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Plants Utilized By Indigenous People for Pediatric Treatment in Central Himalaya

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Abstract: Children are the most marginalized humans in mountains that need sustainable diet and healthcare. Recognizing the role of young demography as human capital for regional, national and global well-beings, a study was conducted on plant-based indigenous medical practices for treatment of child diseases in *Bhabar* tract of Garhwal Himalaya. Data on diseases and indigenous medicinal plants were collected by interviewing diversity of indigenous people using informal discussions, open ended interviews and guided dialogue technique. The plants of medical value as recorded through interviews were collected from nature and identified with the help of respondents, flora and taxonomists. Vomiting, pneumonia, dysentery, diarrhoea, stomach worms and pain, bed wetting, epistaxis and tonsil were recorded as the common diseases among children. A total of 50 plant species, mostly local to natural landscape, being used as effective indigenous medicines for treatment of these diseases are documented. It was recorded that the knowledge networks and adaptive strategies developed by indigenous people to conserve these bioresources are weakening due to change in value system. Appropriate State intervention and empowering indigenous people to ensure continuation of eco-culturally evolved practices is called for.

Keywords: Child diseases, Indigenous uses, Medicinal plants, Central Himalaya

INTRODUCTION

Indigenous knowledge evolved over time eco-culturally as ecosystem specific tools, technologies and practices constitute traditional knowledge and technology as appropriate innovation strategies that effectively conserve resources and allow options for their optimal use by the indigenous people. The role

of traditional knowledge is vital in the sustainable living of the indigenous people in view of the fact that replication and adoption of modern short-time tested technologies developed outside the ecosystem elsewhere are either inaccessible or have not been at times successful in ecosystems like Himalayan mountainous region where the indigenous people live with inaccessibility, fragility, marginality, diversity, niche and adaptability. The rich plant diversity of the natural landscape in Indian Central Himalaya, i.e., the State Uttarakhand, is widely used traditionally by the native communities for diverse economic utilities- prominently the food and medicinal values[1-3] . Ethnobotanical investigations in this region have been largely conducted in the high elevational areas beyond 2,500 m asl on plants of medicinal utility [4-8].The *Bhabar* tract represents dry and hot landform in the foothills (< 800m asl) of Garhwal Himalaya. It is inhabited by tribals- the *Tharus* and *Buksas* and diversity of non-tribal native and migrant communities including *Gujjars* and *Banjaras*. During the last two decades, there has been a growing interest on the ethnobotanical and ecological studies in this region, and a few studies [9] have appeared in the literature. The present study is an attempt on documentation of indigenous healthcare practices of local inhabitants of Bhabar region for children's ailments.

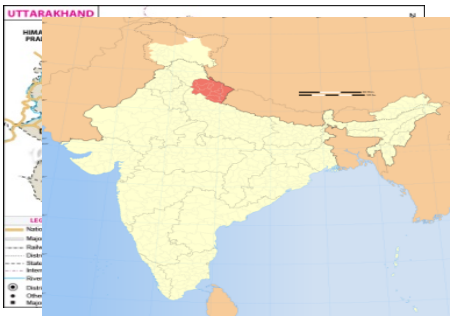

Fig.1: India Map showing Uttarakhand State **Fig.2:** Uttarakhand Map showing Garhwal region

THE STUDY AREA

Bhabar tract in Garhwal Himalaya (78^{0}22' to 78^{0}32' E longitude and 29^{0}43' to 29^{0}48'N latitude) is extended from Northwest to Southwest, about 132 km in length with minimum and maximum width of 0.5 km and 6.0 km, respectively. Soil of the area is characterized as the Siwalik debris, mostly sandy to loam in texture or clayey loam, dry and stony. The climate is monsoonic and bixeric. The tract is named as "*Bhabar*" because of dominance of grass "*Bhabar*" (*Eulaliopsis binata*). Sub-tropical evergreen Sal (*Shorea robusta*) forest is the predominant forest type in the region. The grass cover is represented by *Phragmites- Saccharum- Imperata* type in the riverine areas and *Themeda- Arundinella* type in non-riverine localities. Kotdwar tehsil of Pauri district was chosen for the present study.

Methods: The ethnobotanical studies on the indigenous child healthcare system were conducted through informal interaction, open-ended interviews and guided dialogues using semi-structured questionnaire. The local inhabitants of all age and gender diversity were approached for collection of information. The plant species as indicated by the local inhabitants were collected from nature, and identified botanically following Kanjilal [10], Babu [11] and Gaur [12] as these flora were found useful for the study area due to locational similarities.

