fever, tuberculosis	Cold, fever	S
20	<i>Phyllanthus emblica</i> Phyllanthaceae, Nelli, dried fruits	P	Hair fall, postpartum vigor	Gastrointestinal	S
21	<i>Piper longum</i> * Piperaceae, Thippali, fruits	K	Cough, cold and fever	Cough, cold, asthma	S
22	<i>Piper nigrum</i> Piperaceae, Kurumulaku, fruits	K	Cough, cold and fever	Cold, fever	S
23	<i>Pseudarthria viscida</i> Leguminosae, Moovila, roots	K	Postpartum vigor	Astringent, febrifuge	D
24	<i>Psidium guajava</i> Myrtaceae, Perakka, bark	K	Cough and stomach pain	-	-
25	<i>Rauvolfia serpentina</i> Apocynaceae, Sarpagandhi, roots	K	Snake bite	Neuro-psychiatric disorders, psychosis	D
26	<i>Rotula aquatica</i> * Boraginaceae, Kallur vanchi, roots	P	Kidney stone and abdominal disorders	Kidney stone	S
27	<i>Sapindus trifoliatus</i> Sapindaceae, Uruvanchikkaya, fruits	P	Wounds	Astringent, emetic, detergent, anthelmintic	D
28	<i>Sida cordifolia</i> Malvaceae, Anakurumthotti, roots	P	Hair fall	Rheumatism, neurological disorders	D
29	<i>Solanum melongena</i> Solanaceae, Cheruvazhuthana, roots	P	Wounds	Anti-asthmatic	D
30	<i>Strychnos nux-vomica</i> Loganiaceae, Kanjiram, bark	P	Snake bite	Neurological affections	D
31	<i>Trigonella foenum-graecum</i> * Leguminosae, Uluva, seeds	K, P	Cough, cold and fever, kidney stone and abdominal disorders	Flatulence, dyspepsia, colic, diarrhoea, dysentery	S
32	<i>Zingiber officinale</i> Zingiberaceae, Inchi, rhizome	K	Cough, cold and fever	Cough, cold, fever	S

Note: (*): Used as single plant remedy; P: Paniyars; K: Kattunaikkans.

Ethnomedicinal uses

Kattunaikka and Paniya tribes revealed their knowledge on the use of 79 medicinal plants and about 38 ailments/conditions. Paniya tribes revealed information about the use of 41 species, whereas Kattunaikkans about 43 species which are used as either single or combined forms of medicines. Five species recorded were commonly used by both the tribes. The Paniya tribes revealed information about 24 species which are used as single plant remedies, whereas Kattunaikkans described 28 species (Tables 1 and 2). Information collected from both the tribes on some combined forms of preparations for various conditions is given in Tables 3 and 4. Among the 18 species used by Paniya tribes in combined form of preparations, only one species (*Rotula aquatica*) was used as the single plant remedy also. In the case of Kattunaikka tribes, out of the 15 species used in combination form, one species (*Desmodium gangeticum*) is mentioned as single plant remedy also. Out of the five species used commonly either in single or compound form, only two species, i.e., *Trigonella foenum-graecum* and *Curcuma longa*, were commonly used by the two tribes in combination remedies (Tables 3 and 4). The species were suggested for various diseases like bronchial asthma, cardiac disorders, diabetes, diarrhoea, epilepsy, gynecological disorders, kidney stone, rheumatism, snake bite, body pain and fever.

One point of interest is that there was not even a single species commonly used by the two tribes as single plant remedy for a similar condition or ailment. It was observed that for similar conditions, both the tribes used different plant species. The knowledge and information revealed by Paniya tribes were rich in terms of usage of species for various ailments/conditions compared to Kattunaikkans. In the Paniya community, the number of plants used for a similar condition/ailment was more compared to Kattunaikkan community. For example, for curing skin problems, Paniya tribes revealed use of five species, whereas the Kattunaikka tribes revealed the use of only two. In other words, Kattunaikkans described only twenty-one species for ten ailments, in place of the thirty-five species described by Paniya tribes for same number of ailments (Table 5). The case of using one species for many conditions/ailments was also rarely recorded within the Paniya tribes. For example, Paniyars use *Holostemma ada-kodien* for postpartum vigor and eye diseases and *Indigofera tinctoria* for skin diseases, against jaundice and also as a hair tonic. For about ten conditions/ailments such as diabetes, epilepsy and diarrhea, Kattunaikka tribes alone described certain remedies and for certain other conditions/ailments like piles, leprosy, jaundice and joint pain only Paniya tribes described remedies (Table 6).

