

Original Research Article

Medicinal plant knowledge and Ethno-medicinal uses of Tribal people of Niyamagiri hill, Kalahandi District, Odisha, India.

Abstract

Background – The current study was prepared to collect the ~~Ethnomedicinal~~-ethnomedicinal data from tribal peoples of Niyamagiri hill region of Kalahandi district, Odisha, India. The Tribals of this region have been using ~~the~~ medicinal plants to treat various kinds of diseases since ~~the~~ time immemorial.

Method-

The aim and objective ~~were~~was to record the information on medicinal uses of plants by leading healers by taking interviews and ~~recording to record~~ the comprehensive knowledge about the medicinal properties of different plants with the snowball technique and sampling method. Plants were recognized by the local practitioner also known as Kabi Raja or Vaidya, in ~~the~~ forest floor and were classified botanically.

Result

The present study recorded the use of different parts of 150 plant species belonging to 131 genera of 78, unlike flowering plant families, against various diseases, with special reference to, diarrhoea, dysentery, cold, cough, piles and ~~f~~fever. The practitioners use these plants to treat kinds of ailments like asthma, skin diseases, piles, constipation, diabetes, fever, cough, toothache, wound healing, headache, infertility in women, mouth ulcer, stomach disorder, indigestion, insect bites, ring worms, thirst, eczema, dysentery and diarrhoea. All these medicinal plants are used as healing sources as modern medical facilities are far away from them. All these plants, have ~~a~~ different climatic zone that helps them ~~to~~ grow, specifically in the hilly forest of the district. The current record of ethno-medicinal data specified that the backward and tribal local people commonly used plants for the treatment of diarrhoea and dysentery are *A. salvifolium*, *A. spinosus*, *A. paeoniifolius*, *A. paniculata*, *B. acutangula*, *B. purpuria*, *B. malabaricum*, *B. pinnatum*, *B. lanzan*, *C. arborea*, *C. fistula*. For cold and cough the plants are *A. indica*, *A. sativum*, *A. galanagal*, *A. mexicana*, *A. integrifolia*, *B. acutangula*, *B. campestris*, *B. pinnatum*.

Conclusion-

The present study consists of 150 plants species were collected from Niyamagiri hill region of Kalahandi district, Odisha. All plants are rich in different medicinal properties like healing, therapeutic properties. It is found that still a large number of tribal people are using their traditional knowledge and culture and have adopted herbal therapy for most of the diseases because of strong belief on the local practitioners. They use medicinal plants so intelligently with knowing their medicinal properties, their preparation, their storage and how to administer different dose with great efficiency against kinds of ailment. Due to modernization, population growth and cutting down of trees the Niyamagiri hill is losing its rich diversity of medicinal plants frequently, which is a matter of concern. This concern need to be resolved with proper management and conservation of medicinal plants of Niyamagiri hill region of kalahandi district.

Key-words: Medicinal plants, Ethno medicine, Tribals of Niyamagiri hill, Kalahandi district, Odisha plant identification; Kutia Kondhs and Dongaria Kandha; therapeutic plants; traditional medicine of Niyamagiri hill.

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Introduction

From the beginning, human beings have athe relationship among life, disease and plants. From the evolution of society, people started studying illnesses and cure [1]. After they faced diseases, there is no imitate that people of earliest set interest on the synthetic remedy for their ailments due to their civilization but they tested to make could easily attain, which they could find from their surroundings. [2]. AAn ancient perception ofa the use of disease indicates that traditional medicinal practices have been associated with humanity from time immemorial [3]. These traditional medicine implementations involve the therapeutic methods using predictable medicines that are used orally through generations. In view of indigenous segregation over several years, these applies are unique to different groups and communities, which have continued to the date. Information of traditional practices is now partially utilized by a few closed communities, especially the aboriginal tribals/marginalized population for whom it becomes a part of their cultural practices [4].

Theseis mystical natural surroundings hases hidden resources of bBiodiversity and use of flowering plants to manage, most of the traditional medicines which are used are getting from medicinal plants, minerals and organic matters for various treatment purposes to cure different diseases. About 21,000 plants are listed by world Health Organization (WHO) which are used for medicinal purposes around the world. In India 2500 species are found, out of which 150 species are used for commercially purposes. Ethnobotany is the study of medicinal herbs used by indigenous peoples. Medicinal herbs are found abundantly in India and the majority of plants were suitable for food, where as other plants either poisonous or medicinally useful [5].

Comment [A2]: citation?

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Comment [A4]: I think this is a general sentence. It is better to replace it with the political concern of the Indian state on the use of medical herbs. Is there any data regarding this?

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This Ethnobotany which refers the immediate connection between plants and the man. From "ethno" signifies the investigation of individuals and "herbal science" signifies the investigation of plants. The expression "Ethnobotany" was first used by HarshbergerHershberger [6], to the investigation of plants utilized by crude and native individuals. [7] characterized it as, the investigation of the interrelations of crude men and plants, [8] viewed ethnobotany as an exploration of connections between crude society and their plant condition. About 80% of the world population are using the medicinal plants as the main available drugs [9], the utilization of therapeutic plants is exceptionally boundless innumerable spice so the worlds. Ssince it is generally viewed as that herbal medications are less expensive and more secure in contrast to man-made medications and may be used without or at least side effects. Plants utilized for crude medication restrain an ample scope of substances that can be utilized to regard endless just as irresistible infections. Clinical microbiologists have an incredible enthusiasm for the medicinal plants screening for new therapeutics [10].The real treatments begin in plants as metabolites. The plant concentrates of antimicrobial exercises may occupy in the scope of various parts, including aldehyde and phenolic mixes [11].

Comment [A5]: This is the general definition. Instead, you can use "what is not known" i.e. field conditions that are far from ideal conditions, so that this becomes a knowledge gap that will be solved from the author's research results.

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Kalahandi locally called Kalahani district is located in Odisha of India. From the ancient time of civilizationof civilization, this region had a glorious history. The vulnerable tribal groups in Kalahandi district are The Kutia Kondhs and Dongaria kandha. They live in Lanjigarh, Madanpur Rampur, Thuamul Rampur, and Bhawanipatna blocks. About 90% residents are Kondhs are inhabited in Lanjigarh, where over, every sixth household experiences severe food insecurity and hunger.

Comment [A7]: In this paragraph, in addition to describing the condition of the tribal group, the author can also raise the "Managability" which is a number of previous research results that can be a solution and see the shortcomings of previous research and the author's research offers a more promising solution, so as to close the knowledge gap.

