

Ethno-medico-botanical knowledge of Tiptur taluk in Tumkur district of Karnataka, India

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Medicinal plants play an important role in the primary healthcare in rural India, since they are available locally, inexpensive and are said to have less side-effects. Herbal medicinal knowledge is an invaluable treasure that requires scientific documentation. The phyto-ethno-medicinal knowledge of Tiptur taluk of Karnataka state, India, has not been documented in the literature. Traditional plant medicinal knowledge available with folk people of the taluk was collected by interview-based semi-structured questionnaire and data was subjected to Informant consensus factor (ICF). The study revealed the use of 127 plant species of 118 genera and 52 families to treat 79 diseases and disorders affecting humans in the study area. The study also documented 60 new claims of medicinal use of plants, of which 22 reveals were on individual, and 38 on more than two plant formulations. The ICF analysis revealed that respiratory (0.54) and dermatological disorders (0.52) were highly prevalent in the area, for which 28 and 62 medicinal herbs, respectively, were prescribed by the herbal healers. The present study indicated that the herbal healers have a fair knowledge and a considerable number of their formulations are new records.

Keywords: Ethnobotany, Herbal medicine, ICF, Infectious diseases, Non-infectious diseases

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The traditional folk healers and medicine men are following the practice of treating humans and veterinary animals for their diseases and disorders with the locally available plants and resources. This practice is deep-rooted in India and the herbal medicine knowledge has been acquired through long tradition and experience. The source of herbal drugs include forests, cultivated farm lands, gardens and area near forests or other sources including crude herbal vendors^{1,2}. Tiptur taluk of Tumkur district in Karnataka, situated in the central dry zone of Karnataka state, consists of sparse scrubby to open type of forests. The resident local communities in the taluk utilize locally available plants for their primary healthcare needs (Boosanur, personal observation). The traditional medicinal knowledge could be lost if left undocumented. Plenty of reports are available on the documentation of traditional herbal medicinal knowledge in India, in general^{3,4} and Karnataka, in particular⁵⁻⁹. However, the hidden treasure of traditional medicinal plant knowledge in Tiptur region

is unexplored. This prompted authors to take up a field survey during 2007 and 2008 and document the traditional medicinal knowledge of resident communities of Tiptur taluk.

Materials and methods

The study area Tiptur taluk is situated (13° 26 N lat, and 76°48E long, altitude 862 m above msl, annual rainfall 453.5-717.7 mm - more than 55% received during the Kharif season) in the south interior part of Karnataka state, India. Soils are mainly red sandy-loam and deep-black in certain area. The principal crops grown are ragi, sorghum, pulses and oilseeds. The population (53,043 individuals) consisted of 51% males and 49% females. The literacy rate (74%) in male and female is 79 and 69%, respectively¹⁰. The taluk has one of state's highest economical potential with well-managed agricultural produce market committee.

The phyto-ethno-medical information of Tiptur taluk was collected by frequent field visits based on a semi-structured questionnaire¹¹ during December 2007-December 2008. The questionnaire was

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designed to collect data of the social status, educational qualification, occupation and financial position, their expertise to cure disease, plant products recommended as medicine, adjuvant in a recipe, mode of application, dosage and duration, precaution and the local names of plants from healers of the region¹¹. The people of all age groups were interviewed for their knowledge of medicinal plant. The information regarding the prevalence of diseases and disorders affecting the local people and their animals were collected. A number of visits were made to the study area and consistent reveals were documented. The information was also recorded in an audio tape after their consent. The people of the resident and adjoining area who received herbal medicine treatments for their disease(s) were also interviewed and information documented. The medicine men were persuaded to reveal the local or vernacular names of medicinal plants and their habitat, as described previously¹¹. Following the confirmation of identity, plants were collected for the herbarium preparation and specimens were allotted voucher numbers and deposited in the departmental herbaria centre.

