



Original Article

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## ***Traditional Health Practices among the Tribal Belt of Chhattisgarh, India: An Indigenous Knowledge from Indigenous Peoples***

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### **ABSTRACT**

*Ethnomedicinal practices have a great past and are associated with Ayurveda. It is still the best and cheapest medicinal practice among the tribal people. Due to its holistic, the traditional medicine system provides a new research idea. In this study, we connect the uses of traditional medicinal knowledge to local traditional medicine practitioners by using scientific methodology. The ethnomedicinal survey was carried out in three tribal districts of Chhattisgarh, India i.e., Kanker, Bilaspur, and Jashpur, where 125 informants were identified for interview. The demographic details showed the ages, literacy rates, and experience of informants. The Informant consensus factor, use value, and fidelity level were the major scientific tools used to analyze secondary data. Medicinal plants were categorized into 25 groups according to their medicinal uses. Traditional healers have cited 80 medicinal plant species and 41 different plant families. 31 plant species were used to treat skin and stomach-related health issues. Terminalia bellirica Roxb. has a maximum use value (UV) with a 0.99 score. In our study, we found the highest Informant consensus factor (1.0) for the calculus, hematological and urological ailment categories. The parameter fidelity level was found 100% for Andrographis paniculata, Azadirachta indica A. Juss., Curcuma caesia, Madhuca indica G mel., Terminalia bellirica Roxb. Terminalia chebula, Zingiber officinale Rosc. in this study. we found 79 informants gained indigenous knowledge through vertical transmission.*

**Key words:** *Indian traditional medicine system, Traditional healer, Ethnomedicine, Pharmacognosy, Indigenous knowledge*

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### **INTRODUCTION**

Human beings depend on natural products since the time of civilization. Ancient human societies had a good understanding of the importance of medicinal plants [1]. The use of medicinal plants has a glorious history in the context of India. The unique collection of medicinal knowledge like Ayurveda originated in India 5000 years B.C. and spread all over the world [2]. Today the whole world knows the importance of Ayurveda [3]. Even today, there are some ethnic groups in India serving the tradition of Ayurveda in the far-flung forests. These ethnic communities are successfully flourishing the traditional medicinal knowledge and passing this legacy from one generation to another [4]. The traditional medicinal systems become more important when modern health facilities are out of reach to local people due to improper management [5]. Indian traditional medicine has a great past [6]. Modern drug discovery is based on natural products prepared with herbs. Different drug research centers are using herbs on a large scale [2]. The rural population depends on the indigenous system due to its easy accessibility, cost-effectiveness, higher acceptability, and well-known biomedical benefits [4, 7]. The forest biodiversity in India is the largest reservoir of herbal medicine, aromatic, and spices. The state of Chhattisgarh has a great variety of medicinal herbs. The forest zone of Chhattisgarh provides a livelihood to forest and rural dwellers. It produces food, fodder, fuel, herbal medicine, timber, and non-timber products [8].

Forest biodiversity plays an important role in obtaining herbal drugs for traditional healers [9]. There are more than 4,00,000 flowering plant species reported worldwide, where only 52000 species are used as medicine by different pharmaceutical manufacturers, traditional healers, forest dwellers, and local peoples [6]. The scientists and researchers of drug discovery have serious concerns about traditional medicine practices globally [10].

Chhattisgarh state ranks third in the country in terms of forest cover. The recorded total forest area of this state is 55611 km<sup>2</sup>. The forest area covers 41.13% of the total geographical area of the state. Chhattisgarh is divided into three agro-climatic zones i.e., Bastar plateau, Chhattisgarh plain, and Northern hilly area. The districts Bastar, Bilaspur, and Jashpur cover all these agro-climatic zones respectively. There is also a plurality of Baigas and tribal communities in these three districts therefore, the authors have selected these three districts for the study. Further, these areas have never been researched for herbal traditional studies before.

