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REVIEW ARTICLE

Current outlook and future promise of ethnomedicinal study in Western Odisha, India: An overview

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Abstract

The indigenous folk medicinal practices in India has received the utmost significance in healing a wide range of acute and chronic ailments since the early Vedic period. Odisha is one of India's tribal belts where tribal peoples embrace 11.95 % of global biodiversity in diverse ways. The Western region of Odisha, characterized by abundant forests and hills, is predominantly inhabited by over 60 tribal communities, including the Kutia Kandha, Binjhals, Gond, Krishan, Khadia and Luhura etc. These tribes rely on forest resources for their daily needs and medicinal herbs. This review aims to compile and analyze information on medicinal plants and their therapeutic properties documented in various regions of Western Odisha by different researchers and also to identify their research gaps. It is also possible to determine which plants are most commonly used against most frequently suffering ailments that will aid in a more in-depth investigation of those species. It could offer new information about how to develop a unique drug. On the subject of medico-folklore and pharmacognosy in different districts of Western Odisha, literature and data from various journals, databases and books, have been gathered, analyzed and the missing regions have been discovered. According to the findings, many locations in Western Odisha have not been visited recently for research. The seasonal tour of the forest parcels with local healers may unearth undiscovered therapeutic plants. Native tribes are a precious source of herbal medicines, as they have practiced from generation to generation. Proper documentation followed by pharmacological analysis and clinical trial is very essential for the discovery of natural remedies that benefit both ecological sustainability and human health.

Keywords: ailments; indigenous; medico-folklore; pharmacognosy; sustainability

Introduction

Nature is the storehouse for all basic needs, including food, shelter and clothing and medicinal resources essential for treating illnesses and promoting longer, healthier lives. The priceless gift of nature to mankind is the plants that are like "Genie", the imaginary man with a superpower that can fulfill all one's wishes. Despite the widespread use of advanced allopathic medical systems and technologies in modern society, indigenous communities around the world continue to rely on traditional herbal medicine. Traditional knowledge of herbal care is concentrated in indigenous tribal communities. According to Cotton (1996), 64 % of people worldwide depend on herbal remedies (1). According to the WHO, 80 % of people in underdeveloped countries utilize herbal remedies to cure a variety of diseases (2). A significant proportion of Ayurvedic, Unani and allopathic medicines are derived from plants, with 33 % of allopathic, 46 % of Unani and 80 % of Ayurvedic medications sourced from rural and economically disadvantaged areas (3). As far as the ethnobotanical study is concerned, this review may assist individuals in identifying the hidden area of Western Odisha. Thus, it will reveal a variety of hints for novel fields of interdisciplinary study that encompass ethnobotany, pharmacology and phytochemistry. Main purpose of this review is to compile all ethnomedicinal research conducted in different regions of Western Odisha up to 2025. The study will identify the most popular and untapped areas as well as the research gaps. It is also possible to determine which plants are most commonly used, that will aid in a more in-depth investigation of those species. It might provide fresh insight into the process of creating an entirely novel medication.

Traditional ethnomedicines in various countries

China

The indigenous herbal health system has been largely accepted in China since antiquity. Traditional knowledge of the medicinal plants of the East Han dynasty (25 - 220 AD) of China has been described in the book "Shennong Bencao Jing" (4). Mulam is an ethnic group native to Guangxi in China. In Guangxi, China, the Mulam people employed ethnomedicinal plants and discovered 456 medicinal plant species that belonged to 350 genera and 132 families (5).

Ethiopia

According to report, 80 % of Ethiopians depend on traditional medicines for curing diseases. More than 95 % of herbal medicine preparations are of plant origin (6). The Drug Research Development of Ethiopia collected 600 herbal remedies up to 1996 (7).

Kenya

90 % of people in Kenya have utilized medicinal herbs at least once for various health issues. There is an urgent need to record African traditional plants due to the impending loss of natural ecosystems, cultural variety, traditional community life and knowledge of therapeutic plants (8).

Portugal

According to archaeological research, the usage of plants as medicine extends back 60000 years to the Neanderthal era in Iraq (9). Herbal medicine use in Portugal has remained important ever since. The World Health Organisation and private pharmaceutical firms sponsor research into ethnically derived medicines (10). The project "Aromatic and/or Medicinal Plants in the National Network of Protected Areas" was started by "The Portuguese Institute for Nature Conservation" in 1999 and finished in 2004 (11).

