

A Narrative Review on Ethnomedicinal Relevance and Species Diversity of *Opuntia* Genus in India

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ABSTRACT

Opuntia genus belonging to Cactaceae family has been considered as a weed in various parts of world. It grows extensively all over India particularly in dry areas. Folklore practitioners across India make use of various parts of this plant in innumerable disease conditions. The present review aims to collect all available ethnomedicinal information on various species of *Opuntia* in India. Review has been done on the ethnomedicinal uses of *Opuntia* genus reported in India has been collected from books on ethnobotany and ethnomedicinal research articles which have been compiled from library sources and web-based search engines like Google Scholar, PubMed, ScienceDirect, J-Gate etc from Feb.2021-Nov. 2021. Each particular species of *Opuntia* reported along with vernacular name, place of reporting along with the therapeutic indication, with specific method of administration and other uses if any were also noted. From 122 articles reviewed, members of *Opuntia* genus are found to be available in 16 states across India, with well-established folklore claims. It has reported to be used in 85 different clinical conditions with some potential leads for reverse pharmacological studies. It is also noted that all parts of certain species like *Opuntia dillenii* Haw. are used, whereas *Opuntia vulgaris* Mill. are less used when compared. **Conclusion:** *Opuntia* genus has been claimed for multifaceted ethnomedicinal uses. These ethnomedicinal claims serves as "a lead" for many pharmacological activities which has to be substantiated with suitable *in vivo* and clinical evaluations.

Keywords: Ethnomedicine, *Opuntia* genus, India, *O. dillenii*, *O. elatior*.

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INTRODUCTION

Since time immemorial, mankind depends on plant kingdom for food, fodder and fuel. Later on, the primitive men explored the medicinal values of plants surrounding him, as it was the need of the hour. This knowledge was effectively applied for the well-being of mankind in that particular geographical area.^[1] As there was advancement in science and technology, knowledge about the plant kingdom has been properly documented, validated and established. The study of natural resources traditionally used to cure or manage ailments in diverse ethnic culture is collectively termed as "Ethnomedicine".^[2]

India is one of the recognised megadiverse countries of the world. As it is situated at the tri-junction of Afro-tropical, Indo-malayan and Paleo-Arctic realm, India has a wide array of ecosystems and habitats. India comprises only 2.4% geographical area of the world but harbours nearly 8% of the globally available flora and fauna species.^[3]

The *Opuntia* genus is endemic to American sub-continent and is a valuable source of ancestral Mexican food.^[4] Approximately 181 species have been recognised world-wide. Because of the species richness, chemical composition and adaptability for growing in dry environments this genus occupies a unique place in plant kingdom. This genus contains xerophytic, juicy, armed CAM plants growing in wild or cultivated in arid or sub-arid areas.^[5] The fruits of *Opuntia* genus are generally called as 'prickly pear' and it has been used for various disease conditions by people across India particularly over Saurashtra. This article aims to explore the various *Opuntia* species predominantly available in India and ethno-medicinal claims on them.^[6]

MATERIALS AND METHODS

Data Collection

Information of all reported ethnomedicinal uses of *Opuntia* genus in India has been collected from books on ethnobotany and ethnomedicinal research articles which have been compiled from library sources and web-based search engines like Google Scholar, Pub Med, ScienceDirect, J-Gate etc from Feb. 2021-Nov.2021. For an easy and short presentation abbreviations are used for different species of *Opuntia* and its various parts. Different species of *Opuntia* are mentioned using abbreviations in the article i.e., *Opuntia dillenii* Haw. (OD), *Opuntia elatior* Mill. (OE), *Opuntia ficus-indica* L. (OF), *Opuntia monacantha*



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Mill. (OM), *Opuntia streptacantha* (OSP), *Opuntia stricta* (OS), *Opuntia tuna* L. Mill. (OT), *Opuntia vulgaris* (OV). Different parts of plant are abbreviated as Whole plant (WP), Root (Rt), Stem (St), Bark (Bk), Leaf (Lf), Phyllode (Ph), Flower (Fl), Fruit (Fr), Seed (Sd) and Thorn (Th).

Study Selection

Inclusion criteria

Publications describing the use of *Opuntia* genus (alone or in any combination of other herbs) to treat any disease condition either in human or animal or used as food or any other use of economic value in India were included in the review. This review includes both internal and external therapeutic applications with no language and date restrictions.

