Ethnomedicine and Traditional Health Care System of a Particular Vulnerable Tribal Group in India: Application of Plant Extracts

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Research

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Abstract

Background

The exploration on association of between human and nature has made conceivable to comprehend the undercurrent lifestyle of the communities and the ecosystem in which they inhabit together. Over the last decade there has been a rise of ethnomedicinal studies, still small is known about use of ethnomedicine in traditional health care system of the *Juang*, which is one of the 75 particularly vulnerable tribal groups (PVTGs) in India. Traditional system is unique and undeniably an important cultural ingredient. The aim of the present study was to document the ethnomedicinal practices of the *Juang*, who live in forest fringes and hill tracks and derive their livelihood from forest-based resources. They used varieties of plant extracts, traditional knowledge and belief system for treatment as well as prevention of from various disease and ailments.

Methods

Besides questionnaire as a tool for data collection, Interview, observation (both participant and non-participant observation) and focus group discussion (FGD) were used. Field surveys were carried out in three phases. The informants were selected through the snowball sampling technique. Twelve males and two females key informants were interviewed. The study was exploratory and qualitative in nature.

Results

It was found that 38 medicinal plant species belong to 26 families as having ethnomedicinal uses in the traditional health care practice among the *Juang* community. Comparatively leaf part (36%) frequently utilized followed by root (21%), seed (7%), bark (7%), fruit (6%), rootstock (4%) and tender twig (3%) for medicinal purposes.

Conclusions

Our study can be concluded that the *Juang* people are rich in indigenous knowledge and have provided novel information on the use of medicinal plants to cure, protect and prevent from various diseases and ailments, that are scientific in nature. The novel information has been generated in the present study which will through a light in the direction of modern medical science for the sustainability of human society and recognize the indigenous knowledge as well. We suggested that indigenous knowledge need to be documented and integrated with scientific knowledge to develop new health care management programme.

Background

The enquiry to understand the source and causes of any disease is an important health enquiry among the indigenous communities. Finding to this enquiry is thus important for prevention as well as cure through best possible use of knowledge and rationality is important practice among the forest-based communities and hill dwellers. Understanding of these practices in the context of cross-culture, is called “ethnomedicine” which also hold significance to modern health sciences, biology and the social sciences. Over the years, researches on ethnomedicine have originated new thoughts and applied their domain of knowledge to modern health sciences. The prime concern of ethnomedicine is the existing relationship between disease and environment (human adaptation and socio-cultural behavior), that how peoples of different racial groups look into the diseases and illness towards prevention and cure on the cultural and social organization perspective [1]. Ethnomedicine as specialization can be applied to examine the contemporary issues that has relevance to the biomedical system, as it elucidates how people of different cultural background deals with sickness and its consequence. The contemporary social issues help to understand: i) the effects of environmental factors on human physiologic functions [2], ii) etiological mechanisms of rare and isolated diseases [3], iii) pharmacologic influences of plants, herbs, and other medicines used by a native people [4] and iv) the role of symbols and persuasion in medical healing and in behavioral change [5, 6]. It is believed that ethnomedicine can be utilized to prevent and control the consequence of disease and illness in a more rational way.

Ethnomedicine is a sub-field of medical anthropology that focuses on the nature and effects of diseases and illness. It is conceived by the natives, their own method and criteria for classifying disease, cure and cause, types of therapists and healers who seek to alleviate illness and their skills and social roles, preventive measures, the relationship between medicine and religion, cultural aspects of medicine [7]. Ethnomedicine refers to beliefs and practices relating to diseases which are the products of indigenous cultural development and are not derived from the conceptual frame work of modern medicine [8]. The practice of ethnomedicine is based on the traditional knowledge and belief system by using wide range of plant species extracts, for prevention as well as treatment of many disease and ailments. Since ancient time, use of traditional knowledge for ethno medicine in India has been documented [9]. It is reported that there are more than 43% [10] and 50000 [11] of the total angiosperms or flowering plants have been used for medicinal purpose in India, where as there are 4,22,000 angiosperms reported throughout the globe [12].