Sri Lanka

Over 1400 species of medicinal plants were detected until 2004 and used by Srilanka tribal communities (12). Ayurveda, Siddha, Unani and Deshiya Chikitsa are the important systems of health care in Sri Lanka (13).

Pakistan

During a survey, 97 plant species were documented in Shangla, Pakistan's Ranyal Hills District (14). Several other ethnobotanical studies have been carried out by various researchers in Pakistan (15–21). In Khyber Pakhtunkhwa, Pakistan, 138 plant species from 54 families have been identified in urban areas in the year 2025 (22). According to reports, the people of Lalku Valley, District Swat, Pakistan, have historically used 60 plant species from 31 families and 46 genera as wild edible plants (WEPs) (23).

Nepal

Ethnobotanical studies indicate that over 70 medicinal herbs, along with several minerals and invertebrates, are used for therapeutic purposes in Nepal's Myagdi District (24, 25). Nepal is a significant center for medicinally significant plant species, according to several researches (26–28)

Bangladesh

An ethnobotanical study was carried out in 2022 on the medicinal plants used by the ethnic people of Khagrachhari District of Bangladesh. Nearly 53 different types of illnesses are treated by 94 species of ethnomedicinal plants from 44 families and 86 genera were reported (29). Various ethnobotanical studies have been carried out by researchers in different areas of Bangladesh and documented a large number of ethnomedicinal plants (30–33).

India

India is believed to be a treasure trove of folk remedies because it has sustained an aboriginal herbal health system for a long time. People continue to follow traditional treatment regimens. Indian Traditional Medicine (TM) can be of 3 types: Ayurveda, Unani and Siddha, which have been practiced since the 18th century (34). “Atharba Veda”, the important Veda of Hindus describes details on ailments and their treatment with plant products. Charaka and Sushruta, the eminent ancient doctors and Surgeons describe 600 - 700 medicinal plants in their books “Charaka Samhita” and “Sushruta Samhita” respectively. According to the 2011 census Tribal peoples constitute 8.6 % of India’s population which is about 104 million. The Indian tribes are known as Adivasi, Vanavasi, Girijan and so forth. The government has recognized about 573 communities as scheduled tribes to ensure they receive special benefits. But as per Article 342 of the Indian constitution at present 697 tribes have been notified by the Central Government (35).

In India, 45000 species of wild plants are detected of which 9500 species have high medicinal value. About 3900 plant species are used by tribals as food, 521 species as leafy vegetables, 525 species of plants as fibers, 400 species as fodder, 300 species as sources of various chemicals (naturally occurring pesticides and herbicides, insecticides), 300 species are used for extraction of gum, resins, dyes and perfumes. About 700 species of plants are given importance due to their cultural, religious, aesthetic and social value. In India, ethnic groups have preserved 11.95 % of the world's biodiversity (36). Various researchers in India have documented about 8000 species of plants that are used to prepare 25000 folk medicines (37).

Ethnomedicines in Odisha

Odisha, Bihar, West Bengal and Madhya Pradesh form the middle zone of India, comprising approximately 65 tribes. Reports are available on the use of 421 herbal medicines from 11 undivided districts of Odisha used by 24 tribal communities. Ethnomedicines have been used to treat 166 different conditions, including diarrhea, dysentery, rheumatism, fever, skin infections, toothaches, coughs and colds, headaches, wounds, antidotes, boils, bleeding piles, body aches, eye complaints, leucorrhea, stomach disorders and malaria (38).

Bhadrak

Bhadrak district is located in the North-east direction of Odisha. About 86.66 % of its total population dwells in villages. The district is situated in the deltaic region near the Bay of Bengal. In total, 42 species of wetland plants from 36 genera and 27 families were identified in 2015 (39). In another report, 46 families and 85 species of medicinal plant species in the Bhadrak district were recorded (40).

Dhenkanal

The district of Dhenkanal sits in the middle of Odisha. A geographical area of 4595 sq. km is covered by it. There are forests on 1737.62 sq. km of this total. A total of 315 species from the Dhenkanal district of Odisha were documented, which are divided into 295 genera and 75 families. 26 species of ethnomedicinal plants connected to urinary tract infections were discovered through critical analysis and identification (41). Satpathy has carried out research on ethnoveterinary uses of plants in Dhenkanal district recently in 2024 (42).

Gajapati

Gajapati is one of the coastal belts occupying the district. On average, 3850 sq. km of area is covered with dense forest. Ethnomedicinal study on diabetes ailments concludes that plants belonging to Euphorbiaceae, Cucurbitaceae, Araceae, Apocynaceae, Caesalpiniaceae and Polypodiaceae are mostly used for the said purpose (43).