Exclusion criteria

Various *Opuntia* species reported in India has been considered, outside India are exempted.

RESULTS AND DISCUSSION

Area of Reporting of various species of *Opuntia*

It is observed that OD is being reported for its medicinal usage in 16 states across India, Himachal Pradesh, Uttar Pradesh and Uttarakhand from north region; Tamil Nadu, Telangana, Andhra Pradesh and Kerala from southern region; Assam, Manipur, Odisha and West Bengal from east region; Rajasthan, Punjab and Haryana from the west region; Madhya Pradesh and Maharashtra from the central India. It is reported that OE. is being used as a medicine in 12 states across India, Uttar Pradesh and Uttarakhand from north region; Tamil Nadu, Andhra Pradesh and Karnataka from southern region; Tripura, Odisha and Jharkhand from east region; Rajasthan and Haryana from the west region; Madhya Pradesh and Maharashtra from the central India. It is observed that OF is being reported for its medicinal usage in 3 states Rajasthan and Haryana from the west region and Madhya Pradesh from the Central India. It is observed that OM is being reported for its medicinal usage only in Tamil Nadu. It is observed that OST is being reported for its medicinal usage only in Uttar Pradesh. It is observed that OS is being reported for its medicinal usage in 10 states across India, Himachal Pradesh and Uttar Pradesh from north region; Tamil Nadu, Karnataka, Andhra Pradesh and Kerala from southern region; Odisha and Jharkhand from east region; Punjab from the west region and Maharashtra from the central India. It is observed that OT is being reported for its medicinal usage only in Tamil Nadu. It is observed that OV is being reported for its medicinal usage in 3 states Jammu and Kashmir, Uttar Pradesh and Uttarakhand from north region and Maharashtra from the central India (Figure 1).

Therapeutic uses of various species of *Opuntia*

In the present review, out of the 122 articles considered in the study, various species of *Opuntia* genus are reported to be useful in 85 disease conditions. Among them maximum references have been found for OD followed by OE, OS, OF,

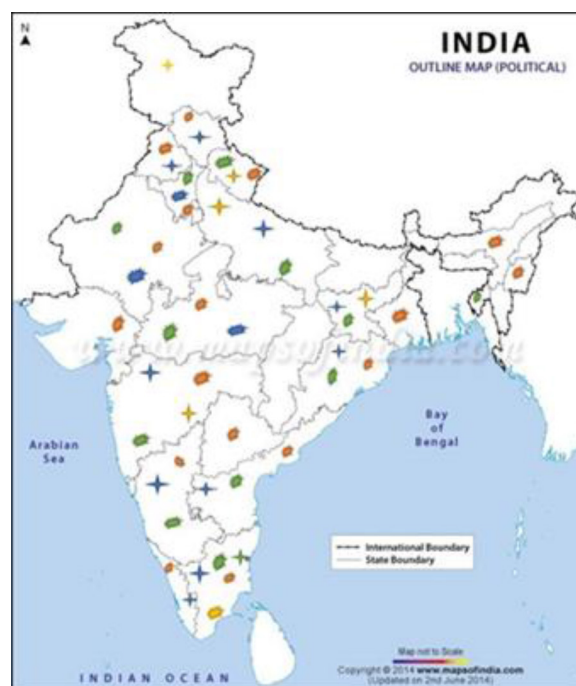


Figure 1: Distribution of various species of *Opuntia* in India.
[OD: ,OE- ,OF- ,OM- ,OST- ,OS- ,OT- ,OV -]

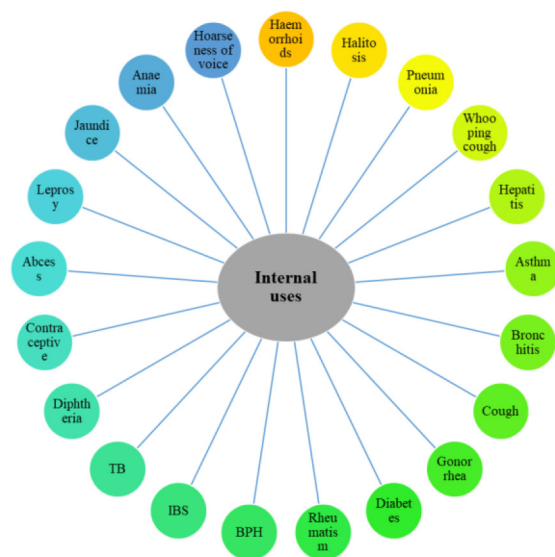


Figure 2: Indications for internal uses of various species of *Opuntia* genera in India.