Documentation of traditional knowledge on health care practices has directed the discovery of various kinds of valuable drugs used in the modern society [13–16]. Even now-a-day, in developing nations approximately 80% of the population dependant on the ethno-medicine are seeking for health care [17]. The concept of ethnomedicine according to *Raji* (a primitive tribe of Uttaranchal, India) is any deformities or disorder found on the body including delivery complications, boils, injuries that make a person incapable for performing normal activities is called diseases or illness. And they are consulting the local healer or folk medicine man known as *ojha* at the time of illness [18]. The utilization of ethnomedical system is predominantly prevalent among the *Bhangalis* (a tribe in western Himalya, Himachal Pradesh, India), which is clearly elucidated from the local saying that “a person cannot be died or succumb to disease in a region where medicinal plants such as *Vitex negundo*, *Adhatoda vasica*, *Acorus calamus*,

Terminalia chebula, *Terminalia bellerica*, *Emblica officinalis* and *Tinospora cordifolia* are available for treatment” [19]. Every culture has its own belief, faith and practices concerning disease [20]. It is widely believed among tribal communities that, supernatural proxies or metaphysical entities are root cause of the disease or any deformities of health condition in any kind. They believe that, there are many more types of supernatural power exist, among which three major kind of supernatural power are influencing the health status of the tribes in different ways. These are as follows: i) Benevolent spirit, ii) malevolent spirit and iii) ancestral spirit. The benevolent spirits are worshiped regularly in the family as well as at the community level; else it can cause death, disease or any physical injuries [21]. Secondly, the evil spirits who are controlling fever, abortion, small pox, etc. are worshiped as malevolent spirits [22]. And finally, genealogically inherited spirits from their ancestors, who are protecting them always in each and every adverse situation, are worshiped as ancestral spirit or protective spirit [23, 24]. The feasibility and accessibility to avail the modern health care system among the tribal will determine the magnitude of acceptance rate of a particular health care system. And, tribal communities are stimulating indigenous knowledge for treatment by putting the value on religious or supernatural power with respect to ethnomedical system.

However, organized studies in this direction were initiated off late have been recognized and the studies on such issues of ethnomedicine are gaining popularity. Unfortunately researches on ethnomedicine in Odisha with tribal population above one-fifth of total population did not pay much attention in this regard at the same time. Despite vast pool of resource available through ethnomedicine using plant and animal extracts among tribes in Odisha, there is hardly any literature on such vast resource pool available and also, there is lack of documentation of this practice in the state. Ethnomedicine which is associated with science (wisdom), culture and society has great potential to address common health concerns of the community. Ethnomedicine and traditional health care practices as alternative means to modern health care practices remain important among the *Juangs* who find it difficult to access modern health care facilities due to various social, cultural, geographical and economic constraints. It is important we must protect the indigenous knowledge system before it goes vanish due to cultural transition, integration and assimilation. Our possessiveness to modern medicine and ignorance to traditional wisdom and ethnomedicine may eventually lead to extinction of traditional health care as an alternative practice.

Keeping this in view, the present study was a modest attempt to examine the nature and application of plant extracts by the *Juang* tribe in Odisha as a part of the study concerning ethnomedicine.

Methodology

The ethnomedicinal survey was conducted among the *Juang* tribes in Gonasika area of Keonjhar district. This study is exploratory and qualitative in nature. Field surveys were carried out in three phases during 2019. In the first phase a pilot survey was conducted to establish the rapport and identifying the key resource persons to understand their dialect. Main survey was carried out for a period of three months, i.e., one month in each season of the year that includes summer, rainy and winter season so as to collect more information related to health and traditional health care practices. In the end, a short field visit was

carried out to cross check the information gathered during the earlier visits and also to ascertain the correct identity of plants and their distribution. The informants were selected through the snowball sampling technique that included traditional healers as well as elderly men and women having involved in this practice since childhood. The members are considered as repository of health wisdom and effective users of flora and fauna to cure various diseases. Twelve males and two females key informants were interviewed after getting verbal consent from them for the collection of data about the utilization of ethnomedicine in the traditional health care system. The traditional healers or the tribal medicine men who use the ethnomedicine are locally known as “*Vaidas*”. Besides questionnaire as a tool for data collection, Interview, observation (both participant and non-participant observation) and focus group discussion (FGD) were used to cross check the collected information. Information about the plants (local name of plants, parts of plant used, method of preparation of herbal medicine, dosage and uses to cure different ailments and diseases were recorded during the field study. A comprehensive report has been generated with regard to the use of medicinal plants for the traditional health care system among the *Juangs* with a modest sample size of 38 plant species that belongs to 26 families.