Jajpur

The district of Jajpur has 725.217 sq. km of forest. Out of this, 415.59 sq. km are other forest lands, 6.35 sq. km are reserve forests and 299.32 sq. km are marked as protected. A total of 68 plant species were studied for their therapeutic qualities while conducting ethnobotanical research on medicinal plants in the Jaipur district (44).

Koraput

Koraput is found to have the greatest number of sacred grooves, but very few have been documented as herbal remedies. It covers about 8379 sq. km area and with predominance of tribal population. There are 94 known species of sacred plants, divided into 63 genera and 43 families. 48, 26 and 21 of them are trees, bushes and grasses respectively. 39 % of plants have medical properties, 23 % are used as food and 13 % are classified as threatened (45).

Mayurbhanj

The district of Mayurbhanj is in the northern region of Odisha. It has a total area of 10418.00 sq. km, of which 4392.13 sq. km are covered with forest. In the Mayurbhanj district, tribal communities utilized 24 plant species from 22 groups, for the treatment of gynecological disorders (46). More than 200 different types of herbal remedies may be found in the Similipal sanctuary, a large woodland area in the Mayurbhanj district. The use of 33 species of ferns from 21 families as medications for various diseases has been documented in the Similipal Biosphere Reserve (47).

Nawarangpur

5290.1 sq. km make up Nawarangpur. The entire district is essentially an elevated Eastern Ghats plateau with sporadic valleys and peaks that range in height from 2000 - 3000 ft (48). The ethno-medicinal plants used by the Gond tribes of Nawarangpur, Odisha show the use of 29 plant species belonging to 20 families. Mostly wax, oil, or raw leaves, bark and roots are consumed to treat various ailments (49).

Rayagada

In the state of Odisha's Rayagada district, tribes predominate. 7584.7 sq. km make up its size. Forestry encompasses 4785.36 sq. km, of which 777.27 sq. km are designated as restricted forest. The two most common tribes are the Kondhas and Souras. Near about 30 medicinal plant species from 23 families are reported as being used by the residents of Rayagada district (50). Ethnobotanical research on Dongria Kondh of Rayagada district documented various ethnomedicinal plants used in the treatment of different ailments (51).

Geography, tribal communities and health care habits of Western Odisha

Western Odisha is the treasure trove of herbal medicine as it is covered by various well-known forests and forest patches with several tribal communities conserving traditional herbal knowledge. Nuapada, Bargarh, Bolangir, Boudh, Sundargarh, Subarnapur, Kalahandi, Kandhamal, Deogarh and Jharsuguda constitute the Western part of Odisha. A vast similarity in the tribal communities, their Socio-cultural activities and the language of Koraput, Raygada and Malkangiri with the other 10 districts of the Western part is also observed. Tribal communities like Binjhal, Sahanra, Kandha, Khadia, Kisan, Mirdha, Gond, Munda, Ganda, Keunt, Naik, etc. are the indigenous inhabitants of the area (52). They are economically and financially very weak. Other Socially backward classes include Teli, Kumbhar, Bhulia, Kulta, Goud, Betra, etc. Most of them are laborers, small farmers and coolie categories so far, as their nature of the job to collect livelihood is concerned. Several tribal people collect timber from the nearby forest, sell it in the market and feed their families. Forest products like Mahua flower, resins, Lac, Kardi and Hendua (fermented bamboo products) have good value in the market which gives another way of earning to the tribal people of this area. During the summer season collecting Kendu leaves and selling them to the Government is another source of income for the tribal peoples of Western Odisha. Despite the availability of primary health centers in most rural areas, people continue to rely on traditional herbal treatments provided by local healers, known as Baidya, Gunia, Baba, Pujhari, Kabiraj and Bhatkari. Their strong belief in herbal medicines is due to their long-lasting curative properties, even though they work slowly. These remedies are readily available at no cost or at an affordable price and they have no side effects, only additional health benefits. The knowledge regarding the medicinal properties of various plants and plant parts is saved only in the brains of old age groups of tribal and other backward societies. They pass their knowledge of the folklore-medicines to the next generations only. They believe that the medicinal effect of herbal products will diminish if the names of the plants and the preparation methods are shared with anyone outside their family. Some people depend on the earnings from advising the way of taking care of patients and providing prepared herbal medicines to others. So, another reason for their denying to share might be a threat to their earning if they convey their knowledge to others.