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MATERIALS AND METHODS

Study Area

~~The current research is carried out the wide ranging survey of various tribal villages in Niyamgiri hill region and its allied villages of Kalahandi district 2018-19.~~ The current research is a wide-ranging survey of various tribal villages in the Niyamgiri hill region and its allied villages of Kalahandi district 2018-19. The Niyamgiri hill is situated in between 19° 26' to 19° 43' N latitude, and 83° 18' to 83° 28' E longitude. The hills are situated within the districts of Rayagada and Kalahandi, and NE-SW direction is part of the Eastern Ghats of India. Niyamgiri is covered with dense forests like evergreen, semi-evergreen and deciduous forest. In Niyamgiri, eight different types of vegetation types are seen, according to local microclimate, plant density, species association and effect of biotic and edaphic factors. Dongria Kandhas are the most dominant tribes, and their language is Odia but kuvi. Every chief leads their tribal groups. Approximately 8,000 population of area present according to 2013 census. These tribal communities are initially nomadic, semi-nomadic communities, but presently living in tribal villages, and each consists of 12-25 families present hilly regions of Kalahandi District, Odisha.

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Image 1. Index map of Kalahandi district, Odisha, India

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Data Collection

Many discussions were done, and information were was gathered from several visits to the villages, randomly from traditional healers, head-men, priests, housewives and patients. Based on the interviews in different regions of different tribal areas, plants from the Niyamgiri hill region were selected based on the interviews in different regions of different tribal area, selection of plants from Niyamgiri hill region were made. All the information given by the local practitioner/practitioner on medicinal plants were recorded reported, and based on that, all the plant specieses were chosen botanically selected and authentication was done through valid references [12]. Before the beginning of the fieldwork, a literature survey was provided regarding location and tribals living in the study area. Before the beginning of the field work literature survey was done regarding location and tribals living in study area. [13, 14] Photos of plants and voucher specimens (herbaria) were conserved at P.G. Department of Botany, Berhampur University, Berhampur. By using the snowball technique and sampling in survey of about 21 villages in the districts was done with the interrogator and personal interview [15]. Plant specimens were prepared and identified.

Comment [A11]: Mention any books used for the identification process

~~Descriptive statistics were used to analyze the collected ethnomedicinal data. To analyze the collected ethnomedicinal data, descriptive statistics were used.~~

Result

Alphabetical arrangement of Botanical names of listed plants were done with family and vernacular names in Table 1. The information on the plant parts are used briefly as medicines against ailment(s). The present record of ethno medicinal data are for 150 plant species belongs to 131 genera of 78 families. These plants are used against different diseases like menstrual problem, gonorrhea, jaundice, fever, ringworm, scabies, cough cold, asthma, eczema, piles, earache, infection, gastric stress, stomachache, diabetes, white discharge, dysentery, urinary infections, amenorrhea, improve digestion, improve sperm quality, rheumatism, improve baldness, gum diseases, piles, headache, intestinal worms, toothache, insect bites, itches, odema, chickenpox, nervousness, troubles in sleeping, pregnancy, increasing sperm count, piles and blood mixed diarrhea, inflammation of genital parts, body pain, check bed-wetting of children, infected nail, yellow fever, cholesterol level, rheumatism and dropsy, joint point, leucoderma, urine blockage, nervous debility, loss of memory, migraines, vomiting for abortion, snake bite, hysteria, skin pigmentation, hernia and hydrocele, scorpion bite wound, kidney stone, metrorrhagia, stranguary, antipyretic, spleen disease, chickenpox, vermifuge, biliousness, anorexia, improve complexion. Herbal medicines are prepared by tribal peoples use single plants parts or many or many plant parts combination for better activity. Generally medicines are prepared from fresh plants, but in the absences of these plants, sun dried plants parts are used.

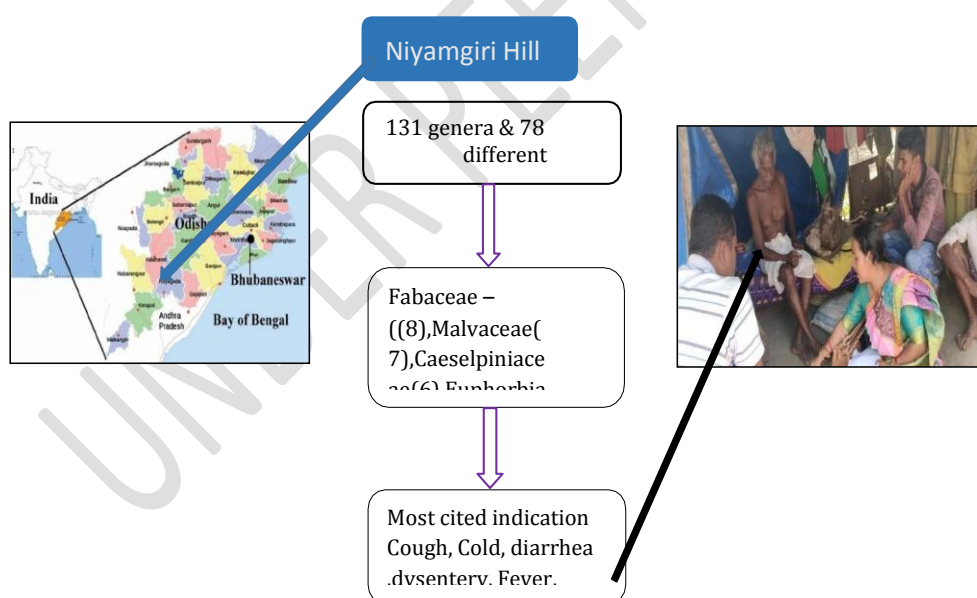


Fig: 1-Ethnobotanical study of Niyamgiri Hill region, Kalahandi

Table-1: Ethnomedicinal information of plants of Niyamagiri hill.

Comment [A12]: Based on the data in this table I suggest making a pie chart of which organs are used in the 150 species.