Geographical Setting

The Keonjhar district lies between 21.1¹ to 22.1¹ N latitude and 85.11¹ to 86.22¹ E longitude which is situated in the province of Odisha that represents a panorama of millennia from both anthropological and geographical context. This district is spreading over an area of 8,240 sq. km, with vast area under lush green forest, numerous waterfalls, roaring gorges, mountains and minerals. About half of the area is covered by forests i.e. about 4043 sq. km out of which 1838.02 sq km area comes under Reserve Forests. The forests are of northern tropical moist deciduous type. The district is situated at an elevation of 1200 m above the MSL due to which the district has a cool climate. But extensive deforestation and lack of vegetation cover due to large scale of mining activities the climatic conditions are changing drastically and the coolness is displaced by hot summers with high humidity, but the winter is remarkably cooler. Three months from March to May make the hot summer months. The maximum temperature goes up to 41 °C. Monsoon starts in June and lasts till September bringing very erratic rainfall.

Topographically the district can be broadly divided into three divisions namely: i) Plain regions of Baitarani river belt, ii) Hilly region of *Juangpirh* and *Bhuinyapirh*, and iii) Mountain regions of western and northern part. Agriculturally the district is undeveloped as it is mostly rain fed and drought prevails most of the year. Paddy is the major crop grown in the district.

People Under Study

The Odisha province has a total of sixty two (62) distinct tribal communities (referred as indigenous people) out of which thirteen (13) tribes known as “Particularly Vulnerable Tribal Groups” (PVTGs) with diversified socio-cultural background and this diversity provides ample scope for anthropological studies. Out of 13 PVTGs, *Juang* community is one among them and predominantly densely inhabits in Keonjhar

district. In the Keonjhar district, there are two Integrated Tribal Development Agency (ITDA) has been working under the aegis of Tribal Ministry Govt. of India. One ITDA is situated at Keonjhar which includes seven blocks such as Patna, Ghatgaon, Kendujhar, Saharpada, Harichandanpur, Telkoi and Banspal. And another ITDA is situated at Champua which includes Joda, Champua and Jhumpura block respectively. Besides these two ITDAs, there is a project namely Juang Development Agency (JDA) has been working in the *Juangpirh* with its headquarter at Gonasika.

Results

It has been observed that, since the ancient time human and nature interlinked in many different ways. Though there has been an increase number of studies on ethnomedicine, still there is no record on the exact number of traditional healers in India. Undoubtedly, most of them live in rural areas. These people use different plant parts or even the whole plant for the ethnomedicinal purpose through using the indigenous knowledge that plays a vital role in the traditional health care system. The study explores that, dependence on plants and animals extracts still exists and about 25% drugs components derived from angiospermic plants [25, 26]. It was found that, indigenous knowledge on the utilization of medicinal plants for the traditional health care system seems to not be confined among the *vaidas* or so-called traditional healers, where as it is spread across elderly people, *Shaman*, village headman of the tribal community as well. It is vividly observed that, younger generations are not much interested about utilization of ethnomedicine for traditional health care system in the contemporary scenario, which might be the one of consequence of rapid industrialization, migration to cities, and access to technology and social media about the contemporary social issues. The report of the finding represents a total of 38 plant species belongs to 26 families as having ethnomedicinal uses in the traditional health care practice among the *Juang* community. The following information was provided for each species, like vernacular name, scientific name, uses in treatment of disease, dosage and plant parts used in table 1. In all, from the study area the *Juang* community uses 38 plants for treating various diseases, out of which highest number of plants belong to tree followed by herb, shrub and small tree as shown in Fig. 2.

In most of the cases, comparatively leaf part of the plants utilized frequently for medicinal purposes followed by root, seed, bark, fruit, rootstock, tender twig where as stem, flower, whole plant, inflorescence, prop root, tuber, anther, root bark, Petals and latex are less utilized as shown in Fig. 3.