Ethnobotanical study of Western Odisha (Table 1 & Fig.1)

Bargarh

Bargarh, one of the 10 districts of Western Odisha is situated between 20° 40' and 21° 49' North latitude and 82° 45' and 83° 48' East longitude (53). Bargarh district extends from Sambalpur to Nuapada district in the East-west direction. Subarnapur and Bolangir district area borders on its South, Jharsuguda district is situated to its North and in North-west border Chhattisgarh. Bargarh district covers about 5837 sq. km of area, which includes 269.329 sq. km of dry deciduous forest. The average temperature in the area varies between 10 °C and 46 °C. The average rainfall is around 2337.5 mm. Crops are grown once a year, depending on rainwater from June to December. Tribals and other backward classes people depend mostly on agriculture and forest products for their livelihood (54–56). Each block of Bargarh district is covered by forests and forest patches. Gandhamardan Hill, situated in Paikmal block, is a very well-known sacred grove as the storehouse of herbal medicines. Another sacred forest of Bheden block is Papanga Pahad, famous for its medicinal plants. Other forests and small forest patches are Barapahad, Thelko Dunguri, Tihidi Dunguri, Khajuria Pahad, Jhanj Pahad,Pathari Dunguri, Bhajpur Dangar, Bhudhasambar Dangar and so on. 2011 census reports the total population in Bargarh district is 1481255.50 out of which the tribal population is 281135.20. 17 % and 18.98 % of the total population belong to the Schedule Cast and Schedule Tribe

Table 1. Some medicinal plants of Western Odisha and their curative properties

Sl. No	Name of the plants	Family	Local name	Mode of uses	Reference
1.	*Abrus precatorius* L.	Fabaceae	Gunj	Seeds and roots are used to cure Constipation and boil	(71)
2.	*Abutilon indicum* L.	Malvaceae	Kuthelchitra	Small pieces of stems are used as toothbrushes to clean the teeth. The leaf paste is applied on teeth in case of toothache.	(70)
3.	*Acacia leucophloea* (Roxb.) Willd.	Fabaceae	Guhiria	5 ml of bark extract is taken twice daily to cure stomach problems.	(72)
4.	*Acacia nilotica* (L.) Delile.	Fabaceae	Bamur	To treat the syphilis wound, coconut oil and crushed leaf powder are externally administered.	(69)
5.	*Achyranthes aspera* L.	Amaranthaceae	Kukurdanti, Tabatakhanda	To treat cough, 20 ml of decoction are used (4-5 times per day). To cure skin conditions, leaves paste is applied directly to the skin.	(55)
6.	*Aegle marmelos* (L.) Corr.	Rutaceae	Bela	The unripe fruit pulp is given to cows twice a day to cure indigestion	(63)
7.	*Annona reticulata* L.	Annonaceae	Badhal	5gm leaf paste with sugar candy is given to children to cure fever.	(67)
8.	*Asparagus racemosus* Willd.	Liliaceae	Satabari	Rhizome used against menstrual problems, abortion	(68)
9.	*Atylosia scarabaeoides* (L.) Benth.	Fabaceae	Jharkulthia	Bone fracture of birds is cured by applying the Leaf paste at the broken site followed by binding a cotton cloth.	(63)
10.	*Boerhavia diffusa* L.	Nyctaginaceae	Gadhapurni	Root paste is used to cure cough	(92)
11.	*Butea monosperma* (Lam.) Taub.	Fabaceae	Palas	Gum and young twigs are used to treat Diarrhoeaand toothbrush and tongue cleaner	(92)
12.	*Curcuma caesia* Roxb.	Zingiberaceae	Kala haldi	Stem and rhizomes used to cure skin disease	(68)
13.	*Euphorbia hirta* L.	Euphorbiaceae	Chitakuti	The root is used in Common cold and fever	(92)
14.	*Grewia hirsuta* Vahl.	Malvaceae	Sunaragda	Root and Colocasia esculenta root are crushed together and applied on bruises.	(71)
15.	*Gymnema sylvestre* R.Br.	Asclepiadaceae	Gudmari	The plant's stem and root are used as an anti-diabetic and a remedy for snake poison. It is thought that the plant has snake-repelling qualities.	(67)
16.	*Heliotropium indicum* L.	Boraginaceae	Hatisundh	3-6ml of Leaf extract is taken twice daily to cure fever	(71)
17.	*Pergularia daemia* (Forssk.) Chiov.	Asclepiadeaceae	Uturulli	leaves chewed on an empty stomach to control diabetes.	(67)
18.	*Ricinus communis* L.	Euphorbiaceae	Jada	5g of seed powder is taken on an empty stomach after the menstrual bath to stop pregnancy for up to 1 year.	(64)
19.	*Tephrosia purpurea* L.	Fabaceae	kulthia	To prevent conception, 12g of root paste is eaten once daily on an empty stomach for 7 days beginning on the day of the menstrual bath.	(62)
20.	*Terminalia arjuna* (Roxb.) wight & Arn	Combretaceae	Arjun	Bark decoction is used to cure heart disease.	(64)
21.	*Terminallia chebula* Retz.	Combretaceae	Harda	Fruits are used to treat illnesses of the stomach.	(63)
22.	*Tinospora cordifolia* (Thunb.) Miers	Menispermaceae	Gulchi	Leaves are used as antidiabetic.	(70)
23.	*Tridax procumbens* L.	Asteraceae	Bishalyakarni	Leaf extract is applied to stop bleeding forthwith.	(62)
24.	*Trigonella foenum-graecum* L.	Fabaceae	Methi	5g of seed powder is taken with warm water on an empty stomach once daily to get rid of high blood pressure.	(83)
25.	*Vitex negundo* L.	Verbanaceae	Nirgundi	Leaf and young twigs are used to get relief from toothache.	(84)

