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Native medicinal plants in use to ameliorate different diseases by local tribal healers of Nuapada district of Western Odisha

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Abstract

Born in the lap of nature and natural climate, tribal people still prefer to reside amidst natural surroundings, hilly and remote inaccessible dense forests, untouched by the trace of modernity. Large sections of tribal society do not have access to modern health care facilities and advanced allopathic medicine. Out of several pockets of the tribal population, Nuapada is one of the most undeveloped district of Odisha, but known to harbor rich ethno medicinal plants resources. The tribal people of Nuapada possess substantial indigenous traditional knowledge associated with herbal medicines; as well the local healers have been practicing to heal several diseases. In this study, we report the medicinal plants and their parts used to treat several diseases and disorders by the people of Nuapada District. A comprehensive ethno botanical data was collected from local tribal healers through group discussion as well as individual interaction with local vaidyas, assisted by field validation. The present investigation was carried out within 25 villages and 94 medicinal plants belonging to 52 families were collected, identified, and documented.

Keywords: Medicinal plants, Nuapada, traditional healers, tribes

Introduction

In the tribal map of India, Odisha occupies a unique position having 62 scheduled tribes including 13 primitive tribes, which covers approximately 23 percent of the total population of the state. The population of the district is 6, 10,382 as per the 2011 Census. The major among them are Gond, Sabars, Saora, Luhuras, Chinda Bhunjia, Banjara, Kharia, Binjhals, Kandha, Paharias and Chuktia Bhunjia. Chuktia Bhunjia is the only primitive group (PVTG) found in Nuapada district. The tribal conquered villages located in remote pockets in forest ecosystem of the district and have limited livelihood options and are mainly depend on forests for their earning and medicinal necessity. Several factors such as poverty, malnutrition, lack of safe drinking water facility, cleanliness, *etc.*, are the major contributing factors to the poor health conditions in tribal communities of Nuapada. Different communicable diseases like Malaria, Diarrhea, Dysentery, Jaundice, Scabies, Cough, Cold and non-communicable disease like Malnutrition are very common in this tribal populated area. Most of the tribal communities are forest dwellers and their healthcare system known as ‘Traditional Health Care’ primarily depends on the herbal treatment, *i.e.* Plants, flowers, seeds, and other plant parts.

Tribal people possess vast knowledge through various non-formal ways from the surroundings where they reside and it depends on their ecological, social and economic conditions. They have their own ethno medical remedies and prefer to cure themselves with help of local healers [1]. Plants have been used for the treatment of various human ailments by these healers as they possess a wealth of knowledge and skills on the utilization and conservation of medicinal plants. Since time immemorial and the knowledge of wild plants as medicine is found in ancient Vedic literature, predominantly in Rigveda, Charak Samhita and Shusruta Samhita. The importance of herbal-based medicine is growing day by day although it varies depending on the ethnological, medical, and historical background of each country. India is well known as a reservoir of medicinal plants [2] and possesses about 8% of the estimated biodiversity of the world. Medicinal plant constituents are used as basic material for research and development of new drugs or as models for pharmacologically active compounds [3]. In modern days there has been an increased demand for herbal products of natural origin throughout the world because of their lesser side effects as compared with contemporary systems of medicine [4]. Even the developing countries rely on traditional health care practitioner’s *i.e.* traditional birth attendants, herbalists and bone-setters for their primary health care needs [5]. Approximately 80% of the world’s population depends on traditional health care systems as reported by World Health Organization [6].

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Nuapada is placed in the western part of Odisha and its border extend in the north, west and south to Raipur district in Chhattisgarh and in the east to Kalahandi, Bargarh and Bolangir districts. It lies between $20^{\circ} 0' N$ to $21^{\circ} 5' N$ latitudes and between $82^{\circ} 20' E$ to $82^{\circ} 53' E$ longitudes and spread over in an area of 3852 Sq. kms (2.47% of the state) and has a forest cover of 1849.69 Sq. kms (48%) of the total area [7]. The district has rich phyto-diversity and is home to large number of medicinal plants.