OM, OV, OT and OST. Among them maximum number of species are indicated for inflammation (5-OD, OE, OF, OM, OS), followed by whooping cough (4- OD, OE, OF, OS), diabetes (4- OD, OM, OST, OS), gonorrhoea (4- OD, OE, OF, OS), haemorrhoids (4-OD, OE, OM, OS), ulcer (4-OD, OF, OM, OS), snake venom (4-OD, OF, OS, OV), boils (3-OD, OE, OS), anaemia (2-OD, OS), menorrhagia (2-OD,OS), prostrate diseases(2-OD, OF), tuberculosis (OE), measles (OD), diphtheria (OD -veterinary use), herpes (OE), foot and mouth

Table 1: Ethnomedicinal claims on OD reported in India.

Sl. No:	Local name	Tribe and Area	Dosage form: external application(E), internal application(I)	Therapeutic claims
1.	<i>Nagphani</i>	<i>Sahariya, Kanjar, Nishad, Kalbelia</i> /Rajasthan		Asthma, acidity
2.	<i>Sappathnikkali</i>	Maharashtra	Fruit paste applied externally	Snake bite
3.	-	<i>Sabar, Saor, Juanga, Pendia, Paraja, Araon, Munda, Miridha, Matia, Mankidi, Mahali</i> /Odisha	Decoction of pulp applied externally	Eye diseases
4.	<i>Nagajammudu</i>	Telangana	Leaves Flowers Fruits	Bleeding Boils Throat pain
5.	<i>Papasukkali</i>	<i>Valmiki, Korava, Lambana</i> Karnataka	Fruit juice boiled with sugar; internally 2 spoonful of juice twice a day for 21 days	Piles
6.	<i>Nagajammudu</i>	Telangana		Whooping cough, gonorrhea
7.	<i>Sappathnikkali</i>	Tamil Nadu	Whole plant	Cough, asthma, gonorrhea
8.	<i>Nagapheri</i>	Odisha	100 ml of fruit juice given orally for 2 times a day for 3-4 days	Diarrhoea in sheep and goat
9.	<i>Hathlathoria</i>	Himachal Pradesh	Fruit Stem	Cough Ophthalmia
10.	-	-	Fruit paste is applied.	Snake bite
11.	<i>Sappathnikkali</i>	Tamil Nadu	Fruit	Gonorrhea, snake bite, dog bite, burning sensation, whooping cough, asthma, hepatitis, fever, poison, constipation, boil, ulcer, oedema, leucorrhoea, menorrhagia
12.	<i>Nagajammudu</i>	Andhra Pradesh	Stem	Contraceptive
13.	<i>Chappathnikkali</i>	Puducherry	Leaf juice is applied.	Asthma, whooping cough, burning sensation, fever
14.	<i>Fanimansha</i>	Assam	Paste of phylloclade is applied	In burns
15.		<i>Yanadi, Nakkal, Irula</i> / Andhra Pradesh	Phyllode Fruit	Whooping cough Body pain Feet crack Diarrhoea
16.	<i>Naagaphani</i>	Rajasthan	Astringent, haemostatic	Irritable bowel, mucous colitis
17.	<i>Sappathnikkali</i>	Tamil Nadu	Fleshy stem paste along with sugar and aloe vera gel is applied.	Wound healing
18.	<i>Nagajammudu</i>	Andhra Pradesh	Flower paste along with turmeric and salt is applied.	Lotion for ulcers.
19.	<i>Nagphani</i>	Haryana		Fistula
20.	<i>Kalli</i>	Tamil Nadu	Fruits Whole plant	Asthma, whooping cough, demulcent, expectorant, hepatitis, fever, poisonous bites, constipation, conjunctivitis, ulcer, diuretic, purgative, liver complaints
21.	-	<i>Kolam</i> /Telangana/Maharashtra	Whole plant	Whooping cough
22.	<i>Chittar thor</i>	Punjab	Fruits	Haematinic

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Table 1: Ethnomedicinal claims on OD reported in India.