Data analysis

Informant consensus originally described by Trotter and Logan¹² and later adopted by Heinrich *et al.*¹³ was used to identify the potentially effective medicinal plants of the study area. The informant consensus factor (ICF) was calculated for each category of ailments to identify the agreements of informant(s) on the reported cures for the group of ailments. It was calculated as:

$$ICF = \frac{n_{ur} - n_t}{(n_{ur} - 1)}$$

where n_{ur} is the number of use reports of informants for particular illness usage, where a use report is a single record for use of a plant mentioned by an individual and N_t refers to the number of species used for a particular illness category for all informants. The factor provides a range of 0 to 1, where a high value acts as a good indicator for high rate of informant consensus. ICF values were indexed into low (ranges from 0.0-0.3), moderate (ranges from 0.31-0.60) and high values (ranges from 0.61 to 1.0).

Results

The present study indicated that that herbal healers and knowledgeable elders of Tiptur taluk used 127 species of plants of 118 genera and 52 families to

treat various human diseases and disorders. Fabaceae topped the list with 19 plant species followed by Solanaceae and Euphorbiaceae (7 and 6 species, respectively). The medicinal plants used by herbal healers were grouped into infectious and non-infectious diseases and certain new claims were detailed in Tables 1 & 2. In each table, information on disease, scientific as well as the local and common names, family, plant part used, and method of preparation of medicine, dosage, duration, and ingredients are given. However, for determining the ICF, all plant species that were used for formulating herbal drugs were considered. The most frequently utilized plant part was leaf (36.10%) and seed (20.12%) in the preparation of herbal medicine, in addition to other parts like rhizome (13.27%), fruit (6.54%), root (6.19%), latex (2.83%), stem (2.65%), flower (2.30%), and gum (0.35%). The most used herbal formulation in Tiptur region was the paste (34.93%) and juice (28.76%), followed by raw materials (10.27%), decoction (9.58%), powder (8.12%), oil (3.76%), tablets (2.39%), steam (1.3%) and ash (0.68%).

The present report also claims 22 new reports for individual plants and 38 new reports for combination of plants to treat various infectious and non infectious diseases and disorders. The herbal healers in Tiptur taluk prescribed more of the single to polyherbal formulations. Out of 207 formulations, 110 were single plant preparations and 49 and 48 were biherbal and polyherbal formulations, respectively. *Allium sativum* was invariably used in 31 formulations for the treatment of 79 diseases and disorders, which is followed by *Piper nigrum* (29), *Citrus medica* (18), *Curcuma longa* (14), *Tinospora cordifolia* (13), *Leucas aspera* and *Tylophora indica* (10).

In the present study, ICF ranged from 0.05 to 0.54 per illness category. Respiratory disorders (0.54) and dermatological disorders (0.52) attracted high ICF values (Table 3). This might indicate the prevalence of high incidence of respiratory and skin ailments in the region.

Discussion

The herbal healers of the study area used medicinal plants either individually or in combination(s) for treating various diseases and disorders. The dependence of the rural folk on herbal medicines could be partly due to their poor economic situation coupled with non-availability of modern healthcare

Table 1—New claims of medicinal plants used in the treatment of infectious human diseases by the resident healers of Tiptur taluk