RESULT AND DISCUSSION

Diseases, viz., epistaxis, fever, headache, jaundice, stomachache due to stomach worms and stone formation were recorded as the major ailments. The plant species used by the local inhabitants for child healthcare for various ailments are enumerated in **Table-1.**

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Table-1: Plant species used by the local inhabitants for child healthcare for various ailments

Name Botanical, Common	**Family**	**Status of Domesti-cation & Habitat Preference**	**Availa-bility**	**Ailment/ Medical Property**	**Part & application, Life form**	**Mode of Administration**	**Threat / Biotic Pressure**	**Nativity & Conservation Status**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Acacia nilotica(L.)Delile.*I.C.*, Babool	Fabaceae	W RL	R	Diarrhoea	Leaf extract T	Oral	FW ST	Afr.; As trop.
A. nilotica *Punica granatum* L., Anar *Bauhinia variegata* L., Kachnar	Fabaceae, Puniacaceae Caesalpiniaceae	W RL C CL NS P RS	R C C	Tonsil	Bark decoction T	Oral (Gargle)	FW ST CE FW	 Europ. Austr; Maurit Ind. Or. Burma China
Achyranthes aspera L., Apamarg	Amaranthaceae	W RS WL	A	Vomiting, Dysentery	Root decoction H	Oral	N	Geront, trop, As Am Austr. As. trop.
A. aspera L., Apamarg *Curcuma domestica* Valeton, Haldi	Amaranthaceae Zingiberaceae	W RS WL C CL	A C	Small-pox	Root & rhizome paste with water on nails head and tongue H, H	External	N	
Acorus calamus L., Bach	Araceae	W R/WC	F	Promote teething of children	Rhizome to bite H	Oral	DWR	Reg Bor temp.
Adhatoda vasica L., Barsingh	Acanthaceae	W WL RS	C	Stomach worm	Root washed, cooked and powdered with hot water or milk Sh	Oral	N	As. trop
Aegle marmelos (L.)Correa., Bel	Rutaceae	CW FL WL NS	F	Dysentery	Leaf & fruit juice, unripe seed powder T	Oral	FW ST CE	Ind. or.
Allium cepa L., Piyaz	Liliaceae	C CL	C	Stomach worm	Bulb hot juice H	Oral	N	Persia,Beluchist, Soongaria, Sibir

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Aregemone mexicana L., Satayanasi	Papavaraceae	W CL WL GL	C	Stammering and Babbling	Latex applied on tongue H	External	N	Am. Bor., Mexic
Azadirachta indica A.Juss., Neem	Meliaceae	W RS WL	F	Stomach worm	Leaf juice with honey T	Oral	ST	Ind. or.
A. indica *Trachyspermum ammi* (L.)Sprag., Ajawain	Meliaceae Apiaceae	W RS WL C CL	F C	Stomach worm	Neem leaf powder and ajwain seed with jaggery T H	Oral	ST N	
Brassica juncea (L.)Czernajew & Cosson, Rai	Brassicaceae	C CL	C	Bed wetting of children	Seed powder H	Oral	N	As. temp.et trop
Butea monosperma (Lam.)Kuntze, Dhak *Embelia tsjeriam-cottam* (Roemer and Schultes)A.D.C., Vai-vidang	Fabaceae Myrsinaceae	W FL WL RS W WL GL FL	F F	Stomach worm	Seed powder, Fruit T	Oral	FW ST CE	
Cassia fistula L., Amaltas	Caesalpiniaceae	W RS WL	C	Dysentery	Ripe Pod powder T	Oral	N	As. trop., Aegypts.
C. fistula *Coriandrum sativum* L., Dhaniya	Caesalpiniaceae Apiaceae	W RS WL C CL	C A	Stammering and Babbling	Amaltas pulp and dhaniya seed powder with hot water T H	Oral (Gargle)	N N	Europ. austr.; Oriens
C. tora L., Panwar	Caesalpiniaceae	W RS WL	A	Promote teething of a child	Leaf decoction U Sh	Oral	N	Connop. trop.
Cedrus deodara (Roxb.ex.D.Don) G.Don, Devdaru *Trichosanthes tricuspidata* Lour., Indrayan	Pinaceae Cucurbitaceae	P RS FL W CL WL RS GL	C C	Tonsil	Root paste on throat T, CH	External	ST N	As Min Syria, Afgan, Rusitimal Alger
Chenopodium album L., Bathua	Chenopodiaceae	W CL WL	A	Stomach worm	Leaf juice with honey H	Oral	N	
Cinnamomum tamala (Buch.-	Lauraceae	W FL WL	F	Stammering	Leaf under	Oral	FW ST	Reg Himal