These medicinal plants were used for treating the common ailments such as cold, cough, fever, stomach ache, head ache, wound, burn, skin disease dysentery etc. At the same time the medicinal plants were utilized to cure various highly complex diseases like malaria, diabetes, jaundice, and asthma, as well as male and female disorders included (Fig. 4).

The mode of preparation and administration of the medicinal plants were of various kind of form that included paste, juice, powder, oil, crushed, concentrated liquor and whole plant extract. It was found that some plants were used in more than one form of mode of preparation. In many cases it has been observed that a single plant is utilized for treating many different types of diseases and the pellet

constitutes a combination of a number of plants and different part of plants. The ingredients of the pellet were in combination of different plant and animal extracts, and some minerals, oil, milk, salt etc. or used singly either. These medicines were prepared using different methods which includes roasting, frying and drying in the sunlight and boiling with water and crushing with specifically tools. Sometimes the traditional healers have to go into the dense forest passing through narrow passages on hills and plains for collection of the medicinal plants, however, majority of the medicinal plants are found in the forests nearby their settlements.

Table 1

Medicinal plants used for treatment of various diseases.

Sl.No	Vernacular Name_Odia	Vernacular Name_English	Scientific Name	Uses	Dosage
1	Kaincha	Crab's eye	<i>Abrus precatorius</i>	To cure leucorrhoea	About 20 mg. of dry leaf powder is taken with cold water once daily for about 15 days
				For rheumatic pain	Freshly prepared and gently warmed leaf paste along with mustard oil is applied on the affected part
				For abortion in early stage of conception	About 10 mg. of juice extract from seeds is taken orally twice daily for 2–3 days
2	Apamaranga	Prickly Chaff Flower	<i>Achyranthes aspera</i>	For easy delivery	About 20 mg. of leaf juice is administered orally to the pregnant woman
				To stop bleeding from the gum	Stem juice is applied on the root of the teeth
				To cure fever	Leaves and inflorescence are boiled and the decoction is taken twice daily
				To cure boils in their early stage	Root or leaf paste is applied
3	Bacha	Sweet Flag	<i>Acorus calamus</i>	To cure asthma	About a half teaspoonful of powder prepared from dried rootstocks is taken twice daily
				To increase appetite	Half teaspoonful of rootstocks powder is taken in empty stomach once in morning
				For the treatment of dysentery	Freshly crushed rootstocks are chewed

Sl.No	Vernacular Name_Odia	Vernacular Name_English	Scientific Name	Uses	Dosage
4	Bela	Bael tree	<i>Aegle marmelos</i>	To cure severe gastritis	Two or three fresh leaves are chewed daily in empty stomach
				To reduce blood sugar level	
				To cure injuries due to burn	Leaf paste is applied in the affected part
5	Bhuineem	Green chiretta	<i>Andrographis paniculata</i>	Use for treatment of abdominal pain	10 ml leaf juice is prescribed twice a day for 5 days against colic pain.
6	Massania		<i>Aporosa octandra</i>	To get relief from stomach pain and frequent loose motion/ Dysentery	Juice of two leaves is taken in empty stomach.
7	Hinjal		<i>Barringtonia acutangula</i>	To cure diarrhoea	Stem bark decoction 2 tsp. is drunk twice a day for 3 days against diarrhoea
8	Siali	Camel's foot climber	<i>Bauhinia vahlii</i>	For the treatment of diabetes	Seed decoction (10 ml.) is taken twice daily in empty stomach
				To cure diarrhoea	About 20 mg. of dried seed powder is taken orally along with water
				To cure pimples on the face	Leaf paste is applied
9	Simili	Red Silk Cotton Tree	<i>Bombax ceiba</i>	To get relief from pain due to boils	Fresh roots are grinded with water and applied on the affected parts
				To restore fertility	Paste prepared from fresh root along with sugar candy is taken by females