Sl. No:	Local name	Tribe and Area	Dosage form: external application(E), internal application(I)	Therapeutic claims
23.	<i>Nagphena</i>	Upper Assam	Twigs Fruits As infusion of fresh or dried plant part with salt once daily in empty stomach for one week	Constipation Stomach pain
24.	<i>Nagajamudu</i>	Telangana	Fruits	Anti-halitosis
25.	<i>Sappathikalli</i>	Tamil Nadu	Stem paste is applied	Wounds
26.	<i>Nagajemudu</i>	<i>Bagatas, Konda Doras, Valmiki</i> /Andhra Pradesh	Phyllode and stem bark paste is applied.	Snake bite
27.	<i>Nagajemudu</i>	<i>Yanadi</i> /Andhra Pradesh	Cultivated in front of hut so as to prevent attack of measles.	Measles
28.	<i>Phaninmans</i>	West Bengal	Root paste is topically applied.	Body sore
29.	-		Stem poultice is applied. 1-2 flower bud is burnt in Kanda and mashed properly, filtrated with honey and given to children.	On wound
30.	<i>Thor</i>	North Gujarat	Latex of plant glued to cloth and tied to wound.	Cucur-Khanshi To expel pus and promotes wound healing.
31.	<i>Nagapheni</i>	Odisha	Pulp decoction is applied externally.	Eye disease
32.	<i>Sappathikalli</i>		Stem bark, fruit, Whole plant	Inflammation
33.	<i>Meipoki</i>	<i>Meetei</i> /Manipur	Stem tip is cut and a hole is made in the middle and affected finger is inserted into it.	Inflammation of fingers due to washing clothes or cleaning vessels
34.	<i>Nagphani</i>	Madhya Pradesh	Stem mucilage Plant powder with sugar	Conjunctivitis
35.	<i>Nagphani</i>	<i>Gond, Kol, Baiga</i> Madhya Pradesh	Stem mucilage Plant powder with sugar	Contraceptive
36.	<i>Thor</i>	Madhya Pradesh	Stem extract	Conjunctivitis
37.	<i>Naagphani</i>	<i>Bhil, Damor, Garasia, Kathodia, Meena</i> Rajasthan	Cut the stem and sprinkle salt on spiny surface warm on fire and tied on affected area for 3-4 days	Contraceptive Pneumonia Internal oozing tumour
38.	<i>Naagphani</i>	<i>Meena</i> / Rajasthan	Seeds	Cough
39.	<i>Bonthajamudu</i>	<i>Nakkala, Irula, Yerukala, Sugali, Lambadi, Chenchu</i> /Andhra Pradesh	Whole plant	Contraceptive
40.	<i>Chuppathi kalli</i>	Tamil Nadu	Remove the thorn and crush the leaves and flowers, extract the paste and apply on the affected area.	Abscess Eye diseases
41.	<i>Chhitar</i>	Haryana	Baked fruit juice is used internally with honey.	Gonorrhea
42.	<i>Nagpheni</i>	Odisha	Decoction of pulp is used internally	Whooping cough, hepatitis, constipation, asthma

continued...

Table 1: Ethnomedicinal claims on OD reported in India.