To enrich the discussion, the discussion about this part of the plant can be in the form of why the leaf part, for example, is the most widely used by the tribe, whether because it is easier to obtain or because of its processing. This will also of course be a reference for the herbal medicine industry in the future

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Sl. No.	Scientific name	Family	Local name	Parts used	Mode of preparation
1.	<i>Abroma augusta</i> (L.) L.F.	Malvaceae	Olatakamala	Bark ,leaves	Decoction of 5 gm and 1 gm of bark powder, black pepper is used respectively by respectively by adding water and is used 7 days to get rid from menstrual disorder. ½ tsp of leaf powder is taken once per a day to cure gonorrhea.
2.	<i>Abrus precatorius</i> Linn.	Fabaceae	Kaincha	Leaf, Root	Prepare a leaf paste and is eaten eaten to cure cuts and swellings. Root pounded with water is sprinkled on head and unripe seed juice is rubbed on scalp to get recovery from baldness.
3.	<i>Abutilon indicum</i> Linn.	Malvaceae	Pedipedika	Leaves	Paste of one leaf along seven numbers of P. longum Piper longum and is used to prevent jaundice, If needed second dose is given after 72 hrs. Prepare infusion of the leaves, drink it two times per times per day to prevent fever.
4.	<i>Acacia nilotica</i> Linn.	Mimosaceae	Bamur babul	Leaves	Tender leaves Tender leaves paste is applied to heal wounds. Prepare a Decoction of 1 table spoon of

					tender leaves with half glass of water and is used to gargle to prevent gum diseases.
5.	<i>Acalypha indica</i> L.	Euphorbiaceae	Indramaris	Leaves	<p>Petiole of leaves is immersed in castor oil and injected in anus of a kid. Keep it for 3 min to cure constipation.</p> <p>Leaf juice is used against cough and cold of children.</p>
6.	<i>Achyranthes aspera</i>	Amaranthaceae	Apamarga	Whole plant	<p>Whole plant powder is used to cure from gums and teeth problems.</p> <p>Prepare a Powder of 1 to 2 tsp of leaves, pepper with jiggery taking equal proportion and is eaten to cure fever.</p>
7.	<i>Aerva lanata</i> Juss-ex-schultz	Ameuranthaceae	Kukrabocho	Whole plant	<p>Whole plant paste is used vocally twice a day to treat spermatorrhoea.</p> <p>Prepare 60 ml of whole plant decoction and use twice a day to get relief from urinary tract infection.</p>
8.	<i>Alangium salvifolium</i> (L.F.) Wang	Alangiaceae	Ankle	Seed ,bark	<p>Small capsules are prepared from paste of equal amount of seed and bark and 1 capsule is given to cure constipation.</p> <p>400 mg of root bark powder is mixed in a glass of Rice water and stirring properly and given daily to treat diarrhea.</p>
9.	<i>Allium cepa</i> L.	Liliaceae	Piaja	Bulb	<p>Onion bulb is used for reducing blood sugars.</p> <p>Consumption of raw onions can</p>

					improve useful in controlling Diabetes.
10	Allium sativum L.	Amaryllidaceae	Rasuna	Bulb (cloves)	Raw bulbets are chewed to suppress acidity and also to expel intestinal worm. Garlic cloves is crushed in a cup of boil water and is given to gargle which prevent cough.
11	Aloe vera (L.) Burm.f.	Asphodelaceae	Ghee kuanri	Leaves	Leaf paste is applied for inflammatory swellings. 4 tsp of leaf juice is given daily for menstrual diseases.
12	Alpinia galangal (L.) Wild	Zingiberaceae	Malayabacha	Rhizome	½ tsp of rhizome powder is added in 200 ml of water and kept for 5 hours. Then add 1 tsp of honey and is used two times per day to prevent asthma. 3 gm of rhizome powder along with sugarcandy is given at night with hot milk to prevent cough.
13	Alternanthera sessilis (L.) R.Br.ex DC.	Amaranthaceae	Madaranga	Whole plant, Flower	Decoction of whole plant is prepared and 2 tsp is used once per day in empty stomach to treat piles. Decoction of flowers with water and is used once per day to treat weak eye sight.
14	Amaranthus spinosus L.	Amaranthaceae	Kantabhaji	Seed, Root	Seeds of plant A. spinosus and leaves of Datura plants are heated in til oil and is used to prevent eczema. The Root juice is taken to treat dysentery and fevers.

15	Amorphophallus paeoniifolius (Dennst.) Nicolson	Araceae	Dhai	Tuber	A Powder of tubers is used to prevent digestive problems and Dysentery.
16	Andrographis paniculata (Burm.f.) wall ex Nees	Acanthaceae	Bhuineema	Leaves	5 gm leaf paste is used orally with water two times daily to prevent dysentery and diarrhoea. The juice of the leaves is used orally to prevent constipation.
17	Annona squamosa LINN.	Annonaceae	Sitaphala	Leaves, Root	The root bark is given to chew for five minutes twice a day to cure toothache. Along with 500ml of water the leaves are boil until the water becomes half and is applied the thick decoction on the affected area to cure rheumatism.
18	Argemone mexicana L.	Papaveraceae	Dragugach	Leaves	The juice of the leaf is mixed with salt and water (1:1) and applied externally to cure ringworm, scabies. Leaf decoction is used against cough.
19	Artocarpus integrifolia L.	Moraceae	Panas	Leaves ,fruit	Inhale the dry leaves smoke to cure cough. The pulp of fruit is used externally to prevent insect bites.
20	Aspidopterys tomentosa Roxb.	Malphigiaceae	Alti laha	Root ,Whole plant	Boil the Roots in til oil and use externally to prevent eczema. Decoction of Whole plant is used to cure skin disease.
21	Asteracantha	Acanthaceae	Kikiri	Leaves, fruits	Fresh leaf juice is used to prevent

	longifolia Nees.				jaundice. Ash of fruit along with castor oil is used locally on cuts for quick healing.
22.	Averrhoa carambola L.	Oxalidaceae	Karamanga	Flowers, leaves	Decoction is made with 1 to 2 flowers in half glass of water and is used two times per day to prevent malaria. The paste of 5 to 6 leaves is used locally, three times a day to prevent chickenpox.
23.	Bacopa monnieri (L.)	Plantaginaceae	Bramhi	Leaves	Taking leaf extract is given for 5 months to prevents from epilepsy. Boiled mixture of leaf juice along ghee and is given to Drink 5 ml twice a day to cure fever.
24.	Barleria prionitis L.	Acanthaceae	Kantamalati	Leaves ,bark	Bark juice mixed with milk and is given to cure swelling. Leaf decoction is given to cure fever.
25.	Barringtonia acutangula (L.) Gaertn	Lecythidaceae	Hijjala	Leaves ,seed	12-15 ml juice of leaves along honey and is used to treat dysentery. Rub the seeds on stone and is used externally to cure chest colds.
26.	Bauhinia purpuria linn.	Caesalpinaceae	Kanchana	Bark	Fresh bark paste is applied on anus and hold it tightly for few minutes for three days to cure piles. 5 ml of bark Decoction is used two times a day to treat diarrhoea.
27.	Bauhinia variegata L.	Caesalpinaceae	Kuler	Leaves	Chew 3 to 4 fresh leaves before taking food to prevent stomach disorder. Root Decoction is used to cure snake