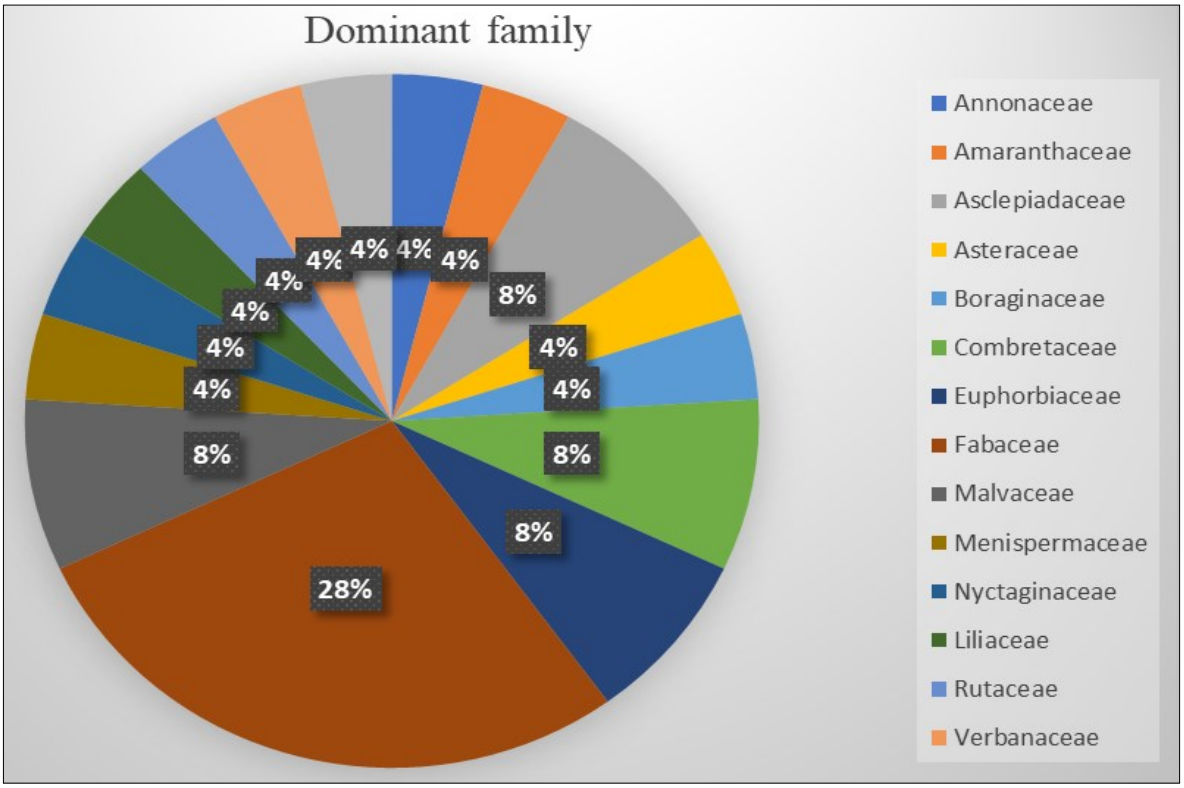

Fig. 1. Dominant family of Western Odisha.

respectively.