Sl.No	Vernacular Name_Odia	Vernacular Name_English	Scientific Name	Uses	Dosage
10	Kala Dudura	Devil's trumpet	<i>Datura metel</i>	For the treatment of hearing loss and to get relief from ear pain.	Fruit and leaves are deep fried in mustard oil and 3 drops of oil is dropped once in a day.
11	Salia Baunsa	Solid Bamboo	<i>Dendrocalamus strictus</i>	For the treatment of wounds and cuts.	Externally applied the powder prepared from leaves and stem bark.
12	Paladhua	Indian coral tree	<i>Erythrina variegata</i>	To relief from headache	Inhaling of well crushed leaves through nostrils
13	Bara	Banyan tree	<i>Ficus benghalensis</i>	For treatment of nocturnal emission and restores vigour and strength in nerves	About 20 ml. of juicy paste prepared from tender tips of prop root is taken in empty stomach once daily for 21 days along with goat milk
14	Gudamari	Gudmani	<i>Gymnema sylvestre</i>	To reduce blood sugar level	Seven fresh leaves are chewed daily in the morning in empty stomach for seven days
15	Anantamula	Indian Sarsaparilla	<i>Hemidesmus indicus</i>	To cure jaundice	About 10 mg. of root paste is taken with coconut water in empty stomach for seven days
				To cure fever	About 10 ml. of leaf juice is taken thrice a day
				To cure rheumatic pain	About 5 mg. of root powder is taken with lukewarm water thrice daily for a period of 21 days
16	Basanga	Justicia	<i>Justicia adhatoda</i>	To cure acute cough and cold	About 20 ml. of leaf decoction taken with honey twice daily in empty stomach for 7–10 days

Sl.No	Vernacular Name_Odia	Vernacular Name_English	Scientific Name	Uses	Dosage
				To get relief from rheumatic pain	Powder made from leaf is taken with warm water once daily for 20 days
17	Mahula	Butter tree	<i>Madhuca indica</i>	To cure burn injuries	Powder obtained from dried leaves is applied
				For treatment of cold and cough	About 20 ml. of flower decoction is taken twice daily for a period of 2 weeks
18	Bagha nakhi	Tiger's claw	<i>Martynia annua</i>	For treatment of spondylitis and rheumatism	Seed oil is externally applied in case of rheumatism and spondylitis
19	Ganga siuli	Night-flowering jasmine	<i>Nyctanthes arbor-tristis</i>	To cure malaria fever	About half glass of bark juice with honey and black pepper is taken in empty stomach once daily at morning for a period of 1 week.
20	Tulsi	Sacred basil	<i>Ocimum sanctum</i>	For treatment of asthma	Leaf juice with honey is taken in empty stomach
				To prevent malaria	3 to 4 fresh leaves are chewed along with honey daily in the morning in empty stomach
				To check excess urination	About 10 ml. of leaf juice is taken in empty stomach for 15 days
21	Karanja	Indian Beech	<i>Pongamia pinnata</i>	To cure pyorrhea	Tender twig is used as tooth brush
				To cure skin disease	Oil extracted from seed is applied on the body
22	Bhuikakharu	Indian kudzu	<i>Pueraria tuberosa</i>	To increase lactation post delivery	Dried tuber powder mixed with dried anthers of <i>Musa paradisiaca</i> is taken once a day for 15 days to increase

Sl.No	Vernacular Name_Odia	Vernacular Name_English	Scientific Name	Uses	lactation after post delivery. Dosage.
23	Kadali	Banana	<i>Musa paradisiaca</i>		
24	Patalagaruda	Rauvolfia	<i>Rauvolfia serpentina</i>	For treatment of snake bite	About 10 ml. of root paste is taken orally
				To cure stomach ache	Bark obtained from root is grinded and about 10 mg. of this paste is taken with cold water
				For the treatment of high blood pressure	About 5 mg. root paste is taken daily in empty stomach for a week
25	Bana kultha	Wild indigo	<i>Tephrosia purpurea</i>	To cure loose motion	Leaf juice mixed with curd is taken to check loose motions
				To get relief from chest pain	Paste prepared from the root is externally applied.
26	Ashoka	Ashoka	<i>Saraca asoca</i>	To cure dysentery	Powder prepared from dried petals of the flower is taken with cold water twice daily in empty stomach
				To cure irregular menstruation and excessive bleeding	About 20 ml. of bark decoction is taken in empty stomach twice daily for about a month
27	Muturi	Muter	<i>Smilax zeylanica</i>	To cure rheumatic pain	About 20 ml. of root decoction is taken for 15 days
				To cure venereal diseases	Paste prepared from root is taken for a week
				For treatment of chronic ulcers	Dried root powder is applied externally.
28	Sahada	Siamese rough bush	<i>Streblus asper</i>	To cure toothache	Regular brushing of teeth by fresh tender twigs