Methods

The study was conducted during May, 2021 to December, 2021. Twenty traditional healers were consulted for the

present study. After consultation with local Vaidyas of different area, about 25 villages were selected randomly for documentation on medicinal uses of plant. The ethno medicinal surveys were accomplished by visiting the tribal areas of Nuapada District several times. Interviews were conducted in local language (Sambalpuri). The data were collected from local traditional healers, local Vaidya, and herbal medicine practitioners through interviews, group discussions, guided field walks, and observations during herbal product preparation. Collected information were carefully recorded. Field trips were also carried out along with some vaidya to know the habits and availability of some plants and the information were documented.

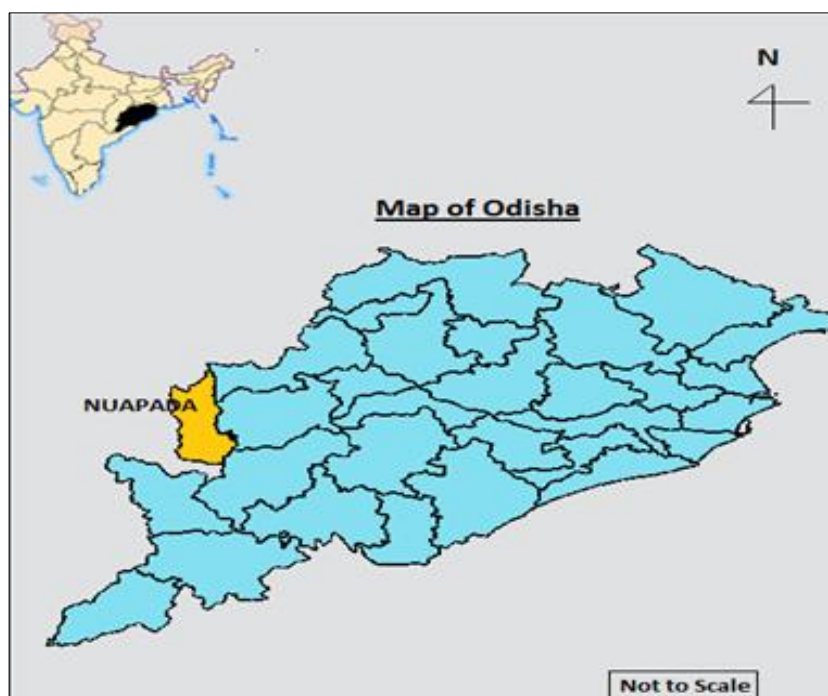


Fig 1: Location of Nuapada in Odisha Map



Fig 2: Map of Nuapada District

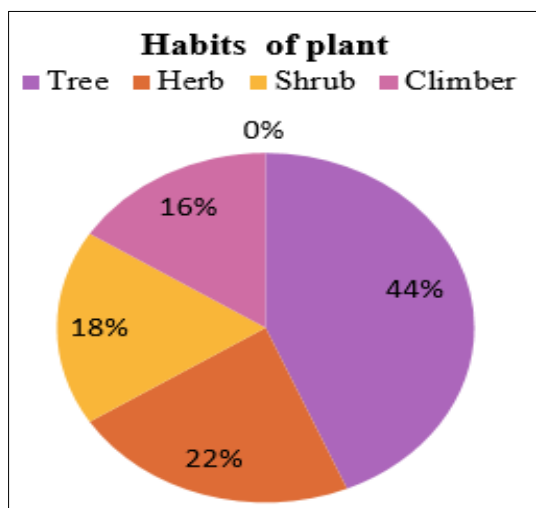


Fig 3: Usage of different type of medicinal plants by local healers of Nuapada District