Sl. no.	Ailment	Botanical name/family	Local name/ common name/ voucher number	Mode of uses
1	Itching	<i>Volkameria inermis</i> L. [syn. <i>Clerodendrum inerme</i> (L.) Gaertn.] Verbenaceae <i>Senna auriculata</i> (L.) Roxb. (syn. <i>Cassia auriculata</i> L.) Fabaceae <i>Cocos nucifera</i> L. Arecaceae	<i>Vishamadhari/ Glory Bower</i> KU/SG/NS 070 <i>Thangadi/ tanner's cassia</i> KU/SD/SR 410 <i>Thengu/coconut</i> KU/SG/JS 266	Leaves of <i>V. inermis</i> and <i>S. auriculata</i> and pure camphor ground with coconut oil and paste applied over the itching part.
2	Skin diseases	<i>Diplocyclos palmatus</i> (L.) C. Jeffrey (syn. <i>Bryonopsis laciniosa</i> auct.) Cucurbitaceae <i>Volkameria inermis</i> L. [syn. <i>Clerodendrum inerme</i> (L.) Gaertn.] Verbenaceae <i>Tinospora cordifolia</i> (Willd.) Hook. f. & Thomson Menispermaceae <i>Curcuma longa</i> L. Zingiberaceae <i>Millettia pinnata</i> (L.) Panigrahi [syn. <i>Pongamia pinnata</i> (L.) Pierre] Fabaceae <i>Allium sativum</i> L. Liliaceae <i>Piper nigrum</i> L. Piperaceae <i>Diplocyclos palmatus</i> Cucurbitaceae <i>Leucas aspera</i> (Willd.) Link Lamiaceae <i>Tylophora indica</i> (Burm. f.) Merr. [syn. <i>Tylophora asthmatica</i> (L. f.) Wight & Arn.] Asclepiadaceae	<i>Mahalingana balli/ lollipop climber</i> KU/TT/HN 337 <i>Vishamadhari/ Glory Bower</i> KU/SG/NS 070 <i>Amruthaballi/ Indian Tinospora</i> KU/SG/JS 157 <i>Arishina/ turmeric</i> KU/BS/SM 52 <i>Honge/Indian pongamia</i> KU/SD/BT 344 <i>Bellulli/ garlic</i> KU/SD/SH 347 <i>Menasu/blackpepper</i> KU/BS/SM 053 <i>Lollipop-climber</i> KU/TT/HN 337 <i>Thumbe/ Common Leucas</i> KU/BS/MU 013 <i>Adumuttada balli/ Indian ipecac</i> KU/SD/SR 427	Leaves of <i>D. palmatus</i> , <i>V. inermis</i> , and <i>T. cordifolia</i> turmeric powder and sulphur macerated in <i>M. pinnata</i> oil and paste applied over the skin. Leaves of <i>D. palmatus</i> , <i>L. aspera</i> , <i>T. indica</i> garlic cloves and pepper seeds ground and applied over the affected part.
3	Sore in nose	<i>Cocos nucifera</i> L. Arecaceae	<i>Thengu/ coconut</i> KU/SG/JS 266	Pure camphor and copper sulphate ground in coconut oil and paste applied over the affected part.
4	Sore in thigh	<i>Leucas aspera</i> (Willd.) Link Lamiaceae <i>Piper nigrum</i> L. Piperaceae <i>Allium sativum</i> L. Liliaceae	<i>Thumbe/ Common Leucas</i> KU/BS/MU 013 <i>Menasu/ black pepper</i> KU/ BS/SM 053 <i>Bellulli/ garlic</i> KU/SD/SH 347	<i>L. aspera</i> leaves, pepper seeds and garlic cloves ground in lemon juice and paste applied over the affected part.
5	Sore in back	<i>Argemone mexicana</i> L. Papaveraceae <i>Tragia involucrata</i> L. Euphorbiaceae	<i>Datturi/ Mexican-poppy</i> KU/SD/BT 681 <i>Thurike gida</i> KU/TT/HN339	<i>A. mexicana</i> seeds and young stem of <i>T. involucrata</i> ground and applied until cure.
6	Wart	<i>Annona squamosa</i> L. Annonaceae <i>Ficus religiosa</i> L. Moraceae	<i>Sithaphala/ custard-apple</i> KU/SD/BH 265 <i>Arali mara/ peepul tree</i> KU/SD/SH 331	<i>A. squamosa</i> leaves ground with <i>F. religiosa</i> bark and paste applied over the skin, until cure.
7	Wounds	<i>Lactuca sativa</i> L. Asteraceae <i>Tridax procumbens</i> L. Asteraceae	<i>Jalamulangi/cabbage lettuce</i> KU/TT/HL 342 <i>Addike soppu/ tridax daisy</i> KU/SG/JS 121	Leaves ground with lemon juice and paste applied over the wound.

Table 2—New claims of medicinal plants used in the treatment of non-infectious human diseases by the resident healers of Tiptur taluk