About 33 plant species from the Gandhamardan hill region were documented and their seeds are used as remedies (57). According to research findings, Gandhamardan Hill is home to 220 species of medicinal, quasi-medicinal and commercially significant plants, out of the 2700 angiosperms and 125 species of significant medicinal plants (57). In this region, more than 500 plant species are utilized in conventional healthcare systems. The Bargarh district's residents employ ethnomedicinal plants to treat diarrhoea and dysentery, Some researchers have researched these plants and reported 35 plant species grouped into 24 families (58). Debrigarh Wildlife Sanctuary (DWS), located in the Bargarh district of Odisha, covers 346.91 sq. km. The dry deciduous forest and Grasslands constitute about 77 species of ethnomedicinal plants belonging to 46 families that can cure 43 diseases (56). A study in the Bargarh district of Odisha focused on a single plant *Pegulariaa daemia* (Asclepiadaceae), commonly called hair knot plant or whitlow plant (Local name “Uturudi”) and searched its usage for medicinal purposes. He found the leaf, root, shoot and flower in various forms like juice, paste, powder singly or with additives such as honey, jaggery, or some other plant products are used to cure ailments like diarrhea, wounds, urinary tract infections, cough, stomach pain, boil, lymph gland, migraine, menstrual problem. The Milky juice is mostly used for the treatment of jaundice (59). According to a study, the residents of Sohela block, Bargarh used 117 ethnomedicinal plants from 52 families to treat various illnesses (60). In another study, 14 plant species from 10 families were reported to be used as contraceptives. Both internally and externally, the plant parts are applied as paste, powder, oil and ash (61). As Bargarh is a farmer-dominated area people use domesticate animals like cows, ox, goats, pigs, buffalo, sheep, ducks, hens, cock, dogs, etc for getting help in cultivation, milk, meat and protection from thieves. Hence, they have to take care of them if they suffer from diseases like bone fracture, mouth ulcer, ear infection, liquid purging, skin infection, the killing of lice, asthma, cough, cold, delivery, dyspepsia, wound, etc. A total of 39 plant species from 28 families and 39 genera were identified in the Bargarh district that had ethnoveterinary qualities (62, 63). A case study from the Bargarh district about the preservation of ethnomedicinal plants through Sacred Groves was published. From their study area, Papanga pahad which belongs to the Bheden block of Bargarh district, recorded 56 species of plants under 32 families, having more usage to cure human ailments (64). In a study, 55 plant species like *Abutilon indicum*, *Achyranthes aspera, Allium cepa, Allium sativum, Alstonia scholaris,* etc were reported, belonging to of genera and 32 families used to treat dental problems in Bargarh district (65). A total of 38 plants belonging to 29 families and 37 genera were identified being used as antipyretic by the tribal people of the Bargarh district of Odisha. In almost all cases leaves are ground and made into paste followed by filtering to extract the juice which is given to the patient to take orally (66). In a study, the medicinal effects of some plants native to the Nrusinghnath forest of Bargarh district were described (67). The plant *Nyctanthes arbortristis* which is commonly called Night Jasmine was found to be used to treat ailments like asthma, malaria, blood dysentery, piles, arthritis, intestinal worm, spleen enlargement, removal of dandruff, dry cough, skin problem (68). In Bargarh district, a total of 57 plant species with therapeutic benefits for dental and oral health were identified (69). From kitchen gardens, a total of 55 plant species that are members of 47 genera and 28 families utilizing to treat a variety of human illnesses were documented (70). In a thorough study, it was examined how tribal people in the Bargarh district used plants from the Fabaceae family to heal

illnesses. They found a total of 209 medicinal plant species out of which 19 species belong to the Fabaceae family (71). A sum of 29 plant species belonging to 22 families is used to cure diseases such as skin problems, hypertension, snake bites, diabetes, jaundice and malaria by residents of Gandhamardan Hill (72). About 45 plant species from 42 genera and 32 families having wound-healing properties are being documented in 2021 (73). In their ethnobotanical study of the utilisation of exotic plant species in the Bargarh district, 74 species were identified. Of these, 41 species were native to Tropical America, 5 to Mexico, 3 to America, 2 to Africa, Brazil, Europe, the Mediterranean and South America and 1 each to Australia, Central America, China, Madagascar, Malaysia, North America, Pantropic, Peru, South America (1824), South America (17th cent.), Tropical West Asia, Tropical Africa, Tropical America (Bf1824)and Tropical South America and West Indies (74). Another study was conducted on the quantitative ethnobotany of medicinal plants used by indigenous communities in the Gandhamardan mountain chains. According to their research, 70 plants from 65 genera and 36 families are used medicinally (75). Traditional methods of detoxifying toxic medicinal plants in Bargarh district were studied and ther elaborated on 19 poisonous plants, their ethnic uses and detoxification process (76). The antibacterial activity, toxicity and drug-likeness profiles of *Woodfordia fruticosa* -derived metabolites via an advanced computational-aided drug design platform were also studied. The plants were collected from Forest patches of Bargarh district (77).

