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ORIGINAL ARTICLE

An ethnobotanical survey of indigenous medicinal plants in Toranmal plateau of Satpuda hills, India

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ABSTRACT
Ethnobotanical research has been investigated thoroughly in the Western Ghats, although the Satpuda hills have mostly been ignored. This study was aimed to identify and document tribal knowledge about medicinal plants. The study was conducted in 2017 and 2018 using the typical ethnobotanical approach. A questionnaire, a one-on-one interview, and a group discussion with pre-identified informants were used to gather information about the medicinal uses of plants. The collection of voucher specimens was assisted by informants, and then the specimens were herbarium processed and identified using pertinent flora. In this study, 28 medicinal plant species from 28 genera and 22 families have been identified. Most these plants' species were used to treat skin conditions, though they were employed to treat a variety of illnesses. Plant preparation and usage were divided into eight types. The most commonly used preparation techniques were paste (25%), juice (21%), decoction (18%), raw (14%), powder (11%), gum exudates, and so on. The majority of the herbal recipes are indicated for internal use. The Toranmal Hills are an ethnobotanically rich area with great availability and knowledge of medicinal plants that can serve as a model for low-cost health care.
Keywords: *Toranmal, Ethnobotanical, Médicinal plant, Satpuda Hill, Traditional knowledge*

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INTRODUCTION

Recently, the relevance of therapeutic plant species in traditional health treatment has shifted researchers' priority to ethnomedicines. Plant species used as traditional remedies provide a real substitution in healthcare services for developing-country rural communities [1]. Tribal people are widely spread throughout the Toranmal hills in Maharashtra. The indigenous tribal population makes judicious use of the medicinal flora to treat diseases, infections, and maintain health [2]. The Satpuda hills begin near the Arabian Sea coast in eastern Gujarat and extend southeast across Maharashtra and Madhya Pradesh, eventually touching Chhattisgarh. The Satpuda Range is a hill range in western India that is part of the Deccan plateau. There are steep regions and undulating plains in the district. Satpuda's knolls are flat-topped and plain. Toranmal Hills, which rise to 3373 ft and have a lake on top, have the highest elevation. Only a minor portion of the Narmada basin slopes west. There, 80% of the population are tribal and use several plants for their basic requirements like medicine, fodder, fibres, dyes, etc. They collect the plants from nearby forests, and also grow some household remedies in their kitchen gardens and dooryard gardens.

Traditional medical knowledge and resources of folklore medicine are being lost in tribal medicine practices due to changing lifestyles, customs, and a dearth of knowledge documentation [3]. Ethnobotany studies help to identify and document important folklore knowledge of indigenous medicinal plants for discovering new remedies [4]. Many common household remedies are used by the Toranmal tribes, which are on the edge of disappearance. Hence, it is imperative to document traditional knowledge about

medicinal plants and their recipes. Given these facts, the authors conducted a structured ethnobotanical survey to document commonly used medicinal plants as first-line treatments.

MATERIAL AND METHODS

Study area

The Toranmal hilltop of the Satpuda ranges is located in Nandurbar district. The Nandurbar district is located in the northern part of Maharashtra state, bordering the state of Gujarat and Madhya Pradesh. It lies between 21°52'N latitudes and 74°3 l' E longitudes and covers about 41 sq. km of forest area (Figure 1). The majority of local residents include tribes viz. Pawara, Bhill, Kokani, Kokana, Mavachi, Vasave, and Pardhi in the Satpuda hills. However, Pawara forms the greater part of the local population [5]. Rainfall in the Satpuda hills ranges between 800-1200 mm annually.