TABLE 4

Some combined form of preparations used by the Paniya and Kattunaikka tribes for various conditions

Condition	Mode of administration	Tribes
Cough, cold and fever	Decoction made up of dry <i>Zingiber officinale</i> + <i>Piper longum</i> + <i>Ocimum sanctum</i> + <i>Allium sativum</i> + <i>Piper nigrum</i> + <i>Trigonella foenum-graecum</i> is taken internally	Kattunaikka
Cough and stomach pain	Ripe fruits of <i>Gmelina arborea</i> + <i>Psidium guajava</i> are taken internally once a day for 2 weeks	Kattunaikka
Hair fall	<i>Lawsonia inermis</i> (dried leaves)+ <i>Eclipta alba</i> (whole plant)+ <i>Sida cordifolia</i> (root)+ <i>Phyllanthus emblica</i> (dried) all are crushed and heated with coconut oil and applied on hair once daily	Paniya
Kidney stone and abdominal disorders	<i>Trigonella foenum-graecum</i> +whole plant paste of <i>Rotula aquatica</i> + <i>Cuminum cyminum</i> is taken internally in empty stomach once daily for man and twice daily for women	Paniya
Lactation	Cocunut milk (<i>Cocos nucifera</i>)+4 or 5 earthworms+ <i>Cuminum cyminum</i> is made in to a paste and mixed in half glass of cow milk only one time	Paniya
Postpartum vigor	A decoction made up of <i>Phyllanthus emblica</i> + <i>Desmodium gangentium</i> + <i>Pseudarthria viscida</i> + <i>Asparagus racemosus</i> is taken internally three months	Kattunaikka
	Seeds of <i>Coix lacryma jobi</i> + <i>Curcuma longa</i> applied on stomach	Paniya
Rheumatism	<i>Alpinia galanga</i> rhizome paste+ <i>Cassia fistula</i> is applied externally	Paniya
	<i>Justicia jerandurossa</i> whole plant mixed with <i>Azadirachta indica</i>	Paniya
Snake bite	Bark of <i>Strychnos nux-vornica</i> (small amount)+ <i>Momordica charantia</i> (4 or 5 leaves) are crushed and take internally on early morning and evening. Bitted portion is recommended to tie with a hair to avoid spreading	Paniya
	<i>Rauvolfia serpentina</i> root paste+ <i>Curcuma longa</i> is applied to affected portion	Kattunaikka
	<i>Cassia fistula</i> tender root+ <i>Curcuma longa</i> external application for 7 days. That person is recommended to avoid sleep and also salt, chilly and oil	Paniya
	<i>Aristolochia tagala</i> whole plant+ <i>Curcuma longa</i> external application for 7 days	Kattunaikka
Tuberculosis	A decoction made up of root tuber of <i>Holostemma ada-kodien</i> + <i>Catharanthus roseus</i> + <i>Ocimum sanctum</i> is taken internally twice a day for one month.	Kattunaikka
Wounds	<i>Ageratum conyzoides</i> plant paste+ <i>Curcuma longa</i> are applied externally for seven days	Paniya
	External application of <i>Sapindus trifoliatus</i> fruits+ <i>Solanum melongena</i> leaf for wounds on head	Paniya

TABLE 5

Difference in use of plants for similar ailments and conditions by Paniya and Kattunaikka tribes