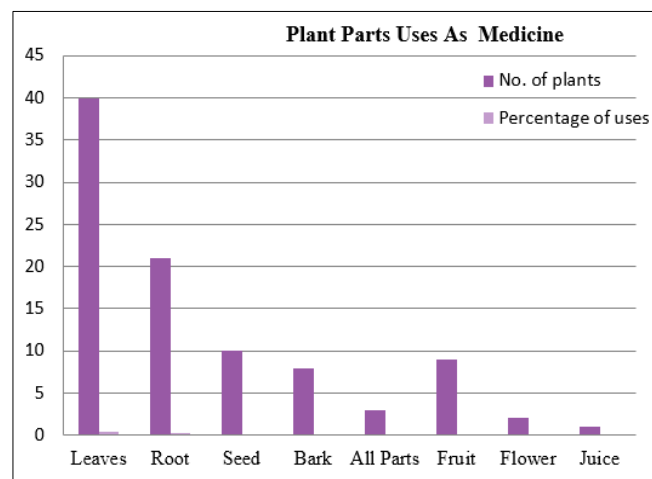


Fig 4: Plant parts of different species used for medicinal purposes by local healers of Nuapada District

Table 1: List of plant species used by local people of Nuapada District for various medicinal uses

S. n.	Plant Name	Local Name	Plant Part Used For Medicine	Habit	Uses
01	<i>Aloe barbadensis</i> (Liliaceae)	Ghikumari	Leaves	Shrub	It is used for deficiency of haemoglobin and removal of pimples.
02	<i>Andrographis paniculata</i> (Acanthaceae)	Bhuinimba	Leaves	Shrub	Leaves paste is used for diabetes, high blood pressure, skin diseases and malaria.
03	<i>Momordica dioica</i> (Cucurbitaceae)	Kankada	Root	Climber	Root paste is used for Diabetes.
04	<i>Cymbopogon citratus</i> (Mimosaceae)	Dhanantari	Leaves	Herb	Leaves juice is used for stomachache and vomiting.
05	<i>Amaranthus viridis</i> (Amaranthaceae)	Kantaleutia	All part	Herb	All parts paste is used for scabies and skin diseases.
06	<i>Acacia catechu</i> (Fabaceae)	Khaira	Leaves	Tree	Leaves paste is used for itching and scabies.
07	<i>Aegle marmelos</i> (Rutaceae)	Bela	Fruit	Tree	It is used for treatment of dysentery.
08	<i>Asparagus racemosus</i> (Liliaceae)	Satavari	Root	Herb	Root powder is used for nervous disorder, diarrhea, dysentery, cough etc.
9	<i>Annona squamosa</i> (Annonaceae)	Sitaphala	Leaves	Tree	Leaves paste is used for pimple.
10	<i>Azadirachta indica</i> (Meliaceae)	Limba	Leaves, seed	Tree	Extract of leaves is helpful to get rid of diabetes if taken in empty stomach. Leaf extract and seed oil is used for skin disease.
11	<i>Abrus precatorius</i> (Papilionaceae)	Kaincha	Root	Climber	Root paste is used for snake bite.
12	<i>Bryonia laciniosa</i> (Cucurbitaceae)	Sibalingi	Seed	Climber	Seed is used for fertility.
13	<i>Bauhinia vahlii</i> (Fabaceae)	Siali	Seed	Climber	Seed decoction used for headache.
14	<i>Butea monosperma</i> (Fabaceae)	Palasa	Flower	Tree	Flowers are used for kapha, leprosy and skin disease.
15	<i>Basella alba</i> (Bacillaceae)	Poi	Root	Climber	The root paste is useful when taken along with rice washed water in the morning in empty stomach for a month to cure irregular period.
16	<i>Bacopa monnieri</i> (Scrophulariaceae)	Brahmi	Leaf	Herb	Leaf juice along with honey for epilepsy.
17	<i>Bombax ceiba</i> (Bombaceae)	simili	Thorn, root	Tree	Effective remedy for gynecological disorder, urinary troubles and dysentery. Thorn paste with cow milk is useful for reducing pimples.
18	<i>Bambusa bambos</i> (Poaceae)	Baunsa	Bark	Herb	The outer layer of the bamboo culm is scrapped and the paste is applied on fresh cuts to stop bleeding.
19	<i>Clitoria ternatea</i> (Fabaceae)	Aparajita	All part	Climber	The root is administered with honey as a general tonic to children for improving mental status. Leaves and flower extracts are used for headache.
20	<i>Curcuma aromatica</i> (Zingiberaceae)	palua	rhizome	Herb	Crushed rhizome is consumed with honey for 3-5 days to cure diarrhea in children.
21	<i>Curcuma longa</i> (Zingiberaceae)	Haldi	rhizome	Herb	Rhizome powder is taken to cure jaundice.
22	<i>Cynodon dactylon</i>	Dubaghasa	Leaves	Herb	Crushed leaves is useful against nasal bleeding.