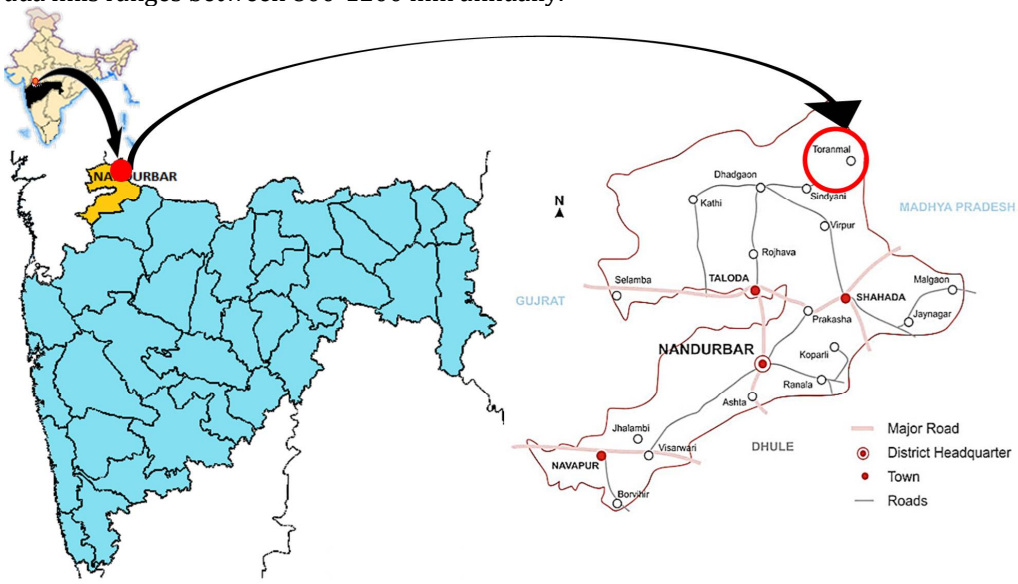


Figure 1 Location map of study site.

Survey methods

A thorough assessment of medicinal plants was conducted from July 2017 to June 2018. The information presented is based on personal interviews and informant observations. In-depth ethnobotanical inquiry was used to compile the traditional knowledge of plants. Each visit to the area lasted about 5–6 days, and it was visited 4-5 times to cover all the hamlets in the field of study.

During the field investigation, for plant collection and documentation of data, the informant accompanied the author/s. Sometimes, more than one informant was included in the team. Each use of the plant has been confirmed and verified during different visits to different localities in the region and even with the same informants on different occasions. The uses were considered valid if at least 2 informants had similar remarks about the uses of the plant.

During the survey, the recommended folklore plant specimens were collected and numbered. Most of the voucher specimens were created during the flowering or fruiting periods of the plant, using conventional techniques. The folklore claims, their descriptions and other relevant information were noted on ethnobotany data sheets and in the field book. Plant specimens were identified using keys to families, genera, and species supplied in standard floras, etc. [6, 7, 8]

RESULTS AND DISCUSSION

Plants have long been used to meet basic needs such as food, medicine, and other requirements. Whatever customary knowledge exists today originated in the past and was passed down verbally from generation to generation. Ethnobotanical research in the Toranmal plateau's forest areas has yielded knowledge on the folklore uses of 28 plant species belonging to 28 genera and 22 families (Table 1). Among medicinal plants, majority of species are from the families viz., fabaceae and apocynaceae. The most common ailments/diseases in these places are skin infections, which may be caused by inadequate sanitary conditions and/or contaminated drinkable water. Based on the tribal expertise of each plant, the medicinal preparations are utilized in various forms. Plant preparation and usage were divided into eight types (Figure 2). The most commonly used recipes were paste (25%), juice (21%), decoction (18%), raw (14%), powder (11%) and gum exudates, smoke and infusion (1%, each). The preparation of paste for