					poison or bites.
28	<i>Biophytum sesnsitivum</i> (Linn) D.C.	Oxalidaceae	Lajkuli	Whole plant	Boil Whole plant in a bucket of water and is used for bathing children suffering from fever.
29	<i>Boerhavia diffusa</i> L. nom. cons.	Nyctaginaceae	Punarnava	Root	Poultice cool root is applied on the affected part to prevent skin diseases. Root paste is used externally to prevent swelling.
30	<i>Bombax malabaricum</i> L. (DC)	Bombaceae	Semel	Root ,stem bark	Root paste and sugar is mixed and is used to cure leucorrhoea. Juice of stem bark is used against diarrhea.
31	<i>Brassica campestris</i> Linn.	Brassicaceae	Sorisa	Seed	Boiled Oil with <i>Allium sativum</i> and black cumin seed is rubbed over joints, feet, palm and neck to get relief from pain and cold.
32	<i>Bryonia laciniosa</i> Linn.	Cucurbitaceae	Shivalingi	Seed	The seed powder is used for increasing sperm count. After menstruation, 6-9 seeds are given to the woman for 5 days for increasing chances of conception, promoting fertility in women.
33	<i>Bryophyllum pinnatum</i> (Lam.) Kurz	Crassulaceae	Amarpoi	Leaves	5-10 ml of leaf juice is added to honey to prevent asthma and cough. Juice of the leaf is given in a dose of 10-15 ml to control bleeding in cases of piles and blood mixed diarrhea.
34	<i>Bucchanania lanzan</i> Spreng.	Anacardiaceae	Char	Stem bark	5 ml stem bark juice is used against diarrhoea

35	Butea monosperama (lam) Kuntz	Fabaceae	Phalsa	Flower	Soak flower for 5 -6 hours and filtered water is used against of genital part inflammation. Terminal bud paste with 3 seeds of black pepper added in water to prevent skin diseases.
36	Byttneria herbacea Roxb.	Sterculiaceae	Samarkhai	Root	Root paste is used against body pain
37	Caesalpinia bonduc L.	Caesalpiniaeae	Gil	Seed	Prepare a paste of Endosperm and seeds of Piper nigrum along with honey to cure fever.
38	Capparis zeylancia Linn.	Capparidaceae	Asadhua	Root ,Leaf	Root powder is applied over wounds. Paste of leaves is given with water for 7 days to prevent urination in bed.
39	Capsicum annum L.	Solanaceae	Lanka maricha	Fruit	Decoction of Fine pieces capsicum Boil in half litre of water along with lemon and salt and this soup is given once a day to cure yellow fever.
40	Careya arborea Roxb.	Lecythidaceae	Kumbhi	Fruit ,stem bark	Decoction of young fruits is taken thrice daily for a month to cure rheumatism. A paste is prepared from Stem bark of C.arborea and H. antidysenterica with water. Then filter it and it is used orally to prevent dysentery.
41	Cascabela thevetia (L.) Lippold	Apocynaceae	Koniyar	Seed ,leaves	Mature seed paste is used to prevent rheumatism . Paste of leaves is added with castor oil and after little warming, apply three times for 2-3 days is used against pain alleviator.

42	Cassia fistula Linn.	Casalpinia ceae	Sunari	Bark	Paste of Bark is applied externally for healing. Raw juice of fresh bark is used to treat dysentery.
43	Cassia tora Linn.	Caesalpinia ceae	Chakunda	Seed	Seed paste along with resin of sal, fermented rice water or curd is applied over infected skin disease.
44	Celastrus paniculatus Willd	Celastraceae	Pengu	Seeds	Crush the seed by stone and is used to prevent ring worms. Extracted seed oil is massage on body to cure body pain and joint point.
45	Chlorophytum arundinaceum Baker	Liliaceae	Bharat batuli	Root	Root decoction with turmeric is used in rheumatism.
46	Chloroxylon weitenia DC	Rutaceae	Bherun	Leaves	Paste of the leaves is massaged on skin to prevent leucoderma.
47	Cipadessa baccifera (Rath) Mig.	Meliaceae	Pitmari	Leaves	Tie the boiled leaves in a cloth and kept on forehead to treat headache.
48	Clerodandrum serratum (L.)	Lamiaceae	Bharangi	Roots	Paste of roots and leaves used in infected areas to prevent skin diseases. Paste of root is massaged on forehead relieves headache.
49	Coccinia grandis L.	Cucurbitacea e	Kunduri	Root	The root juice is given three times a day to cure diabetes. Boil 2 tsp of root powder along with 150 ml of water is taken three times per day to prevent urine blockage.
50	Cocus nucifera	Areaceae	Nadia	Seed	Endocarp is burnt and covered with a metal pot while flaming. After few

	Linn				minutes it is opened . A thin layer of black , oily substances is smeared on the inner wall of the pot.This oily substance is collected and applied over ring worms and scabies.
51.	Colocasia esculenta (L.)	Araceae	Saru	Leaves	Leaf Juice is used to prevent fever. Leaves decoction is given to cure regular menstruation.
52.	Convolvulus pluricaulis Choisy	Convolvulaceae	Sankhapuspi	Whole plant	The decoction of whole plant along with cumin and milk is used to cure fever and loss of memory. The decoction of whole plant is used to clean the piles and then paste of whole plant applied over it to cure piles.
53.	Coriandrum sativum L.	Apiaceae	Dhania	Leaves, root	Juice of leaves (1/4 th cup) is used every one hours to cure vomiting. 10 gm of coriander seeds is dissolved in a glass of water overnight and taken it an empty stomach at morning time, for 3 weeks to prevent leucorrhoea.
54.	Crataeva nurvala Buch-Ham.	Capparaceae	Baruna	Leaves, Bark	The leaves decoction is used to treat wound healing, reduce stomachache . The decoction of bark is used to treat urinary Tract infections.
55.	Curcuma caesia Roxb.	Zingiberaceae	Kalahaldi, krusnakedar	Rhizome	Fresh rhizome decoction is used to cure stomachache. The paste of rhizome is used to cure