	(Cyperaceae)				
23	<i>Cocos nucifera</i> (Arecaceae)	Nadia	Oil	Tree	Coconut oil with turmeric powder is used for cracking feet. Oil is used for Hair growth.
24	<i>Chenopodium album</i> (Chenopodiaceae)	Bathua saga	Leaf	Herb	Consumption of leaf is useful for heart patient to get relief from heart disease.
25	<i>Carica papaya</i> (Caricaceae)	Amrutabhandana	Fruit	Tree	Fruit is used for good digestion, milky juice is used for toothache.
26	<i>Calotropis procera</i> (Asclepiadaceae)	Arakh	juice	Tree	Milky juice extracted from the plant is effective for treatment of skin disease.
27	<i>Chloroxylon swietenia</i> (Rutaceae)	Bherua	Leaves	Tree	Leaves paste is used for fungal infection.
28	<i>Clerodendrum serratum</i> (Lamiaceae)	Bharangi	Leaf	Shrub	Leaf powder is used for common cold.
29	<i>Cassia tora</i> (Leguminosae)	Chakunda	seed	Tree	Seed powder with mustard oil is used for any skin diseases.
30	<i>Coleus forskohlii</i> (Lamiaceae)	Pasanvedi	Root	Herb	Root powder is used for chest pain.
31	<i>Coriandrum sativum</i> (Umbellifers)	Dhania	leaves	Herb	Leaves paste is used for headache.
32	<i>Anacardium occidentale</i> (Anacardiaceae)	Kaju	Leaves, Bark	Tree	Leaves are used for reducing fever, malaria, toothache and gum problem. The bark is used to treat snake bites.
33	<i>Combretum indicum</i> (Combretaceae)	Basantmalati	Fruit, root	Climber	The fruits works well to reduce coughs and consumption of root decoction is helpful to treat rheumatism.
34	<i>Cascabela thevetia</i> (Apocynaceae)	Kaniar	Fruit	Tree	Unripe fruits paste is applied on itches and abscess.
35	<i>Cassia fistula</i> (Fabaceae)	Sunari	Leaves	Tree	The leaves of the tree used for malaria and skin disease.
36	<i>Datura metel</i> (Solanaceae)	Dudura	Leaf	Shrub	Leaf paste along with sea same oil is used for joints pain.
37	<i>Desmodium gangeticum</i> (Fabaceae)	Sal parni	Root, leaves	Shrub	Decoction of root is used as analgesic. Leaves paste on the scalp reduces dandruff.
38	<i>Desmostachya bipinnata</i> (Poaceae)	Kush	Leaves	Herb	Leaves paste is used for skin disease.
39	<i>Diospyros melanoxylon</i> (Ebenaceae)	Kendu	Leaves	Tree	Leaf extract is used for lose motion.
40	<i>Elberia ribes</i> (Primulaceae)	Baibidanga	Fruit	Tree	Fruit paste is applied for skin infection.
41	<i>Erythrina variegata</i> (Fabaceae)	Paladhua	Leaf	Tree	Fresh leaves Juice used for curing worm in stool.
42	<i>Emblica officinalis</i> (Phyllanthaceae)	Amla	Fruit, root, bark	Tree	Fruit paste is applied for hair growth. Fruit is used for diabetes and cancer. Root and bark paste is applied for scorpion stung part of body.
43	<i>Ficus racemosa</i> (Moraceae)	Dimiri	Bark	Tree	Bark is boiled with water then it is applied to any sore of the body. Bark powder is used for red dysentery.
44	<i>Ficus religiosa</i> (Moraceae)	Aswatha	Bark, fruit	Tree	Bark and fruit powder is used for diabetes, diarrhea and leucoderma.
45	<i>Ficus benghalensis</i> (Moraceae)	Bara	bark	Tree	Bark powder is used for diabetes and dysentery.
46	<i>Grewia hirsuta</i> (Malvaceae)	Bansula	Root	Shrub	Root powder is given with honey for 10-15 days to increase concentration of semen. Root paste is given orally in the treatment of severe constipation. Root paste is used for joint bone.
47	<i>Gmelina arborea</i> (Verbenaceae)	Gambhari	Leaves	Tree	Leaves paste is used for headache.
48	<i>Gymnema sylvestre</i> (Apocynaceae)	Gudmari	Leaves	Climber	It is used for diabetes.
49	<i>Geniosporum tenuiflorum</i> (Lamiaceae)	Ban tulsi	Leaves	Shrub	Leaf paste is applied on bitten area in rat bite to get relief.
50	<i>Hygrophila auriculata</i> (Acanthaceae)	Koilekha	All parts	Shrub	Root and leaves paste is used for joint pain, cough.
51	<i>Hibiscus rosa-sinesis</i> (Malvaceae)	Mandar	Leaves	Shrub	Leaves paste is used for easy child birth.
52	<i>Indigofera astragalina</i> (Leguminosae)	Ban kulthia	Root	Shrub	Root are pasted with water and given in empty stomach for 9 days in the treatment of spleen troubles.
53	<i>Ipomoea pes-tigridis</i> (Convolvulaceae)	Kharkhatia	Seed	Climber	Seed oil is applied locally on joint arthritis and seed paste is applied for hair growth.
54	<i>Justicia adhatoda</i>	Basang	Leaf	Shrub	Leaf powder is taken with warm water daily to get