Sl. no.	Ailment	Botanical name/Family	Local name/ Common name/ Voucher number	Mode of uses
1	Allergy	<i>Diplocyclos palmatus</i> (L.) C. Jeffrey (syn. <i>Bryonopsis laciniosa</i> auct.) Cucurbitaceae	<i>Mahalingana balli/ lollipop-climber</i> KU/TT/HN 337	Leaves ground with pure camphor and applied over the skin expressing allergic symptoms.
		<i>Amaranthus spinosus</i> L. Amaranthaceae <i>Tribulus terrestris</i> L. Zygophyllaceae	<i>Mullu arive/ prickly amaranth</i> KU/SD/SK 771 <i>Neggilu mullu/ cat's-head</i> KU/TT/BM 343	Leaves of <i>A. spinosus</i> and <i>T. terrestris</i> ground in buffalo milk curd and paste applied over the skin expressing allergic symptoms.
2	Alopecia	<i>Hibiscus rosa-sinensis</i> L. Malvaceae	<i>Daasavala/ China-rose</i> KU/BS/SM 052	Leaves of <i>H. rosa-sinensis</i> and <i>C. parviflorum</i> ground with pure camphor and fresh coconut oil, applied to scalp and hair.
		<i>Canthium parviflorum</i> Lam. Rubiaceae	<i>Thogali/ Coromandel Canthium</i> KU/SG/NS 85	
		<i>Mangifera indica</i> L. Anacardiaceae	<i>Maavu/ mango</i> KU/SG/V58	Mango and <i>B. monosperma</i> seeds ground in water, paste applied to the hair and scalp.
		<i>Butea monosperma</i> (Lam.) Taub. (syn. <i>Butea frondosa</i> Roxb. ex Willd.) Fabaceae	<i>Muthuga/ bastard-teak/ flame-of-the-forest</i> KU/SG/V 062	
		<i>Euphorbia tirucalli</i> L. Euphorbiaceae	<i>Kaddikalli/ fingertree</i> KU/SD/BT 367	Latex of <i>E. tirucalli</i> mixed with buffalo butter and applied to scalp and hair twice a week.
3	Back pain	<i>Albizia amara</i> (Roxb.) Boivin Fabaceae	<i>Chigare pudi/ Oil cake tree</i> KU/SD/BH 780	<i>A. amara</i> leaves and <i>S. auriculata</i> bark ground with lemon juice, paste applied to the scalp and hair.
		<i>Citrus medica</i> L. Rutaceae	<i>Nimbe/ citron</i> KU/SG/JS 257	
		<i>Senna auriculata</i> (L.) Roxb. (syn. <i>Cassia auriculata</i> L.) Fabaceae	<i>Thangadi/ tanner's cassia</i> KU/SD/SR 410	
		<i>Bergera koenigii</i> L. [syn. <i>Murraya koenigii</i> (L.) Spreng.] Rutaceae	<i>Karibevu/ curryleaf</i> KU/SD/SH 711 <i>Chittellu/ sesame</i> KU/TT/HN 346	<i>B. koenigii</i> leaves ground in sesame oil and paste applied on the back.
		<i>Sesamum indicum</i> L. Pedaliaceae		
4	Bone fracture	<i>Pavonia zeylanica</i> Cav. Malvaceae	<i>Antu thogari/ Ceylon Swamp Mallow</i> KU/TT/HN 347	Leaves macerated and paste paste applied over the broken limbs for 1-2 week. Advised to take nutrient-rich food.
		<i>Pavonia zeylanica</i> Cav. Malvaceae	<i>Antu thogari/ Ceylon Swamp Mallow</i> KU/TT/HN 347	Leaves of <i>P. zeylanica</i> and <i>P. zeylanica</i> crushed and paste applied over the broken limbs for 18 days.
		<i>Plumbago zeylanica</i> L. Plumbaginaceae	<i>Chitramula / plumbago</i> KU/BS/MA 023	
5	Birth control	<i>Acacia concinna</i> (Willd.) DC. Fabaceae	<i>Seege/ soap-pod</i> KU/SD/SH 337	<i>A. concinna</i> bark and dry <i>C. longa</i> rhizome ground in <i>C. gigantea</i> latex, made into tablets and given orally.
		<i>Curcuma longa</i> L. Zingiberaceae	<i>Arishina/ turmeric</i> KU/BS/SM 52	
		<i>Calotropis gigantea</i> (L.) W. T. Aiton Asclepiadaceae	<i>Ekkadagida/ giant milkwood</i> KU/SG/NS 192	
6	Cramps	<i>Senna auriculata</i> (L.) Roxb. (syn. <i>Cassia auriculata</i> L.) Fabaceae	<i>Thangadi/ tanner's cassia</i> KU/SD/SR 410	Leaves macerated and applied over the affected part.
7	Dog bite	<i>Datura metel</i> L. Solanaceae	<i>Dattura/ downy thorn-apple</i> KU/SD/SR 339	<i>D. metel</i> leaves and <i>S. indicum</i> seeds ground with jaggery and made into tablets, given orally.
		<i>Sesamum indicum</i> L. Pedaliaceae	<i>Chittellu/ sesame</i> KU/TT/HN 346	

(contd.)