					rheumatic arthritis.
56.	Cymbopogon citrates (DC.) stapf.	Poaceae	Dhantari	Whole plant,Root	The half cup juice of whole plant is given every morning in empty stomach for some days to prevent reproductive disorders. Spoonful roots powders is given twice a day to cure hysteria.
57.	Dillenia indica L.	Dilleniaceae	Oau	Fruit	Mix the fresh fruit juice with honey or sugar candy and is used for treatment against cough. Mix the fruit pulp with water and is used as shampoo for cleaning the scalp hair.
58.	Dioscorea bulbifera L.	Dioscoreaceae	Pitakanda	Root, Tuber	Apply the root powder externally to cure hernia and hydrocele. Apply the tuber powder over scorpion bite wound.
59.	Diospyros melanoxyloxB.	Ebenaceae	Kendu	Fruits	Take 2 tablespoon of heat fruit pulp to cure dysentery. Squeeze the fruit juice and Apply on the affected areas three times per day.
60.	Elephantopus scaber Linn.	Asteraceae	Mayurchulia	Root	Paste of root is added to raw milk and is used as laxative. Paste of root is added to rice washed water is taken before taking food for 4-5 days to treat irregular menstruation.
61.	Euphorbia hirta Linn.	Euphorbiaceae	Chitakuti	Whole plant	Whole plant juice is given for three days to enhance lactation.

62	Feronia limonia L.	Rutaceae	Kaitha	Leaves	Take 10-12 ml leaves juice, two times per day for a month to treat kidney stone. 3-5 gm powder of dried tender leaves is taken two times a day to prevent diarrhoea.
63	Ficus racemose Linn.	Moraceae	Dimiri	Bark	12-14 gm of bark is cooked with 250 ml water. Add 1 tsp of sugar and 2 gm of white cumin seed powder and is taken two times per day to treat metrorrhagia.
64	Ficus religiosa L.	Moraceae	Ashwattha	Leaves,bark	Bark latex is used externally to cure cracked heels. A little warm leaf juice is given as ear drop to prevent ear infection.
65	Gardenia gummifera L.	Rubiaceae	Kurudu	Stem bark	2 tsp of paste of stem bark is used to remove intestinal worm. Powder is made in Resin that obtained from stem. sprinkle it on wounds of cattle to keep flies away
66	Glinus oppositifolius L.	Molluginaceae	Pita gaham	Root, flower	Root paste is used against the white discharge. The flower paste mixing with wood paste of S. album is given to cure dysentery.
67	Gloriosa superba L.	Lilliaceae	Kulhiakanda	Rhizome	Paste of Rhizome is used on anus to treat piles. Rhizome juice is massaged on joints to reduce joint pain.
68	Gmelina arborea	Lamiaceae	Gamber	Fruit ,leaves	Ripe fruit juice along honey and is used

	Roxb.				to treat stranguary. Boiled leaves and knot it in a cotton and apply on joint pain.
69	Gossypium arboreum L.	Malvaceae	Kappa	leaves, seed	Make a paste of leaves, Apply it on the affected part to cure skin diseases. Prepare a Seed paste along with honey and take one time per day for 7 days to prevent diarrhoea.
70	Grewia abutilifolia W. Vent ex Juss.	Tiliaceae	Dhamana	Bark	The bark decoction is used for to reduce cholesterol.
71	Guizotia abyssinica (L.F.) Cass	Asteraceae	Alsi	Leaves,seed	2 tsp leaf juice is given to treat vermifuge at seven day intervals. Paste of Seeds with tubers of C. rotundus and roots of A. calamus are taken using honey to cure diarrhoea.
72	Gymnema sylvestre R. Br.	Apocynaceae	Gudamari	Leaves	1 tsp leaf juice or powder taken daily to cure diabetes. 1 tsp of each leaf powder and jamun seed is taken to cure urinary infection.
73	Helicteres isora L.	Malvaceae	Murian Anthei	Fruits	Fruits decoction is taken orally to get rid of waist pain instantly after birth of child. A paste of fruits and 3 black pepper seeds is used for development of child.
74	Heliotropium supinum L.	Boraginaceae	Pana airi	Leaves	Plant juice with leaf juice of butea monosperma is taken for 2-3 days in the morning to cure worms.

					Young leaves and stem is used to treat the ulcer of throat.
75.	Hemidesmus indicus (L.) R.Br	Asclepiadaceae	Sugandhi	Root	Dry root powder is added to cow milk and is used to tackle sexual debility. Paste of roots is added cow milk and is given two times upto 7 days to arrest piles.
76.	Hibiscus cannabinus L.	Malvaceae	Kaunria	Seed	Seeds are feed to cows for better lactation.
77.	Holarrhena antidysenterica (L.) Wall.ex A. DC.	Apocynaceae	Kurei	Root ,stem bark	Powder of roots is given after giving tea at morning time as vermifuge. Juice is prepared from Stem bark and roots of Aristolochia bractiatia, 2 tsp of juice is given to toddlers to prevent diarrhoea.
78.	Ipomoea nil (L.) Roth	Convolvulaceae	Khatkhatia	Seed	Seed powder is given with stale-rice water to prevent diarrhoea.
79.	Jasminum grandiflorum L.	Oleaceae	Chameli	flower, leaves	The leaf paste, root and flower is used on the affected part to cure scabies and itching. 40-50 ml of cold infusion of flowers is given to cure fever.
80.	Jatropha gossypifolia L.	Euphorbiaceae	Ramjada	Root, leaf	Prepare a root paste by adding 5 ml of milk and is added to stem bark powder of A. catechu and prepared into capsules. Take each capsule to prevent gonorrhoea. Sprinkle the leaf powder to cure wounds.
81.	Justicia adhatoda	Acanthaceae	Basanga	Leaves, root	50 g of boiled root is added with cow milk (125 ml) and is given once per