	(Acanthaceae)				relief from rheumatic pain.
55	<i>Achyranthes aspera</i> (Amaranthaceae)	Kukurdati	stem	Herb	Stem is used as tooth brush to cure tenderness.
56	<i>Kalanchoe pinnata</i> (crassulaceae)	Amarpoi	Leaf	Herb	Leaf paste is used for cure diarrhea.
57	<i>Lagenaria siceraria</i> (Cucurbitaceae)	Lau	pulp	Climber	Boiled in oil this pulp is used to treat rheumatism.
58	<i>Lawsonia inermis</i> (Lythraceae)	Manjuati	root	Tree	Leaf and stem powder used for cure stone and jaundice.
59	<i>Lucas cephalotes</i> (Labiatae)	Gayash	Leaf	Herb	10 gm leaf extract with honey used for deworming.
60	<i>Lycopersicon esculentum</i> (Solanaceae)	Tomato	Leaf	Herb	Leaf crushed with salt and applied externally on psoriasis, itching and also inner thighs for fungal infection. After application little pain or burning sensation may occur, but it will cure within half hour.
61	<i>Moringa oleifera</i> (Moringaceae)	sajana	Leaf, Bark	Tree	Juice of fresh leaves is directly taken to treat high blood pressure. Paste made from bark is taken with rice washed water on empty stomach to treat rheumatism.
62	<i>Mimusops elengi</i> (Sapotaceae)	Baula	Flower	Tree	Flowers are used to cure wound and ulcers where astender twig is used for tooth brushing to cure pyorrhea.
63	<i>Mimosa pudica</i> (Fabaceae)	Lajakuli	Root, leaf	Shrub	Root paste with rice washed water useful against snake bite. Leaf paste is applied on glandular swelling.
64	<i>Mentha piperata</i> (Lamiaceae)	Pudina	Leaf	Herb	Leaf juice is used for empty stomach pain.
65	<i>Madhuca indica</i> (Sapotaceae)	Mahul	Latex	Tree	Latex is used as remedy for cracked feet.
66	<i>Momordica charantia</i> (Cucurbitaceae)	Kalara	Leaf	Climber	Leaf extract with honey is used for mouth infection.
67	<i>Mucuna pruriens</i>	Baidanka	Root	Shrub	It is used to prevent toxic effects of snake bites.
68	<i>Mangifera indica</i> (Anacardiaceae)	Amba	Stem, bark	Tree	Stem and bark juice used to cure dysentery.
69	<i>Musa paradisiaca</i> (Musaceae)	Kadali	Flower	Tree	Uncooked flower of this plant is used to delight ulcers and dysentery and cooked flowers are good food for diabetes.
70	<i>Nyctanthes arbor-tristis</i> (Oleaceae)	Gangasiuli	Leaf	Tree	Decoction of leaf along with honey is also very effective against malaria.
71	<i>Neolamarckia cadamba</i> (Rubiaceae)	Kadamba	Bark	Tree	The decoction of the bark effective for diarrhea.
72	<i>Oxalis corniculata</i> (Oxalidaceae)	Amliti	Leaf	Herb	Leaf extract with honey is used for indigestion. Leaves with turmeric paste is used for skin disease.
73	<i>Ocimum sanctum</i> (Lamiaceae)	Tulasi	Leaf	Shrub	The leaf juice used for constipation, cholera. Leaf with honey used for common cold.
74	<i>Pongamia pinnata</i> (Fabaceae)	Karanja	Shoot, seed	Tree	Seed oil is used for skin disease. Tender twig is used as toothbrush to cure pyorrhea.
75	<i>Punica granatum</i> (Punicaceae)	Dalimba	Fruit	Tree	Fruit juice is effective remedy for diarrhea.
76	<i>Piper longum</i> (Piperaceae)	Pippali	Fruit	climber	Fruit is used for bronchitis asthma and constipation.
77	<i>Psidium guajava</i> (Myrtaceae)	Pijuli	Leaf	Tree	Leaf extract is used for loose motion.
78	<i>Ricinus communis</i> (Euphorbiaceae)	jada	Leaves	Shrub	Crushing leaves is used for expulsion of placenta. Seed oil is used for hair growth. Leaves paste used for period pain.
79	<i>Rauwolfia serpentina</i> (Apocynaceae)	Patalgarud	Bark, root	Shrub	Effective for treatment of blood pressure and snake bite.
80	<i>Smilax zeylanica</i> (Liliaceae)	Mootri	Root	Climber	The paste of root is given internally in dysentery. Root decoction is used to cure rheumatic pain.
81	<i>Syzygium cumini</i> (Myrtaceae)	Jamu	Leaves	Tree	The paste of root is given internally in dysentery. Root decoction is used to cure rheumatic pain.
82	<i>Semecarpus anacardium</i> (Anacardiaceae)	Ln.Bhalia	seed	Tree	Seed oil is applied on cuts and wounds for healing.
83	<i>Schleichera oleosa</i> (Sapindaceae)	Kusum	Seed, Bark	Tree	Seed oil is very useful therapy to cure rheumatism gout and scabies. Stem bark paste is applied on skin against itch.
84	<i>Shorea robusta</i> (Dipterocarpaceae)	Sala	Leaves, Resin	Tree	The leaves used for treat wounds. Resin used for chicken pox.
85	<i>Santalum album</i>	Chandan	Wood	Tree	Paste of sandal wood is used in the treatment of