Conditions	No. of species used		Name of species used	
	Paniya	Kattunaikka	Paniya	Kattunaikka
Skin diseases	5	2	<i>Calycopteris floribunda</i> <i>Datura stramonium</i> <i>Hydnocarpus pentandrus</i> <i>Indigofera tinctoria</i> <i>Senna tora</i>	<i>Anamirta cocculus</i> <i>Ixora coccinea</i>
Snake bite	5	4	<i>Cassia fistula</i> <i>Curcuma longa</i> <i>Schleichera oleosa</i> <i>Strychnos nux-vomica</i> <i>Momordica charantia</i>	<i>Aristolochia tagala</i> <i>Aristolohia indica</i> <i>Curcuma longa</i> <i>Rauvolfia serpentina</i>
Rheumatism	3	1	<i>Alpinia galanga</i> <i>Cassia fistula</i> <i>Justicia gendarussa</i>	<i>Azadirachta indica</i>
Asthm	1	2	<i>Ricinus communis</i>	<i>Calotropis gigantea</i> <i>Plumbago zeylanica</i>
Gynecological problems	1	2	<i>Asparagus racemosus</i>	<i>Nyctanthes arbor-trists</i> <i>Saraca asoca</i>
Cardiac disorders	2	1	<i>Boerhavia diffusa</i> <i>Solanum violaceum</i>	<i>Desmodium gangentium</i>
Post-partum health	5	4	<i>Curcuma longa</i> <i>Coix lacryma jobi</i> <i>Cyclea peltata</i> <i>Holostemma ada-kodien</i> <i>Phyllanthus emblica</i>	<i>Curcuma longa</i> <i>Cycas circinalis</i> <i>Mesua ferrea</i> <i>Pseudarthria viscida</i> <i>Asparagus racemosus</i>
Cuts and wounds	6	2	<i>Ageratum conyzoides</i> <i>Curcuma longa</i> <i>Ficus exasperata</i> <i>Lantana camara</i> <i>Sapindus trifoliatus</i> <i>Solanum melongena</i>	<i>Hemigraphis colorata</i> <i>Curcuma longa</i>
Hair loss and growth	6	1	<i>Eclipta alba</i> <i>Hydnocarpus pentandrus</i> <i>Indigofera tinctoria</i> <i>Lawsonia inermis</i> <i>Sida cordifolia</i> <i>Phyllanthus emblica</i>	<i>Naringi crenulata</i>
Burning sensation	1	2	<i>Wrightia tinctoria</i>	<i>Myristica malabarica</i> <i>Steriospermum suaveolens</i>
Total species	35	21		

TABLE 6

Ailments and conditions and their remedial plants exclusively used by Paniya and Kattunaikka tribes

Ailments/conditions	Tribes	
	Paniya	Kattunaikka
Diabetes	-	<i>Aegle marmelos</i>
	-	<i>Gymnema sylvestre</i>
Epilepsy	-	<i>Nothapodytes nimmoniana</i>
	-	<i>Bacopa monnieri</i>
Pitha	-	<i>Clitoria ternatea</i>
Flatulence and colic	-	<i>Emilia sonchifolia</i>
Abdominal disorders	-	<i>Euphorbia nivulia</i>
Diarrhoea	-	<i>Kalanchoe schweinfurthii</i>
Head ache	-	<i>Melia azedarach</i>
Vomiting	-	<i>Oxalis corniculata</i>
Back pain / body pain	-	<i>Premna serratifolia</i>
Blood purifying and removing scars	-	<i>Pterocarpus santalinus</i>
Inflammation	-	<i>Vernonia anthelmintica</i>
Piles	<i>Curculigo orchioides</i>	-
	<i>Rotula aquatica</i>	-

Leprosy	<i>Naravelia zeylanica</i>	-
	<i>Datura stramonium</i>	-
Cancer	<i>Gloriosa superba</i>	-
Child birth	<i>Elephantopus scaber</i>	-
Jaundice	<i>Indigofera tinctoria</i>	-
Achene foot diseases	<i>Pancratium triflorum</i>	-
	<i>Piper longum</i>	-
Joint pain	<i>Ricinus communis</i>	-
Infantile fever	<i>Plectranthus ambonicus</i>	-