	L.				day to prevent diabetes. Apply the leaves paste on affected areas to prevent swelling.
82	Lanea coromandelica (Houtt .) Merr.	Anacardiaceae	Mohi	Stem bark	Prepare a juice of Equal amount of stem bark and E. variegata and 100-150 ml of juice is given to arrest dysentery and diarrhoea.
83	Leonotis nepetifolia (L.) R. Br.	Lamiaceae	Kantasido	Leaves ,whole plant	Plant paste is used to prevent skin diseases. Leave paste is used to cure joint pain.
84	Litsea glutinosa (Lour.) C.B.Rob	Lauraceae	Medha	Stem bark	Stem bark is added to raw culms of bamboo paste and apply the paste locally to heal the cracked bone.
85	Loranthus longiflorus Desr.	Loranthaceae	Mahulmadan g	Leaves ,Whole plant	Pour the leaf juice into the ear to prevent earache. Whole plant paste is used to cure skin-inflammation.
86	Ludwigia perennis Linn.	Onagraceae	Jaljali	Leafves	Leaf paste with salt is applied locally at infected skin parts to cure scabies and ring worms.
87	Madhuca indica J.F.Gmel	Sapotaceae	Mahua	flower ,seed	The juice of flower is massaged to cure skin diseases. Massaging of seed oil is very effective to reducing pain.
88	Mallotus philippensis (Lam.) Muell.Arg	Euphorbiaceae	Sundari	Leaves,Root	Decoction of the leaves is very effective against diarrhoea. Chew root scrapings with a betel

					mixture as a contraceptive for women.
89.	Marsilea quadrifolia L.	Marsileaceae	Sunsuniasaga	Leaves	2 drops of young leaves juice is poured in the nostrils two times per day to prevent migraine.
90.	Martynia annua L.	Martyniaceae	Baghnakhi	Seed	Seed oil is used for curing skin infection. The leaf juice is used to gargle for treating sore throat.
91.	Mentha spicata L.	Lamiaceae	Podina	Leaves	The leaf is taken as chutney for indigestion. 4 tsp of leaves decoction is used two times a day to prevent cough.
92.	Merremia gangetica (L.)	Convolvulaceae	Musakani	Whole plant	Apply the whole plant paste on foot to treat inflammation.
93.	Milletia auriculata Baker.ex .Bran	Fabaceae	Mankadmal	Leaves	Leaf juice is used as vermifuge.
94.	Mimosa pudica L.	Mimosaceae	Lajkuli	Leaves, seed	Leaf paste is used externally to prevent eczema. Prepare a paste of root and P. nigrum seed and is poured with curd and is given orally before taking meal for 7 days to arrest piles.
95.	Momordica charantia Linn.	Cucurbitaceae	Karla	Leaves	Half to one cup of leaf juice is eaten in empty stomach for seven day prevent chicken pox, measles and Fever.
96.	Morinda tinctoria Roxb.	Rubiaceae	Achhu	Root bark ,leaves	Mix the root bark decoction with sugar and is used upto 7 day to prevent biliousness. Mix the Leaf juice with rhizome juice of C. rotundus. It is used to cure dysentery.
97.	Moringa oleifera	Moringaceae	Sajana	Stem bark,	1 to 2 drops of stem bark juice is

	Lam.			flower	<p>poured in ear to prevent Earache.</p> <p>Prepare juice of drumstick flowers along with lemon juice or honey to cure urinary tract infection.</p>
98.	Mucuna pruriens (L.) DC.	Fabaceae	Baikhujen	Seed , root	<p>Mix the seed powder with water to prevent stranguary.</p> <p>The root decoction is added to honey and used orally to prevent cholera.</p>
99.	Murraya koenigii (L.) Sprengel	Rutaceae	Versunga	Leaves	<p>1 tsp of curry leaf powder and buttermilk is consumed to get relief from gastro-intestinal troubles.</p> <p>2 tsp of leaf juice with honey is taken to cure jaundice.</p>
100.	Operculina turpethum (L.) Silva Manso	Convolvulaceae	Tihudi	Root	<p>Wash the root with water and then cooked with cow's milk, this is taken in the dose of 20-30 ml in adults and 5-10 ml to children to cure abdominal disorders and skin diseases.</p> <p>Prepare a root decoction and Drink 10 ml of it twice a day to cure liver diseases.</p>
101.	Oroxylum indicum (L.) Benth. Ex Kurz	Bigoniaceae	Phapen	Bark, Root	<p>Paste of 1 tsp of bark is eaten with water to prevent measles.</p> <p>Root paste is eaten to remove intestinal worms.</p>
102.	Pergularia daemia (Forssk.) Chiov.	Asclepiadaceae	Uturudi	Leaves	<p>Take leaves juice with lime juice and is applied to the affected area to prevent skin diseases.</p> <p>Decoction of leave is prepared, and is</p>

					given two times per day to prevent cough.
103.	Phyllanthus emblica L.	Phyllanthaceae	Amla	Fruit, leaves	<p>2 to 3 g of plant powder, dry fruit is consumed daily in 30 ml water upto 21 days for preventing diabetes.</p> <p>Leaves of amla is crushed and is mixed with curd is taken before food is improve good digestion.</p>
104.	Piper betel L.	Piperaceae	Pana	Leaves	<p>Apply paste of leaves on wounds.</p> <p>Juice of piper betle with honey is used to cure cough and indigestion.</p>
105.	Plumbago zeylanica L.	Plumbaginaceae	Chitapar	Leaves, root	<p>The paste is eaten with banana for curing spleen diseases.</p> <p>Leaf Paste is used to reduce muscular pain.</p>
105.	Psidium guajava L.	Myrtaceae	Jamu	Leaves, seeds	<p>Seed powder is mixed with leaf powder of <i>Gymnema sylvestre</i> is taken three times daily for a month to prevent diabetes.</p> <p>Boil the infusion of guava leaves and roots and drink 2 to 3 times per day to prevent dysentery.</p>
107.	Pueraria tuberosa (Wild.) DC.	Fabaceae	Patalkumda	Tubers	<p>Tuber paste is used on forehead to reduce headache.</p> <p>Tuber juice is given orally to prevent stranguary.</p>
108.	Punica granatum L.	Punicaceae	Dalimba	Fruit, flower	Paste of unripe fruit with fermented rice water is taken for 4-5 days for

					amenorrhoea. 2 to 3 tsp flower juice and sugar is used to cure jaundice, cough.
109.	<i>Ricinus communis</i> L.	Euphorbiaceae	Jada	Seed, leaves	Seed oil is applied locally to relief pain and swelling after insect bite. Paste of the leaf is used for massaging to reduce body swelling and joint pain.
110.	<i>Schleichera oleosa</i> (Lour) Oken	Sapindaceae	Kusum	Seed	Massage the seed oil on joints to prevent rheumatism.
111.	<i>Selaginella rupestris</i> (L.) Spreng	Selaginellaceae	Tirupati	Whole plant	Prepare the whole plant paste with rice water and is used to prevent leucorrhoea.
112.	<i>Sesamum indicum</i> L.	Pedaliaceae	Rasi	Seed	Sesame oil massage on your scalp and hair to help reduce dandruff. The oil is also helps to reduce pain relief.
113.	<i>Sesbania sesban</i> (L.) Merr.	Fabaceae	Jayanti	Bark	A cup of bark decoction or leaf decoction is given thrice daily for a month.
114.	<i>Shorea robusta</i> Roth.	Dipterocarpaceae	Shargi	Resin	This plant resin is mixed oil of <i>R. communis</i> and apply on cuts to prevent foot crack.
115.	<i>Sida cordifolia</i> L.	Malvaceae	Bajramuli	Whole plant, Root	Whole plant of <i>S. cordifolia</i> and <i>W. somnifera</i> oil is mixed and massaged on affected area to prevent paraplegia. 4 to 6 gm of root powder of both <i>A. racemosus</i> and <i>S. cordifolia</i> used three times per day to prevent throat disorder.