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Ham.)Nees and Eberm., Tejpat				and Babbling	tongue T			
Citrus aurantifolia (Christmann)Swingle, Kagzhi nimbu	Rutaceae	C CL	C	Dysentery, Stomach ache	Fruit juice, pinch of salt and sugar with water Sh	Oral	CE	As. Bor
Coriandrum sativum L., Dhaniya	Apiaceae	C CL	A	Vomiting	Leaf juice H	Oral	N	
Cucurbita maxima Duch., Kadoo	Cucurbitaceae	C CL NS	A	Tonsil	Seed decoction TH	Oral (Gargle)	N	As. trop, (Orb. Trop. Cult.)
Cynodon dactylon (L.)Persoon, Doob	Poaceae	W CL WL RS GL	A	Epistaxis (Bleeding from nose)	Leaf-cum-stem juice is dropped into nose H	External	N	Cosmop; Arab.; Nubia
Ferula asafoetida L., Hing	Apiaceae	C CL	C	Stomach ache	Root exudate paste applied around naval H	External	N	Persia; Afgan
Ficus racemosa L., Gular	Moraceae	W CL WL FL GL	C	Pneumonia, Epistaxis (Bleeding from nose)	Latex, Bark boiled in water for pneumonia, and bank (-rind) powder, cow milk and cold water dropped into nose T	Oral, External	FW	Austral. Trop; Ind or; Burma
F. religiosa L., Peepal	Moraceae	W WL RS FL	F	Vomiting	Bark burned and wetted	Oral	N	Ind. or.
Foeniculum vulgare (L.)Miller, Saunf, *Amomum subulatum* Roxb., Badi Elaichi *Mentha longifolia* (L.)Hudson, , Pudina	Apiaceae, Zingiberaceae Lamiaceae	C CL C CL C NS	C F A	Promote teething of children	Flower decoction of saunf and bari elaichi and Pudina leaf H, Sh, H	Oral	N N N	Europ. Reg. Himal Europe; As Bor.; Reg. bor. temp.
Fumaria vaillantii (Hauss.K.)Pugsley, Pitpapra	Fumariaceae	W CL WL RS	A	Diarrhoea	Fruit powder H	Oral	N	Gerout. trop.
Gossypium herbaceum L., Kapas	Malvaceae	C CL NS	F	Pneumonia	Flower burnt	External	N	As. trop.

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					Sh			
Mangifera indica L., Aam *Rosa alba* L., Gulab	Anacardiaceae Rosaceae	C CL NS RS C CL NS	C C	Vomiting	Fruit, Flower juice T	Oral	N N	Sumatra
Mentha longifolia (L.)Hudson, Pudina	Lamiaceae	C CL NS	C	Vomiting, Stomach worm, Dysentery, Stomach-ache	Leaf juice alone or with sendha salt H	Oral	N	
M. longifolia *Zingiber officinale* Roscoe., Adarak	Lamiaceae Zingiberaceae	C CL NS C CL	C C	Pneumonia	Leaf, Rhizome juice with honey H HR	Oral	N N	Trop. cult.
M. longifolia *C. aurantifolia* *Z. officinale*	Lamiaceae Rutaceae Zingiberaceae	C CL NS C CL NS C CL NS	C C C	Diarrhoea	Leaf, Fruit, Rhizome juice with honey H, Sh, HR	Oral	N CE N	
Mimosa pudica L., Chuimui	Fabaceae	W CL WL GL	C	Diarrhoea	Leaf powder H	Oral	N	Bras.
Mimusops elengi L., Bakul *Tamarindus indica* L., Imli	Sapotaceae Mimosaceae	W RS WL W RS	C F	Tonsil	Bark decoction T T	Oral	N N	As.et Afr. troop
Musa paradisiaca L., Kela	Musaceae	C CL NS	C	Dysentery, Epistaxis (Bleeding from nose)	Fruit with common salt, stem juice for dysentery and Fruit, milk and sugar for epistaxis plus snuffing by bark juice SP	Oral, External	N	As. trop
Myristica fragrans Houtt., Javitri/Jaiphal	Myristicaceae	C FL RS	MB	Small-pox	Fruit powder with water T	Oral	N	Ins. Molucc.
Ocimum tenuiflorum L., Tulsi	Lamiaceae	C NS	C	Vomiting, Stomach worm, Promote teething of	Leaf juice with honey or jiggery for worms and with sandha	Oral	N	Geront trop.