Bolangir

The Bolangir district is located between latitudes 20011' 40" and 210 05' 08" north and longitudes 820 41' 15" and 830 40' 22" east. According to earlier report, less than 25 % of the region is covered by scrub and dry deciduous forests, which are reportedly understudied botanically. The two dominant tribes are Gond and Kondha (78). The Kandha and Gond tribes of the Bolangir district use 25 plant species for various therapeutic purposes on both people and animals (79). In the Bolangir district's Lathor village, a total of 15 Fabaceae-family medicinal plants have been identified as of 2023 (80). According to a study, the traditional diarrhoea relies heavily on 30 Gandhamardan medicinal herbs to treat respiratory tract infections, skin conditions, wound infections, diarrhoea and dysentery (81).

Boudh

Between latitudes 200 22' and 200 50' N and longitudes 830 34' and 840 49' E is where you'll find the Boudh district. The district is connected to Kandhamal and Nayagarh in the south, the river Tel and Sonepur district in the west and the river Mahanadi and Angul district in the north. The overall size of the district is 3098 km^2. Forty eight plants from 34 households in the Kondh-dominated region of Boudh are thought to exercise magic and religion. Interviews conducted in 2013 with a total of 15 informants documented 35 ethnomedicinal plant species spread across 27 families in the Boudh district (82).

Jharsuguda

The 740-ha Andhari sacred forest is situated between the latitudes of 84012' 58.3" and 84015' 21.6" and the longitudes of 210 55' 43.81" and 210 57' 59.8" in the Laikera block of the Jharsuguda district of Odisha. In the Jharsuguda district in 2016, 91 plant species from 46 families were used by the indigenous healers (83).

Kalahandi

In the southwest corner of the state of Odisha, Kalahandi is situated between 19.30 N and 21.50 N latitudes and 82.200 E and 83.470 E longitudes (84). Its northern and southern boundaries are the Balangir and Nuapada districts, while it's eastern, southern and Western boundaries are the Rayagada, Kandhamal and Boudh districts. Its northern boundary is formed by the Balangir and Nuapada districts. It is the seventh-largest district in Odisha, with an area of 8364.89 km^2. The area once boasted a proud history and a flourishing civilization. The Lanjigarh, Thuamul Rampur, Madanpur Rampur and Bhawanipatna blocks are home to the Kutia Kondhs, one of the districts of Kalahandi's more vulnerable tribal communities. Fifty plant species from 35 families were employed in Niyamagiri Hill by several ethnic tribes to treat 27 different illness categories, including skin problems, gastrointestinal disorders, wound healing, etc. (85). In the Bhawanipatna block of Kalahandi district, Odisha, an ethnobotanical investigation was conducted in 2023 and discovered 30 commonly used plant species from 24 families (86). In 2024, a total of 32 seasonal plants, such as *Citrus acida, Azadirachta indica* and *Bambusa vulgaris*, were identified to be used indigenously by the Kalahandi Tribal people for sustainable health practices (87).

Kandhamal

Between 19.34° and 20.50° N latitude and 80.30° and 84.48° E longitude are the latitude and longitude of Kandhamal district. Its borders are shared by the districts of Boudh in the north, Rayagada in the south, Ganjam and Nayagarh in the eastand Kalahandi in the west. Its 764900 ha of land represent a sizable size. Two prominent tribes are "Dongria" and "Desia," and their native tongue is "kui". In a study, the traditional applications of 40 ethnomedicinal plant species from 37 genera and 28 families in the Kandhamal district were documented (88). In the North-eastern ghat regions of Ganjam and Kandhamal district, a survey was conducted and revealed the use of 46 plant species (36.96 % trees, 32.61 % herbs and 30.43 % shrubs) for ethno-veterinary practises in 2023 (89).