Table 2—New claims of medicinal plants used in the treatment of non-infectious human diseases by the resident healers of Tiptur taluk (*contd.*)

Sl. no.	Ailment	Botanical name/Family	Local name/ Common name/ Voucher number	Mode of uses
8	Jaundice	<i>Cissus quadrangularis</i> L. [syn. <i>Vitis quadrangularis</i> (L.) Wall. ex Wight] Vitaceae <i>Centella asiatica</i> (L.) Urb. Apiaceae <i>Cynodon dactylon</i> (L.) Pers. Poaceae <i>Cajanus cajan</i> (L.) Huth (syn. <i>Cajanus indicus</i> Spreng.) Fabaceae <i>Ocimum tenuiflorum</i> L. (syn. <i>Ocimum sanctum</i> L.) Lamiaceae	<i>Mangaravalli/ winged treebine</i> KU/SG/JS 937 <i>Ondelaga/ Indian pennywort</i> KU/BS/MU 012 <i>Garike/ Bermuda grass</i> KU/BS/SM 051 <i>Thogari/ pigeon-pea/ red gram</i> KU/TT/HN 348 <i>Tulasi/ holy basil</i> KU/SG/V 061	Leaves given orally thrice a day, for 4-5 days. Leaves of all indicated plant species ground, made into paste, given orally with dhal rasam. Rasam is prepared by boiling seed splits (dhal) of <i>C. cajan</i> and tomato fruit in water and seasoned with fried mustard (<i>Brassica juncea</i> , Brassicaceae), jeera (<i>Cuminum cyminum</i> , Apiaceae), and murraya leaves in little oil.
9	Leucorrhoea in women	<i>Cryptolepis buchananii</i> Roem. & Schult. Asclepiadaceae <i>Glycyrrhiza glabra</i> L. Fabaceae <i>Elettaria cardamomum</i> (L.) Maton Zingiberaceae <i>Myristica fragrans</i> Houtt. Myristicaceae <i>Leucas aspera</i> (Willd.) Link Lamiaceae	<i>Halada balli/ Wax Leaved Climber</i> KU/SD/SH 262 <i>Athimadhura/ licorice</i> KU/UK/KV/HG 311 <i>Elakki/ cardamom</i> KU/SD/BT 320 <i>Jayikayi/ nutmeg</i> KU/UK/KV/MD 286 <i>Thumbe/ Common Leucas</i> KU/BS/MU 013	Tender shoots and sugar candy ground in tender coconut milk and given orally, thrice a day in empty stomach. <i>G. glabra</i> leaves, cardamom seeds, sugar candy, <i>M. fragrans</i> seeds and <i>L. aspera</i> flowers ground and paste given orally with rice washed water for 3-4 days.
10	Menstrual pain	<i>Pergularia daemia</i> (Forssk.) Chiov. (syn. <i>Daemia extensa</i> R.Br.) Asclepiadaceae <i>Cocos nucifera</i> L. Arecaceae <i>Guizotia abyssinica</i> (L. f.) Cass. Asteraceae <i>Cicer arietinum</i> L. Fabaceae	<i>Kultiga/ Pergularia</i> KU/BS/TH 046 <i>Thengu/ coconut</i> KU/SG/JS 266 <i>Kuttellu/ Nigerseed</i> KU/SG/JS 110 <i>Hurigadle/ chick-pea</i> KU/TT/HN 350	<i>P. daemia</i> leaves 25 g, coconut endosperm 100gm, <i>G. abyssinica</i> seeds 100gm, fried chick-pea gram 100gm and jaggery 50gm ground, added with water and given orally.
11	Paralysis	<i>Azadirachta indica</i> A. Juss. Meliaceae <i>Moringa oleifera</i> Lam. Moringaceae	<i>Bevu/ neem</i> KU/SG/MH 068 <i>Nugge/ drumsticktree</i> KU/BS/MU 012	Bark of both plant species powdered, mixed with honey and given orally.
12	Partial headache	<i>Ocimum tenuiflorum</i> L. (syn. <i>Ocimum sanctum</i> L.) Lamiaceae <i>Elettaria cardamomum</i> (L.) Maton Zingiberaceae	<i>Tulasi/ holy basil</i> KU/SG/V 062 <i>Elakki/ cardamom</i> KU/SD/BT 320	Seeds of cardamom ground in <i>O. tenuiflorum</i> leaf juice and applied over the head.
13	Piles	<i>Agave americana</i> L. Agavaceae	<i>Kattale/ American agave</i> KU/TT/HN 351	The transition zone of root and shoot given orally, thrice a day for 3 days.
14	Respiratory problem in children	<i>Withania somnifera</i> (L.) Dunal Solanaceae <i>Elettaria cardamomum</i> (L.) Maton Zingiberaceae <i>Crocus sativus</i> L. Iridaceae	<i>Ashwagandha/ winter-cherry</i> KU/SG/NS 071 <i>Elakki/ cardamom</i> KU/SD/BT 320 <i>Kunkum kesari/ saffron</i> KU/TT/HL 352	<i>W. somnifera</i> roots, cardamom seeds and kunkum kesari boiled in cow's butter and applied over the entire body.
15	Strengthening of bone in children	<i>Citrus medica</i> L. Rutaceae	<i>Nimbe/ citron</i> KU/SG/JS 257	Pinch of lime in 2 tea-spoonfuls of lemon juice and water given orally.