Sl. No:	Local name	Tribe and Area	Dosage form: external application(E), internal application(I)	Therapeutic claims
43.	<i>Kallisedi</i>	Malayali /Tamil Nadu	Fruits	Stomach ache Diarrhoea
44.	<i>Sappathnikalli</i>	Kerala	Stem paste	Burns
45.	<i>Nagphani</i>	Santhal, Kolha, Bathaudi, Bhumij, Munda, Gond /Odisha	Pulp decoction	Eye disease
46.	<i>Sappathi kall</i>	Kani /Tamil Nadu	Stem paste	Wound
47.	<i>Sagarfena</i>	Assam	Stem decoction Flower Fruit juice	Snakebite Bronchitis Asthma
48.	<i>Nagapheni/Moroda</i>	Sanial, Kol, Bhomij, Bhuyan, Bathuri, Kharia, Gond, Manihidas, Satharias, Mahali / Odisha	Pulp decoction applied externally	Eye diseases
49.	<i>Sappathnikalli</i>	Irula /Tamil Nadu	Leaves	Ophthalmic diseases and Spasmodic cough
50.	<i>Nagphani</i>	Himachal Pradesh	Fruit juice Fruit decoction with ginger	Asthma
51.	<i>Nagphani</i>	Uttar Pradesh	Ripened fruit	Whooping cough in children
52.	<i>Sappathnikalli</i>	Tamil Nadu	Fruits Fruit paste	Gonorrhea Gonorrhea Applied on snake and dog bite.
53.	<i>Sappathnikalli</i>	Karnataka	Phylloclades	Respiratory diseases
54.	<i>Nagphani</i>	Maharashtra	Fruits	Poultice is used for extraction of guinea worms. Juice cures asthma and whooping cough
55.	<i>Nagfani</i>	Haryana	Stem pulp is rubbed or tied with turmeric externally over the affected area 4-5 times in a month.	Arthritis
56.	<i>Mullu kall</i>	Irula /Tamil Nadu	Fruit juice	Diabetes
57.	<i>Sappathnikalli</i>	Tamil Nadu	Fruit Pulp	Whooping cough Ophthalmia, controls spasmodic cough
58.	<i>Niwdung</i>	Maharashtra	Fruit powder 1 spoonful per day till cure.	Rheumatism
59.	<i>Nagphani</i>	Uttar Pradesh	Paste applied	Wound
60.	<i>Niwdung</i>	Maharashtra	One spoonful of powder till cure	Rheumatism
61.	<i>Kanthari</i>	Gond, Bhil, Baiga, Korku, Bhadial /Madhya Pradesh		Asthma, whooping cough, fever, constipation, conjunctivitis, boils, ulcers, oedema, leucorrhoea, menorrhagia

continued...

Table 1: Ethnomedicinal claims on OD reported in India.

Sl. No:	Local name	Tribe and Area	Dosage form: external application(E), internal application(I)	Therapeutic claims
62.	<i>Sappathikalli</i>		Inner fleshy part of stem is mixed with leaf of Aloe vera and sugar, this is well ground and taken orally or applied topically to heal wounds. Dose – 2 teaspoon paste once in a day for 2-3 days early in the morning	Wound healing
63.	<i>Nagphani</i>	Uttarakhand	Flowers, fruits, stem	Irritable bowel, prostrate reducer
64.	<i>Papasukalli</i>	Karnataka	Ripened fruits are crushed, filtered the juice, boiled with sugar and kept in a bottle. Two spoonfull of juice twice a day for 21 days.	Piles
65.	<i>Nagphani</i>		Fruit	Gonorrhoea, whooping cough, spasmodic cough
66.	<i>Phanimansa</i>		Pulp	Digestive disorder Rheumatism
67.	-	Andhra Pradesh	-	Weight losing agent
68.	<i>Nagphani</i>		Fruit	Refrigerant, gonorrhoea, cough Ophthalmic disease
69.	<i>Sappathikalli</i>		Phylloclade	
70.	-		Stem bark, fruit, entire plant	Snake bite
71.		<i>Beiga/</i> Uttar Pradesh	Whole plant pulp	Digestive disorder and rheumatic disorder
72.	<i>Nagphani</i>	-	Internal bark of <i>Butea monosperma</i> mixed with the root of <i>O.dillenii</i> used as juice and paste applied	Snake bite
73.	-	-	Leaf pulp decoction applied externally.	Eye diseases
74.	<i>Sappathikalli</i>	-	Fruit	Ripe fruits are eaten raw ad used to prepare jelly and is also used as a colouring agent for cool drinks.
75.	-	-	Stem paste is used. Whole plant	Burns and to control diabetes. Body sore, asthma, whooping cough, fever, constipation, ulcer, liver complaint, gastrointestinal disorder

Table 2: Ethnomedicinal claims on OE reported in India.