Nuapada

The 3852 sq. km.-large Nuapada district spans the latitudes of 20° 0' to 21° 5' N and the longitudes of 82° 20' to 82° 53' E. Thirteen primitive tribes, including the Gond, Sabars, Sahara, Luhura, Chinda Bhunjia, Banjara, Khadia, Binjhal, Kandha, Paharias and Chuktia Bhunjia, are among the 62 scheduled tribes that are found to live here. In the Nuapada district in 2022, 94 medicinal plants totalling 52 families were gathered, recognised and recorded (90). In an earlier study, the use of 18 plant species from 14 families in the Nuapada district to treat common illnesses among the local tribes were reported (91). According to a study, 10 plant species from 8 families are utilized to treat women's health issues such as menstruation irregularities (92). A research amongst the tribals of Nuapada district in 2024 identified *Azadirachta indica* as the most widely recognized traditional medicinal plant with significant potential for treating dental disorders, as compared to other plant species

(93).

Sambalpur

The Sambalpur district has an average elevation of 150.75 m above mean sea level and is located between 20° 40' and 22° 11' North latitude and 82° 39' and 85° 15' East longitude. It has a vast area of 6702 sq km, of which 3276 sq km are covered in forest. The Deogarh district is to the east of the district, Bargarh and Jharsuguda districts are to the west, Sundargarh is to the north and Subarnapur and Angul districts are to the south. Ten species of oil-producing plants from 8 families were identified (94). A total of 28 medicinal plant species that are found in 26 genera and 19 families are regularly utilized by the inhabitants of Kuchinda Subdivision to cure a variety of skin conditions (95). A comprehensive investigation was conducted into the myths, sociocultural beliefs and several applications of *Madhuca longifolia* in Western Odisha (96).

Subarnapur

It is located at 200 50 54.1° N latitude and 830 52 34.4° E longitude. As of 2019, the district covers a total area of 2337 sq. km, of which 350.85 sq. km are forested, based on the State of Forests report for India. Between June and September, the district receives an average annual rainfall of 1438 mm, though dry spells occur during the monsoon season (97). No ethnobotanical studies have been conducted in this district to date.

Sundargarh

Sundargarh district is located between 21^0 35/ Northern and 22^0 32/ Northern latitudes and 83^0 32/ and 85^0 22/ longitudes. It is bordered by Ranchi district (Jharkhand) to the north, Raigarh district (Chhattisgarh) to the west and northwest tand the Odisha districts of Jharsuguda, Sambalpur and Deogarh to the south. To the east, it is surrounded by Singhbhum district (Jharkhand) and the Odisha districts of Keonjhar and Angul. The district covers an area of 9675 sq. km. The Bonai, Sundargarh and Panposh Forest Divisions of the Sundargarh district are home to about 40 distinct ethnic populations, including the forebears of the Oraon, Munda, Kharia, Kisan, Bhuiyan and Gonare tribes. A list was compiled of the 42 families, 78 genera and 83 plant species that were the most frequently utilized medicinal plants in the region (98). Several ethnobotanicals studied have been carried out by various researchers in different areas of Sundargarh district in between 2021-2023 (99–101).

Conclusion

Western Odisha is the warehouse for folk drugs. The indigenous tribes of this region are unaware of the global significance of herbal knowledge. They hesitate to share their knowledge with others out of fear that it may reduce the effectiveness of the medicines, affect their income and diminish their social status. There is a need to educate and document herb-based knowledge in the area. The therapeutic characteristics of plants used to treat certain particular ailments in certain specific places have very seldom been studied. Subarnapur district remains unexplored. Many locales of Western Odisha have not been visited for research for a long time. No paper depicting the restorative properties of all plants present in the entire region has been found to date. There is a need for a systematic survey of neglected regions at regular intervals. Most widely used plants to cure their common ailments i.e gastro-intestinal disorders, UTI and wounds are *Litsea glutinosa*, *Byttneria herbacea*, *Hemidesmus indicus*, *Oroxylum indicum* and *Woodfordia fruticosa*. It is especially necessary to conduct pharmacological activities, antibacterial research and other extensive studies on the area's most often utilized plants. There is relatively little research-related literature and databases accessible for several regions in Western Odisha, suggesting there are still unstudied areas that should be picked for further study. There is a saying in Odiya “Jaha Nahi Bharate, Taha Nahi Jagate” which means ‘whatever is not found in India is not found anywhere in the world’. Further documentation, research and exploration in the field of ethnomedicine are required.

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Authors' contributions

DS and RB carried out writing, data collection and arrangements. GM conceptualized the work, critically reviewed and finalized the final manuscript.

Compliance with ethical standards

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