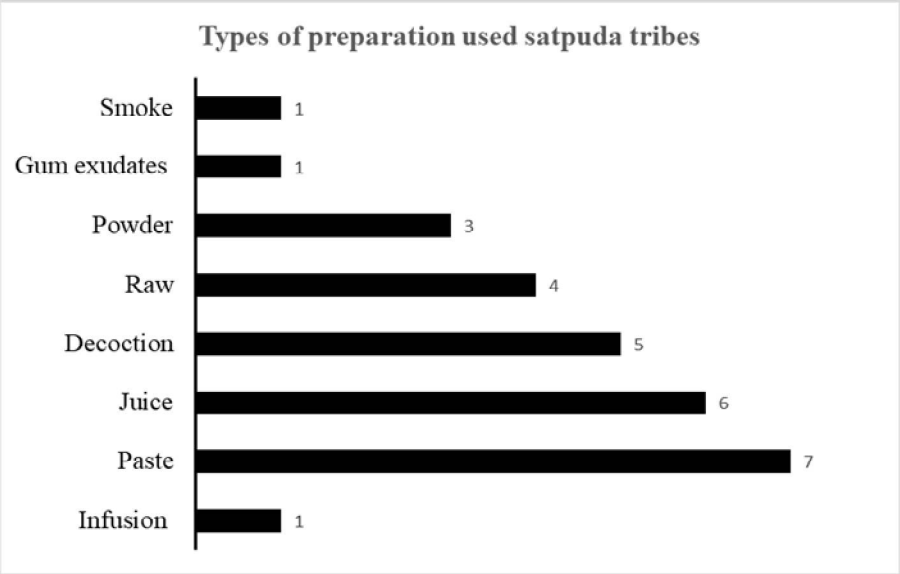
treating diseases is a frequent practice among various Indian tribes. Most of the preparations are derived from leaves, stem bark and roots. This may be due to the availability of these parts round the year.
Folk remedies for internal use dominated (75%) compared to external or topical usage (25%), and smoking application. One of the most important methods used to treat ailments such as skin problems, fractures, poison bites, and fever was direct application of paste.

Table 1 Ethno-medicinal plants of Toranmal and their traditional therapeutic uses

Sr. No	*Local name*	*Scientific name*	*Family*	*Part of plant*	*Preparation*	*Method of preparation /use*
1	*Ranbhendi*	Abelmoschus manihot *(L.) Medik.*	*Malvaceae*	*Lateral roots*	*Infusion*	*Few roots are crushed and soaked in water overnight the cup of infusion is given to the patient for curing the bone fracture for 7-8 days.*
2	*Ankul*	*Alangium salviifolium* (L.f.) Wangerin.	*Alangiaceae*	*Bark and roots*	Paste	Inner bark paste is applied for treating cuts. Root paste is applied externally on boils for 15 days
3	*Brahmaraxass*	Alocasia macrorrhizos *(L.) G.Don*	*Areceae*	*Leaves*	*Paste*	*The leaf paste applied locally as anti-inflammatory*
4	*Kapuri-madhuri'*	*Aerva lanata* (L.) Juss.	Amaranthaceae	Leaves and flowers	*Smoked*	*Dry leaves/ flowers smoked like cigarette thrice a day till cure*
5	*Arya gavat/ shatavari*	Asparagus racemosus *Willd.*	*Liliaceae*	*Roots*	*Paste*	*Fresh root paste applied locally to cure pimples*
6	*Walmohida*	Atylocia volubilis *Gamble.*	*Fabaceae*	*Bark*	*Decoction*	*Decoction with water taken twice (30-40 ml ml) to treat diarrhoea*
7	*Sabaja*	ocimum basilicum Linn.	*Lamiaceae*	*Leaves*	*Paste*	*Leaf paste used topically used in Snake bite*
8	*Apata*	*Bauhinia racemosa* Lam.	*Fabaceae*	*Leaf and stem Bark*	Powder	Leaf and bark powder used in diabetes
9	*Sawar,*	Bombax ceiba *L. f.*	*Bombacaceae*	*Roots*	*Paste*	*Roots of young plants are cut and rubbed over stone to make a watery paste and taken orally to cure leucorrhoea.*
10	*Kumbhi*	*Careya arborea* Roxb.	*Lecythidaceae*	*Stem bark*	*Decoction*	*Few fresh stem bark decoction (40-50 ml) twice a day for 3-4 days to control body pain*
11	*Karvand*	Carissa carandas *L.*	Apocynaceae	Fruits	*Without processing*	*Fresh fruits used in treatment of anaemia*
12	*Khas Gavt*	Chrysopogon zizanioides *(L.) Roberty*	*Poaceae*	*Grass*	*Juice*	*Juice of the leafs taken as blood purifier*
13	*Gokharni*	*Clitoria ternatea* L.	*Fabaceae*	*Leaves*	*Juice*	*Fresh leaf juice is applied topically to treat skin diseases/infection*
14	*'Kadunay'*	Enicostema axillare *(Poir. ex Lam.) A. Raynal.*	*Gentianaceae*	*Leaves*	*Paste*	*Leaf paste is applied over forehead and other body parts to reduce temperature*
15	*Jangli Keli,*	Ensete superbum *(Roxb.) Cheesman.*	*Musaceae*	*Seeds*	*Powder*	*The seeds are powdered and given to the patient suffering from kidney stone, twice a day for 4-5 days.*
16	*Bedkipall*	Gymnema sylvestre *(Retz.) R.Br. ex Sm.*	*Apocynaceae*	*Leaves*	*Without processing*	*Orally used in diabetes*
17	*Dudhkuhadi,*	Holarrhena pubescens *(Buch-Ham.) Wall. ex Don.*	*Apocynaceae*	*Leaves*	*Without processing*	*The fresh leaves are chewed early in the morning for a week to cure dental caries.*
18	*Ran lasun*	Iphigenia stellate *Blatt.*	*Colchicaceae*	*Fruit*	*Juice*	*Fresh fruit juice used to treat cough*
19	*Nag Keshar*	Mesua ferrea *L.*	*Calophyllaceae*	*flowers*	*Without processing*	*Fresh flowers are taken as CNS stimulant*
20	*Parijatak*	Nyctanthes arbour-tristis *L.*	*Oleaceae*	*Root and leaf*	*paste*	*Root paste applied topically in skin infection,* LEAF DECOCTION TAKEN ORALLY TO CONTROL VOMITING
21	*Ran tulas*	Ocimum tenuflorum *L.*	*Lamiaceae*	*Flowering top*	*Juice*	*Juice of flowering top taken orally to control Malaria and fever*