Ethnobotanical survey in Mundakunnu village of Gudalur taluk, Nilgiri district of Tamil Nadu, (India) reveals that six plant species are commonly used for different ailments by the Paniya tribes from two localities. But, tribes from both places use *Hemidesmus indicus* as a refreshing drink or coolant [8]. Thomas et al., [3] reports ethno-veterinary uses of 30 species from the Paniyar tribes of Malappuram, in which two species, *Asparagus racemosus* and *Elephantopus scaber* are found commonly used. They also report that Paniyars have a strong tendency of keeping their traditional knowledge and techniques secret. Ramachandran et al., [9] studied the wild edible plants used by the Paniyas and Kurumbas of Western Nilgiris, Tamil Nadu and describe nine species which are used as food and also for curing various common ailments. Plant species such as *Lantana camara*, *Momordica charantia*, *Cyclea peltata*, *Solanum anguui* (*Solanum violaceum*) and *Phyllanthus emblica* which are consumed as wild edible plants by the Paniya and Kurumba tribes of Nilgiris, were found to be used for therapeutic purpose among the Paniya tribes in our study. Prasad et al., [10] records the plants used by the Paniya and Kattunaikka tribes for the treatment of digestive system disorders in Wayanad district, Kerala and they mention certain similarities in the usage of plants among these two tribes. Only two species, *Aegle marmelos* and *Aristolochia tagala*, used by the Kattunaikka tribes of Nilambur forests for diabetes and snake bite respectively, reported in our study are used by both the tribes of Wayanad district for digestive system disorders. Amuthavalluvan [11] documents the traditional ethno-medicinal practices of Kattunayakan of southern northern Arcot district, Tamil Nadu and nearly ten medicinal species utilize by them in traditional healing system is found to be common in our report for same or different conditions. They also report the use of two or more remedies for the same disease indicating that one is superior to the other and such observation has been recorded in our study also. Out of the 32 plant species reported by Naseef et al., [12] against gynaecological problems by the Paniya tribes of Nellivayal of Wayanad district, Kerala, only one species, *Holostemm ada-kodien* was found commonly used by the Paniya tribes of Nilambur forest for same condition.

Ayurvedic use of ethnobotanical plants

Ayurveda, which also relies on medicinal plants for treatment, is possibly the oldest traditional medicinal system in the Indian sub-continent dating back to nearly five thousand years ago. Of the 79 species recorded in this study, 64 species (81%) were found to be used in the Ayurvedic system of medicine and 65% for similar conditions. Nearly 79% of the plants used as single plant remedies by the Paniya tribes are recorded to be used in the Ayurvedic system of medicine for treating similar (73.7%) or different (26.3%) conditions (Table 1). In the case of Kattunaikka tribes 78.6% of the plants used as single plant remedies are recorded to be used in the Ayurvedic system of medicine for treating similar (77%) or different (23%) conditions (Table 2). Among the 32 plants used in the combined form of drugs, 87.5% are being used in Ayurveda and similarity in use was recorded in 53.6% cases (Table 3). The Ayurvedic system of medicine has been the major medicinal system practiced in Kerala since time immemorial. The traditional medicinal practice of the tribal communities typically involves simple use of plant parts of single plants or combination of 3 or 4 items, whereas Ayurvedic formulations mostly contains combination of many medicinal plants. The observation by Rahmatullah et al., [13] that use of medicinal plants in the traditional medicine practiced by Chakma tribes in Bangladesh is having resemblance to their use in Ayurveda, supports our view. Of the 73 total plants used by Chakma tribe, the medicinal uses of 33 plants are similar to Ayurvedic uses, as reported for various Ayurvedic preparations. While documenting the tribal medicinal practices of the Deb-barma clan of the Tripura tribe, residing in Dolusora Tripura Palli of Moulvibazar district of Bangladesh, Kabir et al.,

[14] records that a number of the plants used by the clan healer have similar uses in Ayurveda, but differ considerably in their therapeutic uses from that reported for other tribes in Bangladesh.

According to some researcher's traditional medicine and biomedicine may be incompatible and the use of biomedicine and biomedical concepts often displaces the use of traditional medicine and medical beliefs. In contrast, other scholars have found that traditional medicine and biomedicine can co-exist, complement and blend with each other. Giovannini et al., [15] use an econometric model and quantitative data to test the association between individual knowledge of pharmaceuticals and individual knowledge of medicinal plants in a rural indigenous community at Mexico. The results suggest that, in the study site, individual knowledge of medicinal plants and individual knowledge of pharmaceuticals co-exist in a way which might be interpreted as complementary. They conclude that social organization involves in the use of medicines from both traditional medicine and biomedicine is of particular significance and the use of pharmaceuticals alone is not associated with a decline in knowledge/use of medicinal plants.