Sl. No:	Local name	Tribe and Area	Dosage form: external application(E), internal application(I)	Therapeutic claims
1.	-	-	Fruits	Ripe fruits are edible.
2.	-	-	Whole plant	Increases lactation, edible
3.	Nagphani	Madhya Pradesh	Root bark decoction given internally	Tuberculosis
4.	-	Uttarakhand	-	Cough, inflammation, ophthalmia
5.	Phadya nivadung	Maharashtra	Leaf paste with turmeric is applied	Rheumatism
6.	-	Chakma/Tripura	Crushed stem mixed with water and 2bsp thrice a day.	Liver disorders
7.	-	Maharashtra	-	Expectorant
8.	-	Tamil Nadu	Bark and Fruit	Whooping cough
9.	Nagphani	Haryana	Baked fruits are given internally	Whooping cough, increases flow of bile, controls spasmodic cough, expectorant
10.	Nagphani	Madhya Pradesh	Leaves and fruits	Purgative, Gonorrhoea
11.	Nagphani	Gond, Kor'ku/ Madhya Pradesh	Stem pulp is heated and applied externally on swelling on animals	Inflammation
12.	Brammajemudu	Mathura, Lambada, Gondal Andhra Pradesh	Burned stem ash is applied externally	Joint pain and Foot pain
13.	Dabbagalli	Karnataka	One mature fruit is eaten per day for 4-5 days	Whooping cough in children
14.	Nivadung	Andha, Bhill/ Maharashtra	Stem pulp given for infants Warm pulp applied on swellings	Stomachic Anti-inflammatory
15.	Nagphan	Maharashtra	Five fresh flowers are roasted and taken orally twice a day for 4-5 days.	Haemorrhoids
16.	Nagphani	Karnataka	Stem	Inflammation
17.	Nantli nagphani	Bhil, Bhilala, Pataya/ Madhya Pradesh	Root bark decoction	Tuberculosis
18.	-	Uttar Pradesh	Thorns Leaves	Diphtheria Body ache
19.	-	Paraja, Bhumia, Godaba, Bhatra, Kondha, Gouda, Mali, Paika/Odisha	Whole plant	Wound
20.	Nagphani	Santhal, Paharia, Oraon, Munda, Kol, Kharwar, Ho, Asur, Baiga/Jharkhand	Phyllode	Cut, boil, wound
21.	Kantella thor	Bhil, Meena, Garasiyal/ Rajasthan	Fruit juice with jaggery is taken for 2-3 days by tribal ladies to induce sterility. Warm stem pulp applied externally in abscess for speedy recovery. Pulp mixed with turmeric powder is applied locally.	Induces sterility Abscess Inflammation

Table 3: Ethnomedicinal claims on OF, OM, OSP, OS, OT and OV reported in India.

Sl. No:		Local name	Tribe and Area	Dosage form: external application(E), internal application(I)	Therapeutic claims
1.	OF	<i>Nagphani</i>	-	Fruit	Refrigerant Gonorrhoea Cough
2.		-	-	Fruit, leaves	Asthma, whooping cough, heat, inflammation, ulcer
3.		<i>Motali Nagphani</i>		Fruit decoction is given internally. Root powder given with water.	Pneumonia Snake bite
4.		-	-	-	Skin emollient
5.		<i>Thuhar</i>	<i>Gond, Mawasi, Kol/</i> Madhya Pradesh		Irritable bowel syndrome, prostrate disorders
6.		<i>Nagfani</i>	Haryana		Wound, inflammation, urinary diseases
7.		<i>Nagphani</i>	Rajasthan	Baked fruit is given for children. Poultice made out of leaves are applied externally.	Asthma, Whooping cough Inflammation
8.		<i>Nagphani</i>	Rajasthan	Baked fruits are given	Asthma, whooping cough
1.	OM	<i>Chappathikalli</i>	<i>Irula</i> /Tamil Nadu	Fruit juice	Diabetes, inflammation, ulcers
2.		-		Whole plant	Pulp is used in digestive disorder and rheumatic disorder
3.		-	Tamil Nadu	Fruit juice is given internally	Leprosy, piles, Jaundice
1.	OSP	<i>Nagfani</i>	Uttar Pradesh	Leaves	Anti-hyperglycaemia
2.		<i>Nagphani</i>	Uttar Pradesh	-	Anti-diabetic
1.	OS	-	-	Fruit	Used in diabetes
2.		-	-	Stem applied externally	Joint pain
3.		-	-	Stem, leaves	Boil, blister, snake bite
4.		<i>Sappathikalli</i>	<i>Irula/</i> Tamil Nadu	Skin peeled stem pieces are mixed with pepper powder and given internally.	Snake bite
5.		<i>Nagajemmudu</i>	Andhra Pradesh		Gonorrhoea, ophthalmia
6.		<i>Gumian</i>	Punjab	Fruits are eaten raw. Milky exudate is applied externally	Anaemia Skin problems
7.		<i>Chappathikalli</i>	<i>Irula/Tamil Nadu</i>	Fruit	Fever, cough, cold
8.		<i>Chappathikalli</i>	<i>Pulaya, Muthuvan/Kerala</i>	Fruits are eaten raw.	
9.		-	Kerala	Flowers Fruit	Skin ailments Eaten raw
10.		-	Andhra Pradesh	Fruits and flowers are eaten raw	Relieves hoarseness of voice
11.		<i>Nagphani, Nagopenia, Nagaphini</i>	<i>Lodha, Kontha, Kolha, Saunti, Bathudi, Munda/</i> , Orissa	Pasty mass (3g) from whole plant mixed with 2g common salt is taken internally twice a day for fifteen days	Swelling of joints
12.		<i>Nagpheni</i>	<i>Munda, Bihore/Jharkhand</i>		Anti-inflammatory
13.		<i>Nagphany</i>	<i>Gujjar, Gaddi/</i> Himachal Pradesh	Used as an antidote. Leaves are applied externally as a poultice. Milky juice with sugar given internally.	Inflammation Purgative
14.		<i>Noppales</i>	<i>Toda, Kota, Kurumba, Paniya/</i> Tamil Nadu	10ml fruit juice given internally	Menorrhagia, metrorrhagia
15.		<i>Dabbugalli</i>	Karnataka	Fruits are given along with clove powder and fresh juice of bark of <i>Butea monosperma</i> for 7 days.	Sore throat
16.		<i>Naagfani</i>	<i>Baiga/</i> Maharashtra	Bark	Boils
17.		<i>Nagphani</i>	Uttar Pradesh	-	Induces lactation
18.		<i>Nagaphani</i>	Uttar Pradesh	-	Inflammation/Boils