	(Santalaceae)				skin disease.
86	<i>Celastrus paniculatus</i> (Celastraceae)	Malkangini	Seed	Climber	Seed oil is used for skin disease.
87	<i>Tinospora cordifolia</i> (Menispermaceae)	Guluchi	Leaves	Climber	The leaf and stem juice with 3-5 drops of honey is used for reducing blood sugar.
88	<i>Tagetes petula</i> (Asteraceae)	Gendu	Leaf	Herb	Decoction of leaf applied on cuts and injuries for healing of wounds.
89	<i>Terminalia arjuna</i> (Combretaceae)	Arjun	Bark	Tree	Bark paste is externally used in different skin disease.
90	<i>Terminalia chebula</i> (Combretaceae)	Harida	Fruit	Tree	Paste prepared from fruit taken along with curd to cure diarrhea. The fruits are used for digestive and cough.
91	<i>Terminalia bellerica</i> (Combretaceae)	Bahada	Fruit	Tree	Fruit powder is used for hair growth.
92	<i>Vetiveria zizanioides</i> (Poaceae)	Bena	Root	Herb	Root decoction is used for weakness.
93	<i>Vinca rosea</i> (Apocynaceae)	Sadabihari	Root	Shrub	Root paste is used for high blood pressure.
94	<i>Zingiber officinale</i> (Zingiberaceae)	Ada	Rhizome	Herb	Rhizome powder mixed with warm water is taken thrice a day for abdomen pain. The Raw zinger extract in warm water or mixed in tea relieves from coldache.