CONCLUSION

The study revealed that Paniya and Kattunaikka tribes of Nilambur forest use many plants or plant parts for both internal and external applications for the treatment of various ailments in their daily life. The difference in usage of plants by same tribes occupying different localities and different tribes of the same or nearby localities was observed. The similarity and difference observed between tribal and Ayurvedic system also requires more investigation. The use of plants among these tribes reflects their interest in ethnomedicine and further investigation on unexplored species may led to the discovery of novel pharmaceutical products. Study may produce valuable information on new phytopharmaceuticals for new drug development in future towards combating various human ailments.

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REFERENCES

1. Chathukulam J, Reddy MG, Rao PT, et al. An assessment and analysis of Tribal Sub-Plan (TSP) in Kerala. Res Live Nat Res. 2012.
2. Thomas B, Aravindhan V, Maharajan M, et al. Wild edible roots and tubers and their contribution to the food security of Shola Naikans tribes of Kerala, India. J Non-Timr For Pro. 2010;17(4):449-451.
3. Thomas B, Rajendran A, Aravindhan V, et al. Ethnoveterinary medicines of tribe Paniyars in Kerala, India. Int J Biol Tech. 2011;2(2):72-75.
4. Thomas B, Mathews RP, Rajendran A, et al. The wild edible plants and its contribution to the dietary equilibrium of tribe Cholanaiikkans of Nilambur forest, Western Ghats of Kerala, India. GTRP Botan Rep. 2012;1(2):8-12.
5. Thomas B, Mathews RP, Rajendran A, et al. Ethnobotanical observations on tribe Arnatans of Nilambur forest, Western ghats region of Kerala, India. Res Plant Biol. 2013;3(2):12-17.

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6. Sivarajan VV, Balachandran I. Ayurvedic drugs and their plant sources. Oxford IBH. 1994.
7. Narayanan MR, Anilkumar N, Balakrishnan V, et al. Wild edible plants used by the Kattunaikka, Paniya and Kuruma tribes of Wayanad district, Kerala, India. *J Med Plants Res.* 2011;5(15):3520-3529.
8. Manikandan PA. Folk herbal medicine: A survey on the paniya tribes of Mundakunnu village of the Nilgiri hills, South India. *Anc Sci Life.* 2005;25(1):21-27.
9. Ramachandran VS, Udhayavani C. Knowledge and uses of wild edible plants by Paniyas and Kurumbas of Western Nilgiris, Tamil Nadu. *Indian J Nat Prod Res.* 2013;4(4):412-418.
10. Prasad AD, Shyma TB, Raghavendra MP. Plants used by the tribes for the treatment of digestive system disorders in Wayanad district, Kerala. *Appl Pharm Sci.* 2013;3(8):171-175.
11. Amuthavalluvan V. Ethno medicinal practices and traditional healing system of Kattunayakan in Tamilnadu: An anthropological study. *Int Multidiscip Res J.* 2011;1(7):47-51.
12. Naseef SA, Ajesh TP, Kumuthakalavalli R, et al. Study on folklore medicinal practices of Paniya tribes for gynaecological ailments. *Inter J Phar Bio Sci.* 2012;3(4):493-501.
13. Rahmatullah M, Chowdhury AR, Esha RT, et al. Ayurvedic influence on use of medicinal plants in Chakma traditional medicine. *Sustain Agric AEJSA.* 2012;6(2):107-112.
14. Kabir MH, Hasan N, Rahman MM, et al. A survey of medicinal plants used by the Deb barma clan of the Tripura tribe of Moulvibazar district, Bangladesh. *J Ethnobiol Ethnomed.* 2014;10:1-28.
15. Giovannini P, Reyes-García V, Waldstein A, et al. Do pharmaceuticals displace local knowledge and use of medicinal plants? Estimates from a cross-sectional study in a rural indigenous community, Mexico. *Soc Sci Med.* 2011;72(6):928-936.