continued...

Table 3: Cont'd.

Sl. No:		Local name	Tribe and Area	Dosage form: external application(E), internal application(I)	Therapeutic claims
1.	OT	-	Tamil Nadu	Latex from fresh leaf will be mixed with salt and applied externally.	Swelling
1.	OV	-	-	Fruits	Ripe fruits are edible.
2.		-	-	Flowers	Used in boils
3.		<i>Nagphani</i>		Root powder given with water	Snake bite
4.		<i>Nagphani</i>	<i>Bheel, Bhilal, Korku, Gond, Bharia, Mobasi, Bastar/</i> Central India	Crushed roots are administered internally	Snake bite
5.		<i>Kolakar</i>	Jammu and Kashmir	Stem	Keep the evil spirits away, symbol of desertness.
6.		-	Uttaranchal	-	Foot and mouth disease
7.		<i>Kolakar</i>	Uttar Pradesh	Stem	Ward of evil spirits
8.		<i>Trappar Sula</i>	Jammu and Kashmir	Juice of whole plant is used as ear drop	Otalgia

Table 4: Ethnomedicinal use of various *Opuntia* species in various systems.

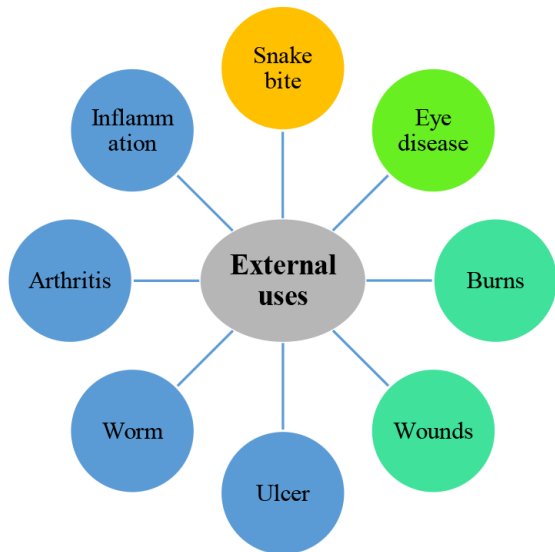
Cardiovascular System	Disease	OD	OE	OF	OM	OSP	OS	OT	OV
Digestive System	Bleeding	+							
	Haemostatic	+							
	Haemoptysis						+		
	Acidity	+							
	Carminative	+							
	Constipation	+							
	Diarrhoea	+					+		
	Digestive			+	+				
	Dysentery					+			
	Haemorrhoids	+	+			+		+	
	Halitosis	+							
	Hepatitis	+							
	Irritable bowel	+		+					
	Jaundice					+			
	Mucous colitis	+							
	Purgative	+	+				+		
Scorbutic ulcer			+						
Stomach ache	+								
Stomachic		+							
Endocrine System	Diabetes	+			+	+	+		
	Diuretic	+		+					
	Galactagogue		+				+		
	Weight loss	+							
Genito-urinary System	Contraceptive	+							
	Gonorrhoea	+	+	+			+		
	Leucorrhoea	+							
	Menorrhagia	+					+		
	Metrorrhagia						+		
	Prostrate diseases	+		+					
	Urinary calculi						+		
	Urinary disease			+					