Table 3—Informant consensus factor (ICF) values for different category of human ailments in the study area

Sl.No.	Category	No. of reports	No. of plants used	ICF values
1.	Respiratory problems	60	28	0.54
2.	Dermatological problems	129	62	0.52
3.	Fever	17	11	0.37
4.	General health problems	82	59	0.28
5.	Cardio-vascular problems	20	16	0.21
6.	Menstrual problems	32	26	0.19
7.	Poisonous bites	14	12	0.15
8.	Pains	26	23	0.12
9.	Liver problems	19	18	0.05
10.	Gastro-intestinal problems	11	11	0

facilities, and services. The elder individuals preferred herbal drugs to modern allopathic counterparts, as they strongly believed in the good effects of herbs. They were reluctant to reveal their knowledge but, were persuaded in the good interest of human welfare. They had also wide-spread belief of the ineffectiveness of traditional therapies if revealed and practiced by individuals other than their own family members. Although the western medical care is available, many people still preferred traditional herbal medicines for treating their ailments¹. The elder citizens of the study area have rich knowledge which is being neglected by young individuals, who are influenced by the attraction of modernization and allopathic drugs.

The ICF value depended on the availability of the plant species and prevalence of diseases and disorders and vegetation pattern of the study area. A study by Rajakumar & Shivanna¹⁴ in eastern part of Shimoga district, showed that liver complaints was assigned with maximum ICF (0.77) followed by respiratory (0.46) and urological (0.44) problems. Achar *et al.*⁹ reported moderate ICF (0.30) for respiratory problems and maximum ICF (1.00) for jaundice with *Khare-vokkaliga* community.

Many formulations used by the herbal healers of Tiptur were reported for the same purpose as in many parts of India and world. For example, the herbal healers of Tiptur used *Piper nigrum* to cure cough and this plant was used for the same purpose in the Bhadra Wildlife sanctuary in Karnataka¹¹; similarly, asthma with *Tinospora cordifolia*¹⁶, eczema and fever with *Azadirachta indica*¹⁷, menstrual problems with *Leucas aspera* and *Cocos nucifera*^{16,18}, diabetes with *Tinospora cordifolia* and

Catharanthus roseus individually or in combination with *Syzygium cumini*^{9,14}.

In contrast to the above examples, certain plants commonly used for treating disease(s) across regions were also reported to be effective in curing other diseases. For example, *A. precatorious* was reported for snakebite⁹, and jaundice¹⁹ and is scientifically proven for its anticancer property²⁰. Tiptur folk people used *Leucas aspera*, *Tylophora asthamatica* and *Aristolochia indica* for snakebite either individually or in combination. The use of *L. aspera* in snake bite is not reported in the literature; however *Tylophora asthamatica* and *Aristolochia indica* were used for the same purpose in some villages of Shimoga district, Karnataka⁵. *Butea frondosa* reported in *Materia Medica of Hindus* as rejuvenator²¹ was used for treating ring worm by Tiptur folk people, as well as in Shimoga district⁵.