22	*Bui Avada*	Phyllanthus niruri *L.*	*Phyllanthaceae*	*Leaves*	*Powder*	*Fruit powder used to control the anorexia, fever and jaundice*
23	*Ritha*	*Sapindus saponaria* L.	*Sapindaceae*	*Fruits*	Decoction	Fruit powder decoction used for hair wash to control lice and itchy scalp
24	*Kodala*	Sterculia urens *Roxb.*	*Sterculiaceae*	*Roots*	*Juice*	*Juice of roots given to increase men stamina*
25	*Hirda*	Terminalia chebula *Retz.*	*Combretaceae*	*Bark and leaf*	*Decoction*	*Bark and leaf decoction used as digestive when taken orally and topically for skin infections*
26	*Gokharu*	Tribulus terrestris *L.*	*Zygophyllaceae*	*Whole plant*	*Juice*	*Whole plant is washed and then crushed and soaked in appropriate amount of water. This freshly prepared mucilaginous solution is taken for three weeks to treat leucorrhoea.*
27	*Babul*	Vachellia nilotica *L.*	*Mimosaceae*	*Gum and stem bark*	*Gum exudates* Decoction	*Gum is edible and is considered to be energetic, so given in infertility (for men). The bark decoction is orally given to the patient having bone fracture.*
28	*Bor*	*Ziziphus rugosa* Lam.	*Rhamnaceae*	*Bark*	*Decoction*	*Decoction taken twice orally (20-30 ml) to control loose motions*

Figure 1 Different types of preparation used by Satpuda tribes



CONCLUSION

The current study found that indigenous people in the study area use a range of therapeutic plant species to cure a variety of ailments. Although modern health-care services are prevalent, the indigenous community still practices traditional medicine, emphasizing the significance of plant-based traditional recipes. Our findings offer a platform for establishing a link between folklore practitioners and scientific communities, which could be essential in the development of drug candidates. As a corollary, prominent plant species could be investigated further for bio prospective druggable molecules and *in vivo/in vitro* pharmacological activity that could lead to the development of the new and potential drugs.

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DISCLOSURE

The author reports no conflicts of interest in this work.

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