116.	Smilax zeylanica L.	Smilacaceae	Mutri	Twig	Prepare a powder of Dry root, P. longum and P. nigrum and is used two times daily to prevent infertility.
117.	Solanum indicum Linn.	Solanaceae	Dengabhejri	Root, Leaf	Mix 2 gm of root powder along curd for 9 to 10 day to treat sprue. Mix 2 tsp of leaf juice along a tsp of honey is used to prevent fever.
118.	Solanum nigrum L.	Solanaceae	Bhejri	Whole plant	Paste of whole plant is used to reduce chest pain.
119.	Solanum surattense Burm F.	Solanaceae	Kantabhejri	Whole plant	crushed plant juice along honey to prevent fever. The paste of 6 gm of root and 3 seed black pepper is used to prevent measles.
120.	Solanum virginianum L.	Solanaceae	Bhejibaigan	Whole plant	Smoke the dried plant powder to prevent toothache. Mix the dried plant powder with turmeric and is eaten to reduce cough.
121.	Soymida febrifuga (Roxb) A. Juss	Meliaceae	Raen	Stem bark	Boil stem bark paste in coconut oil till it looks black, filtrate oil after cooling and massage on forehead to reduce insanity. Knot the boiled stem bark in a cotton and apply externally to prevent rheumatism.
122.	Sphaeranthus indicus L.	Asteraceae	Bhuikadam	Bark	Powder of bark is eaten and also applied to prevent piles.

					Seed and root powder is eaten to destroy worms in children.
123.	<i>Streblus asper</i> Lours	Moraceae	Sahada	Stem bark, Root	Paste of root mixed with curd and is eaten to reduce stomach pain.
124.	<i>Strychnos nux-vomica</i> L.	Loganiaceae	Kochila	Root, bark	Paste of root is applied externally in snakebite. Infusion of bark is taken in epilepsy.
125.	<i>Syzygium cumini</i> (L.)	Myrtaceae	Jambakoli	Fruit, stem bark	Stomach ache and digestive troubles are cured by using ripe fruit juice Mix 35-40 ml of stem bark juice with curd (1:2) and eaten for curing diarrhoea.
126.	<i>Tagetes erecta</i> L.	Asteraceae	Mandaful	Leaves ,inflorescence	Apply the leaf juice on boils and carbuncles to reduce pain. inflorescence decoction is used as an antipyretic drug.
127.	<i>Tamarindus indica</i> L.	Caesalpinia- eae	Tetli	Fruit, Leaves	Mix the fruit pulp with water and salt then give it to cattle to prevent fever and dysentery. The paste of leaves is used as poultice and applied on boils for easy bursting.
128.	<i>Tephrosia purpurea</i> (L.) Pers.	Fabaceae	Paharagacha	Whole plant, Root	Plant juice is eaten to treat acidity and joint pain. Crush a piece of root with teeth and kept for some time to reduce toothache.
129.	<i>Terminalia alata</i> Heyne ex Rath.	Combretacea e	Asan	Bark, leaves	Mix the Bark ash with sesamum oil and is applied to prevent itches. Paste 2-3 fresh leaves and eat three

					times per day to prevent vomiting and loose motion.
130.	Terminalia arjuna (Roxb.) Wight & Arn.	Combretaceae	Arjuna	Bark ,Leaves	Pour the leaf juice into the nostril to reduce headache. Prepare a paste of Stem bark with black pepper powder is to cure dysentery.
131.	Terminalia bellerica (Gaertn.) Roxb.	Combretaceae	Beheda	Seed, fruit	Prepare Paste of seed along honey to prevent eye disease. The fruit juice is used with honey to prevent diarrhoea.
132.	Terminalia chebula Retz.	Combretaceae	Harda	Fruit	Chew 2 gm dried fruit of Terminalia chebula at night to cure asthma. Consume 1 fruit per a day with salt to cure constipation.
133.	Terminalia tomentosa(Dc)W & A	Combretaceae	Sahaja	Bark	Aliquots of 20-30 ml of bark juice is taken three times till the symptom disappears to prevent epilepsy. Extracted seed oil is used to reduce joint pain.
134.	Thysanolaena maxima (Roxb.) Kuntze	Poaceae	Phulachanchuni	Root	Apply the root paste on boils to dry the pus and quick healing.
135.	Tinospora cordifolia (Thunb.) Miers	Menispermaceae	Gulchi lata	Root, Leaves	Root powder is used to prevent dysmenorrhoea. Leaf juice is used to prevent jaundice.

136.	Trachyspermum ammi (L.) Sprague ex Turrill	Apiaceae	Juani	Leaf, Seed	Leaf juice with honey is consumed by children and infants weekly to boost their resistance power against illness and also helps to cure cold cough. Carom seeds is mixed with a pinch of common salt. Take 1 tsp of this mixture with cup of lukewarm water sip by sip to reduce stomach ache.
137.	Tribulus terrestris L.	Zygophyllaceae	Gokhur	whole plant,root	Prepare a paste of Same amount of whole plant of T. terrestris, S. surrantense and C. aromaticus along with milk and the paste is eaten to check miscarriage. Same amount of Roots with rhizomes of Z. officinalis are crushed to powder and 5gm of the powder is given two times daily to reduce waist pain.
138.	Trichodesma indicum L.	Boraginaceae	Hetamund	Leaves	leaf paste is applied to prevent skin disease. A paste of leaves and coconut oil is prepared and is applied on the affected areas to prevent insect bites.
139.	Trichosanthes bracteata Lam.	Cucurbitaceae	Mahakal	Root, leaves	leaf smoke is inhaled to prevent asthma. Root paste processed in cow urine is used for hair falling due to infection and regeneration of new hair.
140.	Tridax procumbens L.	Asteraceae	Bishalya karani	Root	Decoction of root is used in diarrhoea and stomachache. Leaves are applied externally in