Result and Discussion

The tribal people of Nuapada having huge information about ethno botanical uses since long ago. It has been observed that most of the plants used to cure skin diseases such as itching and scabies, pimples, leprosy and fungal infections. The common diseases treated using medicinal plants are diarrhea & dysentery, malaria, diabetes, rheumatic pain, snakebites, joint pain, and jaundice. The local communities practice various methods for preparation of traditional medicines to cure different types of diseases. Information about plants and their uses is passed from generation to generation through oral folklore.

Plants with ethno medicinal properties and uses by tribal communities of Nuapada district are depicted in Table-1. A total of 94 medicinal plant species belonging to 52 families were used by the local communities. Figure 2 shows no. of different life forms of plants species recorded in this study. Among different types of plants used for medicinal purposes, trees and herbs are predominant. Among 94 plant species, 41 were trees (43.61%), 21 were herbs (22.34%), 17 were shrubs (18.08%) and 15 were climbers (15.95%). Among different plant parts used for medicinal purposes, leaves of the maximum no of plants species (40), followed by bark (8), seed (10), root (21), flower (2), all parts (3), fruit(9) and juice (1) were used (Figure 3).

Mode of preparation is different such as decoction, juice, oil, paste and whole plant extract. In the collection of data concerning the preparation of medicine, traditional healers reported that various skills are associated with herbal preparation. Most people use this medicinal plant in powder form because the powder can be stored for more days. People of the study area harvest different plant parts (e.g., leaves, roots, seeds, barks, and fruits) for the preparation of traditional remedies. It was observed that the traditional healers use to harvest leaves of 39 species, and they believe that leaves contain more concentration of the active constituents. The survey report revealed that most of the traditional medicines were prepared from single plant parts, whereas a few decoctions were prepared from the combined product of two or more plant species.

Conclusion

Nowadays, the importance of herbal medicine is increasing. All age groups of people of tribal society use the herbal

medicines widely. The tribal pocket of Nuapada district is a precious reservoir of traditional medicinal plants, yet remains unexplored. People of the tribal areas mostly believe in traditional medicine and protecting the medicinal plant. All traditional medicine needed to be evaluated for its efficacy and safety. Unfortunately, this kind of valuable traditional knowledge is depleting day by day from the area due to less interest of the younger generation in a traditional treatment system. Documentation of traditional practices and collection of information available with local communities is important as it will lead to further research and development on medicinal plants of the region. Awareness created during the study has also enabled the tribal population to understand the importance of bio resources of their region and initiate effective measures of their protection and conservation.

Declarations

▪ Ethics approval and consent to participate

“Not applicable” in this section.

▪ Consent for publication

“Not applicable” in this section.

▪ Availability of data and materials

Data sharing not applicable to this article as no datasets were generated or analyzed during the current study.

▪ Funding

Ministry of tribal affairs

▪ Competing interests

We declared that we have no “competing interests “in this section.

▪ Author’s contributions

“JJ and RM conceived of the presented idea. JJ developed the theory and performed the computations. RM verified the analytical methods & to investigate and supervised the findings of this work. All authors discussed the results and contributed to the final manuscript.”

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