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				children, Stomach ache	salt for stomachache U Sh			
O. tenuiflorum *T. ammi*	Lamiaceae Apiaceae	C NS C CL	C F	Small-pox	Leaf juice of Tulsi and seed powder of ajawain U Sh, H	Oral	N N	
Phyllanthus embelica L., Amla	Euphorbiaceae	C W FL CL GL WL RS	C	Stammering and Babbling	Green fruit for chewing T	Oral	N	As. trop.
Piper nigrum L., Kalimirch	Piperaceae	C RS CL	MB	Stomach worm	Seed powder with butter milk Cl	Oral		Ind. or. Malaya.
P. nigrum *C. aurantifolia* *Z. officinale*	Piperaceae, Rutaceae Zingiberaceae	C RS CL C CL NS C CL NS	MB C C	Stomach ache	Mixture of kalimirch seed powder and juice of lemon and adarak Cl, Sh, HR	Oral	 CE N	
Psidium guajava L., Amrood	Myrtaceae	C CL NS	A	Stomach ache	Leaf juice UT	Oral	N	Am. trop.
Punica granatum L., Anar	Puniacaceae	C CL NS	C	Stomach worm, Epistaxis (Bleeding from nose)	Root powder, snuffing of flowers for epistaxis UT	Oral, External	CE	
Symplocos racemosa Roxb., Loth	Symplocaceae	W RS FL WL	C	Diarrhoea	Bark powder T	Oral	FW ST	Ind. Or.; China
Syzygium cumini (L.)Skeels, Jamun	Myrtaceae	W R/WC	C	Vomiting	Young Leaf juice T	Oral	FO ST	
S. cumini *M. indica* *P. embelica*	Myrtaceae, Anacardiaceae Euphorbiaceae	W R/WC C CL NS CW CL FL WL GL NS	C C C	Diarrhoea	Leaf juice with ghee, honey and milk T, T, T	Oral	FO ST ST N	
Trachyspermum ammi (L.)Sprag., Ajawain	Apiaceae	C CL	C	Stomach worm	Fruit powder and little black	Oral	N	

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					salt with hot water H			
Trichosanthes tricuspidata Lour., Indrayan	Cucurbitaceae	W CL WL RS GL	C	Stomach worm	Root powder filtered and jaggery with hot water CH	Oral	N	
Woodfordia fruticosa (L.)Kurz.,, Dhav	Lythraceae	W Wa RoS	C	Diarrhoea	Flower powder with water Sh	Oral	F RC	
Zizyphus nummularia (Burm.f.)Wight, and Arn., Jharberi	Rhamnaceae	W CL WL	C	Diarrhoea	Root powder and til paste with honey and Cow or Goat milk Sh, H	Oral	G GC	Persia; Ind. or.
Sesamum indicum L., Til	Pedaliaceae	GL FL RS	C				F	Reg. trop. (Cult.)

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A total of 50 species have been reported for child healthcare in the area which include one Gymnosperm (*Cedrus deodara*), five monocots and 44 dicot angiosperms. Species, viz., *Amomum subulatum, Cinnamomum tamala, Embelia tsjeriam-cottam, Ferula asafetida, Myristica fragrans* and *Piper nigrum* are purchased from the local market whereas all other species are available locally in the area in natural landscape (24 number) and in crop lands (20 number). Life form-wise, the reported species belong to tree (16), shrub (05), climber (01) and herb (28) categories. The plant species are used as sole or in combination for ailments as described in Table 1. Plant parts, viz., leaves and seeds are in wide use for healthcare.

Among the species indicated of medicinal value by the inhabitants, *Ocimum tenuiflorum,* followed by *Azadirachta indica* and *Ficus religiosa* have recorded maximum utility (treatment of 30, 25 and 24 ailments, respectively) for child healthcare in the study area (Table-2). The plants of natural landscape are available locally; agriculturization of these plants is not a practice at all in the study area. However, people expressed gradual decline in the availability of the natural species on account of continuous exploitation and believe of inhabitants as a free resource. Further, due to change in life style (more believe on readymade market-centric drugs), inhabitants do not regard much the traditional system particularly in peri-sub-urb area of Kotdwar. The field surveys conducted by the author reveal diseases and pests infestation of species of medicinal value, gradual appearance of invasive species, particularly *Lantana camara* and *Parthenium hysterophorus,* and poor regeneration in case of species of wide medical utility.

CONCLUSION

Traditional systems of healthcare are wise practices of local inhabitants that save the lives endogenously with least or no market dependence. Such practices are more significant than the drugs for the inaccessible area and people of low economic class. A greater awareness among inhabitants about the threats being faced by the local by available medicinal plant species, and village level cultivation of natural species need be given emphasis for sustenance of natural medicinal species in the area.

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