Among the single plant drugs for infectious diseases, *Plumbago zeylanica* and *Holoptelea integrifolia* were used for mouth ulcer, and *Gardenia gummifera* for whitlow. Among plants used in combination, *Clerodendron inerme* was used along with the *Cassia auriculata* and *Cocos nucifera*, although *Clerodendron inerme* was reported for itching²². Similarly, *Bryonopsis laciniosa* was used in combination with *Curcuma longa*, *Allium sativum*, *Tinospora cordifolia*, *Leucas aspera*, and *Physalis minima* for treating skin diseases; the former two were known for skin diseases^{23,24}. *Azadirachta indica* and *Clerodendron inerme* and *Calotropis gigantea* and *Eleusine coracana* in different combinations were used for the treatment of whitlow. The above plant species either in combination or individually were not reported previously for the treatment of whitlow. *Tridax procumbens* known for wound healing individually²⁵, was used with *Lactuca sativa*, for wound healing in the study area.

In case of non-infectious diseases, *Bryonopsis laciniosa*, *Accacia concinna*, *Piper nigrum*, *Allium sativum*, or *Citrus medica* were used individually for treating allergy syndrome for the first time. *Amaranthus spinosus* in combination with *Tribulus terrestris*, is a new report for allergy treatment and is not reported previously for this purpose. Although, *Hibiscus rosa-sinensis* is well known for treating alopecia and hair growth related problems²⁶, its combination with *Canthium parviflorum* for alopecia is a new claim. *Butea frondosa* with *Mangifera indica* and *Albizia amara* with *C. medica* and *Cassia*

auriculata are new claims. On the other hand, the use of *Euphorbia tirucalli* and *Plumeria alba* individually for alopecia is a new claim in the present study, but the former plant was reported for diseases and disorders other than alopecia²⁷. Similarly, *Croton tiglium* used for alopecia is a new claim in the present study. Combined use of *Murraya koenigii* with *Sesamum indicum* oil for back pain is hitherto not reported, however, the sesame oil alone is used in back pain²⁸. Epistaxis treatment with combination of *Cocos nucifera* and *Calatropis gigantea* with *Plumeria alba* is also not known to literature.

Use of *Pavonia zeylanica* in the treatment of bone fracture, *Artocarpus integrifolia* for dog bite, *Vitis quadrangularis* for jaundice, *Abelmoschus esculentus* for kidney stone, *Cryptolepis buchanani* for leucorrhoea, *Agave americana* for piles, *C. medica* for rat bite, and *Diospyros montana* for respiratory disorders are some of the noteworthy unreported claims in the present study. *Phyllanthus amarus* known for the treatment of jaundice^{14,29}, in combination with *Allium sativum* is a new claim in the present study. *Azadirachta indica* and *Moringa oleifera* combination is a new claim for the treatment for paralysis, while there is no such previous report. The polyherbal combination of *Centella asiatica*, *Cynodon dactylon*, *Ocimum sanctum*, and *Cajanus indicus* in the treatment of jaundice is another noteworthy observation; however *C. indicus* alone was reported previously³⁰. A combination of *Withania somnifera*, *Elettaria cardamomum* and *Crocus sativus* were used for the treatment of respiratory problems in children, and among the above, only *C. sativus* is clinically proven for the treatment of respiratory disorder³¹. Another use of polyherbs with *Piper nigrum*, *A. sativum* and *Curcuma longum* for laryngitis is a new report in the present study. Use of *A. sativum* is already reported for the same purpose²⁴, however, the use of *P. nigrum* and *C. longa* is not documented.

The single medicinal plant or combinations of medicinal plants might contain few to many pharmacologically active compounds. In some cases, the therapeutic effect of ingredients is not known and possibly they could be used as adjuvants¹⁵.

Conclusion

The resident healers of Tiptur taluk are very knowledgeable and used 127 species of plants of 52 families to treat 79 diseases and disorders affecting the local population. A considerable number of herbal

drugs are new records, most of which are not threatened with extinction as per the IUCN Red data list of medicinal plants. However, *Gardenia gummifera* is the only red listed plant.

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