Sl.No	Vernacular Name_Odia	Vernacular Name_English	Scientific Name	Uses	Dosage
				For treatment of dog-bite	Paste prepared from root paste is applied externally.
				To cure eczema	Leaf paste with castor oil (<i>Ricinus communis</i>) is applied
29	Jammukoli	Java plum	<i>Syzygium cumini</i>	To cure dysentery	About 20 ml. of fruit juice is taken once daily in empty stomach
				For treatment of piles	About 10 mg. of dry fruit powder is taken in empty stomach for 7–10 days
30	Harida	Harar	<i>Terminalia chebula</i>	To cure cough	About 1 tsp. of powder prepared from the fruits of harida, bahada and anala with cold water is taken twice daily for a period of 1 week
31	Bahada	Beleric	<i>Terminalia bellirica</i>		
32	Anala	Indian gooseberry	<i>Phyllanthus emblica</i>		
33	Kochila	Strychnine	<i>Strychnos nux-vomica</i>	For the treatment of piles.	Juice prepared from stem bark of <i>Strychnos nux-vomica</i> , onion and root of <i>Cissampelos pareira</i> is taken twice daily after meal for 3 days.
34	Ooli/ Piaja	Onion	<i>Allium cepa</i>		
35	Akala bindhi	Velvetleaf	<i>Cissampelos pareira</i>		
36	Nimba	Neem	<i>Azadirachata indica</i>	To cure scabies	Paste prepared from turmeric and leaf of neem is applied externally twice daily after cleannning up the wounds with bioled neem water.
37	Haldi	Turmeric	<i>Curcuma longa</i>		
38	Pita karuan	Dyer's oleander	<i>Wrightia tinctoria</i>	To cure paralysis	Salve prepared from latex and mustard oil in a ratio of 2:1 is externally applied.

Discussion

The ethnomedicinal knowledge is an important aspect of the traditional health care system, by which tribal communities or the remote area peoples are able to prevent, protect and cure themselves against

the various kind of illness and disease. The present study reported utilization of indigenous knowledge about the medicinal plants to meet the desired needs of the traditional health care practices, which is firmly accepted by the World Health Organization [27, 28] and World Bank [29]. In literature of ancient medicine system of India, which includes *Ayurveda*, *Sidha* and *Unani*: *there is most focus on use of plants and processes for use as medicine. This* has closely relevance with the ethnomedicine that can be elucidated from the present study. The plant species *Hemidesmus indicus* is used for treating jaundice, fever and rheumatic pain by the *Juang* tribes, which is also find prescription in *Ayurveda* for curing skin disease, cough and rheumatism [30]. In others study it was found that *Aconitum heterophyllum* is used by the *Bhangalis* for curing stomach ache finds mention in *Ayurveda* for curing stomach ache and fever. It is one of the main ingredients of "Ativishadi churna", "Chandraprabha vati" and "Amritarishta" *ayurvedic* medicines [31]. Similarly, the plant species *Abrus precatorius* that is used by the *Juang* people to cure leucorrhoea, rheumatic pain and for abortion in early stage of conception, are also found to be used to treat leucoderma, tetanus, and rabies by some communities [32]as well as to treat ailments, such as scratches, sores, and wounds caused by dogs, cats, and mice by other communities [33]. The plant species *Achyranthes aspera* is used for easy delivery, to cure fever, to stop bleeding from the gum and to cure boils in early stage by the *Juangs* which is also used in the treatment of dropsy, rheumatism, stomach problems, cholera, skin diseases and rabies [34, 35]. *Acorus calamus* is another important plant species that has been utilized for the treatment of dysentery, to cure asthma and to increase appetite as well in traditional health care practices among the *Juang* people. In *Ayurveda* it is highly valued as a rejuvenator for the brain and nervous system and as a remedy for digestive disorders [36]. The medicinal plant *Bauhinia vahlii* is used in the treatment of diabetes, to cure diarrhea and for the treatment of pimples on the face trough the indigenous knowledge of the *Juang* people. On the other hand, this plant is also used for various household purposes such as leaf plate, rope etc. *Ficus benghalensis* and *Saraca asoca* plant species play an important role in the treatment of highly rated male and female disorders such as, nocturnal emission and irregular menstruation respectively. At the same time, according to *Ayurveda*, *Ficus benghalensis* is useful in treatment of biliousness, ulcers, erysipelas, vomiting, vaginal complains, fever, inflammations, leprosy, and as per the Unani system of medicine, it is useful in piles, nose-diseases, gonorrhea etc. In *Ayurveda*, *Saraca asoca* is said to be particularly useful for treating a wide range of female reproductive disorders such as irregular painful menstruation and excessive bleeding [37]. The plant species *Smilax zeylanica* is used for the treatment of rheumatic pain, venereal diseases and to cure chronic ulcers in the health care practices among the *Juang* people. In the Indian traditional system of medicine, *Streblus asper* is prescribed for the treatment of diabetes mellitus. Others studies reported this plant is used as an antidiabetic [38], antihepatitis-B [39, 40], antiseptic and astringent [41, 42]. The *Juang* tribes used the *Pueraria tuberosa* medicinal herb to increase lactation post-delivery, finds mention in the Indian system of *Ayurvedic* medicine for the treatment of sexual weakness, contraceptive agent, diuretic and galactagogue, and referred as "*Vidari*" [43]. It is interesting to note that the plant species *Wrightia tinctoria* and *Martynia annua* are used for the treatment of morbidity conditions such as paralysis and spondylosis that could not be found in the literature perused for the Odisha region.