					ringworm.
141.	Trigonella foenum-granum L.	Fabaceae	Methi	Seed	<p>½ tsp of seed is boiled in cup of water, strain, drink every day to prevent indigestion problems.</p> <p>Prepare a paste of Soaked 2 tablespoons seeds of overnight and is applied it on the roots of hair and for 20 minutes for hair growth.</p>
142.	Vitex negundo L.	Verbenaceae	Nirgundi	Leaves, Whole plant	<p>Knot the Fried Leaves in a cotton and give a warm massage on joint to reduce rheumatism.</p> <p>Whole plant decoction is used as three times per day to prevent asthma.</p>
143.	Vitis auriculata (Roxb.) Wall.	Vitaceae	Dumalaha	Rhizome	A paste of Rhizome with rhizome of costus speciosus is prepared and eaten to reduce rheumatism.
144.	Vitis quadrangularis wall cat.	Vitaceae	Hadasangad	Stem, leaves	<p>Paste of Stem is eaten with cow milk to prevent piles.</p> <p>20 ml of juice of stems and leaf, along with honey is used two times per day to prevent menstrual disorders.</p>
145.	Woodfordia fruticosa (L.) Kurz	Lythraceae	Dhatu	Flower, seed	<p>Prepare a powder of 2 gm of sun dried flowers and is eaten with honey for curing cough.</p> <p>Take 2 to 3 pinches of dried seed powder with milk twice a day to cure menstrual disorders.</p>
145.	Zingiber officinale	Zingiberaceae	Ada	Rhizome	Ginger is used nutritionally in cooking and treatment of nausea and vomiting.

	Roscoe.				The combination of hot water, slices of ginger, lemon and honey remedy is used to cure cough.
147.	Ziziphus mauritiana Lam.	Rhamnaceae	Barakoli	Leaf	2 to 3 young leaf with leaf bud is given thrice daily for 5 days to cure cough.
148.	Ziziphus oenoplia (L.)Mill	Rhamnaceae	Kantekoli	Leaves , Root	2 cm long root with 21 black peppers is eaten to prevent rheumatism.
149.	Withania somnifera	Solanaceae	Ashwagandha	Root	Take ¼ - ½ teaspoon of ashwagandha root powder along with ghee, sugar and honey daily for a month once or twice a day to improve sperm quality
150.	<i>Curcuma amada-amada</i> Roxb.	Zingiberaceae	Amba ada	Rhizome	Prepare a paste of rhizome and 200 gm bark of Moringa oleifera is used to cure arthritis. The paste of r Rhizome- is applied to reduce skin diseases.

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Discussion

In the modern healthcare system ~~Ethnomedicinal~~ ethnomedicinal plants are used, from the accumulated knowledge on folk medicines of different sources, worldwide. 21,000 plant species available around the world according to WHO, which are used in the primary healthcare systems [16]. Among 60,000 flowering plants in India, in ethno medicine or folk-medicine 3,000 plants are to be used out of about 1,500 plants of Ayurveda, Unani and Siddho system. In Pharmacological studies More than Seven hundred plants are investigated and chemically used in modern remedial system [17]. It is specially touching that, regular incidences of terrifying natural and often induced devastation induced forest fire is the cause insurmountable of loss of vegetation. at the forest-agriculture Thus, on ex-situ preservation of rare plants it is needed to record the ethnobotanical data of aged people. The forest-agriculture is need to develop a viable module of soil conservation and shifting cultivation in this nation. Especially that the Niyamagiri hill of Kalahandi district which is a huge store of bauxite ore with a promise for an initiated industrial development, which is rich in flora and fauna of the hill area along with unoccupied aborigines, they are fit together with nature in all aspect of their lives. Medicinal plants are present in many regions of Odisha and in India to supply the several plant-based pharmaceutical companies. The protection and preservation of forest possessions are essential due to so many unique plants of Odisha state are supplied for medicinal and other purposes. This document was recorded from aged and old aborigines for current rate of deforestation and the concerned loss of biodiversity.

Comment [A16]: discussion must be relevant and to the point

Comment [A17]: The author can discuss 150 species that have been obtained in terms of the abundance of the most abundant families found, why, whether the habitat conditions support the family to grow, so that diversity is very high. The author can also discuss the parts of the organs in plants that are most widely used. The author can compare the data obtained with previous data from other researchers, explain the similarities and differences between the research and previous research, whether the results of this study have also answered the research objectives, as well as the uniqueness of this study, is the new location related to the ecohabitat of new/endemic species? new methods or become a reference to produce new products in the world of health?

From the different parts of the world the first categories of plant-drugs are simple crude extracts and also recorded in the literature of folklore medicines. [18]. The scientists and elites collaboratively studied for appraisal but some are so popular and are used by the leading mass without any assessment, e.g. the use of clove (*Syzygium aromaticum*) as a anti-cough, which used in India. As we know that the benefits of making plant based medicines are relatively safe, cheaper having no side effects on body as compared to chemical one, as pure chemical medicines have bad side effects on health. None the less phytochemicals also have both known and unknown toxic effects on the human body. It could be noted that many similar plants and their uses against many diseases is frequently used by Indian rural Tribals, which must have been lost due to rapid modernisation. Anyhow ethnomedicinal study is the base of all further research work. There is the need of further pharmacological investigation of the traditional prescriptions used by the traditional healers to prove their safety and efficacy for the treatment of many ailments. It is required to develop sustainable conservation plan for the medicinal plants which are becoming threat because of the biological, ecological and social pressure. As per the literature from different parts of the world, the first categories of plant-drugs are simple crude extracts. Scientifically these extracts needs proper validation. Still there is a number of herbal drugs are in practice, which need scientific authentication through biochemical analysis, clinical trials and other laid down parameters [19].

CONCLUSION

The present study consists of 150 plants species were collected from Niyamagiri hill region of Kalahandi district, Odisha. All plants are rich in different medicinal properties like healing, therapeutic properties. It is found that still a large number of tribal people are using their traditional knowledge and culture and have adopted herbal therapy for most of the diseases because of strong belief on the local practitioners as they are far away from today's modern medical facilities. They use medicinal plants so intelligently with knowing their medicinal properties, their preparation, their storage and how to administer different dose with great efficiency against kinds of ailment. It is found from above discussion that the use of herbal therapy, their advantages, side effects and other details almost have traditional values with the previous workers with a little difference. The efficiency and safety of all the listed ethno-medicinal plants needs to be evaluated for phytochemical and pharmacological studies.

NOTE:

The study highlights the efficacy of "herbal" which is an ancient tradition, used in some parts of India. This ancient concept should be carefully evaluated in the light of modern medical science and can be utilized partially if found suitable.

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