Integumentary System	Blister								+	
	Body pain	+								
	Body sore	+								
	Burn	+	+						+	
	Crack feet	+								
	Cuts		+							
	Foot and mouth disease									+
	Herpes		+							
	Inflammation	+	+	+	+				+	
	Skin disease due to allergy	+							+	
	Skin emollient			+						
Suppuration of nail		+								
Musculo-skeletal System	Abscess	+								
	Arthritis	+	+							+
	Demulcent	+								
	Fistula	+								
	Fracture		+							
	Rheumatism		+				+			
	Swelling on joints								+	
Nervous System	Conjunctivitis	+								
	Leprosy							+	+	
	Ophthalmic disease	+	+						+	
	Otalgia	+								+
Respiratory System	Asthma	+		+						
	Bronchitis	+								
	Cough	+	+	+					+	
	Diphtheria	+								
	Expectorant	+	+							
	Hoarseness of voice								+	
	Measles	+								
	Pneumonia	+		+						
	Sore throat								+	
	Spasmodic cough	+	+							
	Throat pain	+								
	Tuberculosis		+							
Whooping cough	+	+	+					+		

continued...

Table 4: Ethnomedicinal use of various *Opuntia* species in various systems.

Cardiovascular System	Disease	OD	OE	OF	OM	OSP	OS	OT	OV
Multi-systemic diseases	Anaemia	+					+		
	Fever	+					+		
	Oedema	+						+	
	Tumour	+							
	Ulcer	+		+	+		+		
External factors	Antidote						+		
	Dog bite	+							
	Poison	+							+
	Snake venom	+		+			+		+
	Swelling due to cold/ fatigue						+		
	Worm infestation	+							
	Wound healing	+	+	+			+		+
Other uses	Ward off evil spirits	+							+
	SO2 absorbent						+		

**Figure 3:** Indications for external uses of various species of *Opuntia* genera in India.**Table 5: Various parts of each species of *Opuntia* genus mentioned for usage either as food/ medicine.**

Sl. No:	Species	Part used
1.	<i>Opuntia dillenii</i> Haw.	WP, Rt, St, Bk, Fr, Ph, Pulp, Fl, Latex, Sd
2.	<i>Opuntia elatior</i> Mill.	WP, St, Bk, Lf, Fr, Fl, Th
3.	<i>Opuntia ficus-indica</i> L.	Rt, Lf, Fl, Fr
4.	<i>Opuntia monacantha</i> Mill.	WP, St, Fr,
5.	<i>Opuntia streptacantha</i> Lem.	Lf
6.	<i>Opuntia stricta</i> (Haw.) Haw.	WP, St, Lf, Fr, Fl, Latex
7.	<i>Opuntia tuna</i> L. Mill.	Lf
8.	<i>Opuntia vulgaris</i> Mill.	WP, St, Rt, Fr, Latex

disease (OV), hoarseness of voice (OS), metrorrhagia (OS) etc. (Tables 1-4) (Figure 2 and 3).

Parts used of various species of *Opuntia*

It is observed that there are well established ethnomedicinal claims on WP, Rt, St, Bk, Fl, Fr, Ph, Pulp and Latex of OD, WP, St, Bk, Lf, Fl, Fr, Th of OE, Rt, Lf, Fl, Fr of OF, WP, St and Fr of OM, Lf of OST, WP, St, Lf, Fl, Fr, Latex of OS, Lf of OT, WP, St, Rt, Fr and Latex of OV across India. (Table 5).

CONCLUSION

Present ethnobotanical review highlights the uses of various species of *Opuntia* genus present in India. Even though it is enlisted as a weed, it has been used for 85 different clinical conditions by the folklore practitioners. Even though the plant is an extra pharmacopeial drug it is used by various traditional practitioners all over India. Various species are reported with a huge array of ethnomedicinal claims which can be further strengthened through pharmacological and clinical studies. The present review will help to better utilization of a commonly available plant species for its pharmacological practices.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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