Conclusion

It was reported in the study that the knowledge of ethnomedicinal plant has been orally transferred from one generation to another generation and people are reluctant to disclose their knowledge to the outsiders. This is a kind of knowledge that they believe to have acquired from the blessings of their ancestors through which they are getting highly esteemed rank in the society. A traditional healer said that, compared to him his ancestors knew much better and, in the years, passed by this practice has been diminished. Therefore, in the years ahead this practice may be vanished if not properly taken care. Due to rapid industrialization, migration to cities and strong affinity towards technology and different social media among the youths, the youths are exposed to new culture while posing new threat to traditional health system.

The traditional health care practice is very much associated with belief, rationality, faith, knowledge and practice as per prescribed norms and values to maintain good health and wellbeing of the community people. The application of plant extracts itself expresses their knowledge practiced through great acumen and scientific measures. Specific doses or quantities of plant extracts are prescribed on the basis of generations of experience through trial and error method. Although this use of plant species and extracts are not practice in Indian society, but many types of plant species used are more or less new. Our findings suggest that the *Juang* people are rich in indigenous knowledge and have provided novel information on the use of medicinal plants to cure, protect and prevent from various diseases and ailments in the contemporary old. The communities like *Juang* rely strongly on the traditional health care practice and depend on the plants for medicinal purposes and which are also based on prevailing cultural practice of the community. The experts understand the local needs, norms and value system, restrictions and taboos well to prescribe any medicine which fall in the ambit of the community culture. Experienced *Vaidyas* are widely respected. The experience shared in the present study will help the readers to understand the value of ethnomedicine in present days. The study will lead interest to study further for expanding traditional wisdom and knowledge system concerning health measures.

Declarations

Ethics approval and consent to participate

This study was approved by the joint collaboration of the Indian Institute of Technology (Indian School of Mines) and Indian Statistical Institute. All interviews were conducted only after oral informed consent was obtained.

Consent for publication

Not applicable.

Availability of data and materials

The dataset supporting the results and conclusions of this article is included within the article (and its table).

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

A.S. conceived the study design, conducted field work, wrote the manuscript. H.B. critically reviewed the manuscript. A.B and all authors reviewed and approved the final manuscript.

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Figures

Figure 1

Map showing study area

Figure 2

Different kind of plants used

Plant Parts Used

Figure 3

Statistics of plant parts used

Figure 4

Number of Plants used for treatment of various diseases