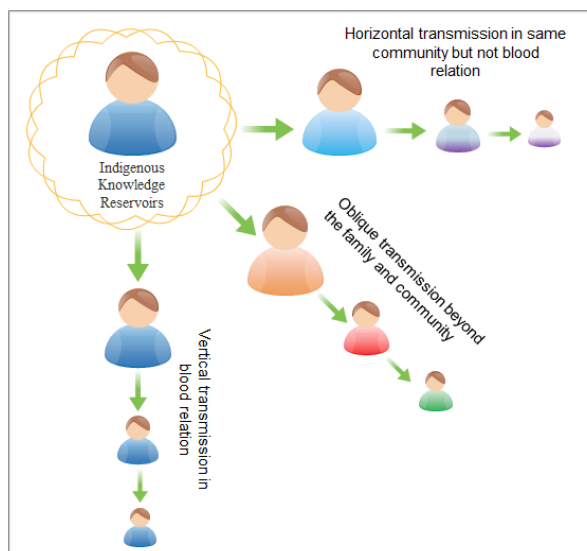
There is much evidence available to prove that modern medicines are derived from traditional medicinal knowledge and the traditional healers who serve society without any expectation [10]. Bacoside A [3-( $\alpha$ -L-arabinopyrrolyl)-O- $\beta$ -D-glucopyranoside, and 20-dihydroxy-16-keto-dammar-24-ene] is a major phytoconstituents of *Bacopa monnieri* used by traditional healers to effectively treat neurological disorders from ancient times [11, 12]. The stem of *Tinospora cordifolia* is one of the miraculous herbs that produce alkaloids, glycosides, diterpenoid lactones, sterols, and aliphatic components which are used to treat a variety of ailments viz., immunity disorders, neurological issues, inflammation, and hypertensive disorders [13]. *Terminalia arjuna* bark has been used for cardiac ailments since ancient times. It is well mentioned in the ancient Indian text Ayurveda [14]. *Hemidesmus indicus* L. is used by the tribal community of central and southern India to treat poisonous bites viz., snakes, scorpions, and dogs. Pharmacological studies proved that 2-hydroxy-4-methoxybenzoic acid (HMBA) and 4-hydroxy-4-methoxybenzaldehyde (MBALD) are the major bioactive compound in *H. indicus* L. It is also used as mosquitocidal, anti-diarrheal, and anti-arthritis in rural areas [15, 16]. Similarly, in Ayurveda, traditional Chinese medicine, and Vietnamese medicine *Andrographis paniculata* was used as an immunity booster thousands of years ago by ancient humans [17]. Furthermore, various reports are showing *Andrographis paniculata* could inhibit viral infection effectively [14]. Valerie Jia-En Sin et. al., (2020) reviewed the 369 articles on erectile dysfunction, where more than 700 plants were found traditionally used as aphrodisiacs and treating erectile dysfunction. *Pausinystalia johimbe*, *Lepidium meyenii*, and *Panax ginseng* have been significantly used by traditional healers and pharmaceutical industries for erectile dysfunction. Recent clinical trials support indigenous knowledge for treating erectile dysfunctions [18]. *Carica papaya* is a very common fruit plant. The fruit pulp and dried seed powder of papaya have traditionally been used as anti-diabetic drugs. Various researchers provided clinical evidence that *C. papaya* significantly reduces blood sugar [19]. *Ficus racemosa* is a common fruit tree in rural India. It has been reported to treat various physiological disorders i.e., stomach problems, urological disorders, burning sensation, piles, diabetes, ulcer, and dysentery [20]. Mostly, it was recommended by traditional healers for regulating digestion. Asiaticoside derived from *Centella asiatica* is used to treat fever and memory enhancement. Commonly dried leaf powder of *Centella asiatica* is used by traditional healers [21]. In-vitro and in-vivo trials found asiaticoside has an effect on the neurological disorder [22].

There is no universal definition for the particular term 'Traditional knowledge.' Different philosophers and researchers may define this term accordingly. Even scholarly literature showed many synonyms for traditional knowledge i.e., Indigenous knowledge (IK), traditional ecological knowledge (TEK), Aboriginal traditional knowledge (ATK), and Local knowledge [23-25]. Despite all, traditional knowledge refers to unique knowledge that connects ethnic communities with their beliefs. Traditional knowledge is flexible, adaptable, and innovative in nature and its carriers are the experts of their locality. Generally, this precious knowledge can only be transferred from one generation to another orally.

A pragmatic study was done by Cavalli-Sforza and Feldman (1981) [26] who proposed three pathways for the transfer of indigenous medicinal knowledge among ethnic groups. First, vertical transmission is supported by knowledge transfer from ancestor to progeny. It is the most common and genuine way to transfer the legacy of indigenous knowledge. The second way of knowledge transfer is horizontal transmission which occurs when knowledge is transferred to closely related individuals, not in blood relations. In this kind of transmission often knowledge remains confined within the particular community. The third way of knowledge transfer is oblique transmission in which knowledge is transferred beyond the ethnic groups. In this kind of knowledge transfer, neither the source reservoir nor receptor is in blood relation or closely related. A random person pursues traditional medicinal practices learned from traditional healers or other sources of knowledge. **Figure 1** elaborates on the flow of indigenous knowledge in ethnic groups. Different alphabets with numbers denoted the new generation of

the groups that successfully transfer the knowledge. Knowledge transmission from one generation to another is a continuous process therefore authors denote  $F_n$ ,  $H_n$ , and  $T_n$  for further generations to connect with the knowledge reservoir.

The present study is an ethnomedicinal investigation of three major tribal districts of Chhattisgarh. The aim of the study is to identify the indigenous peoples who conserve and transfer precious traditional medicinal knowledge through herbal practices and the role of traditional healer community participation in the rural health system.



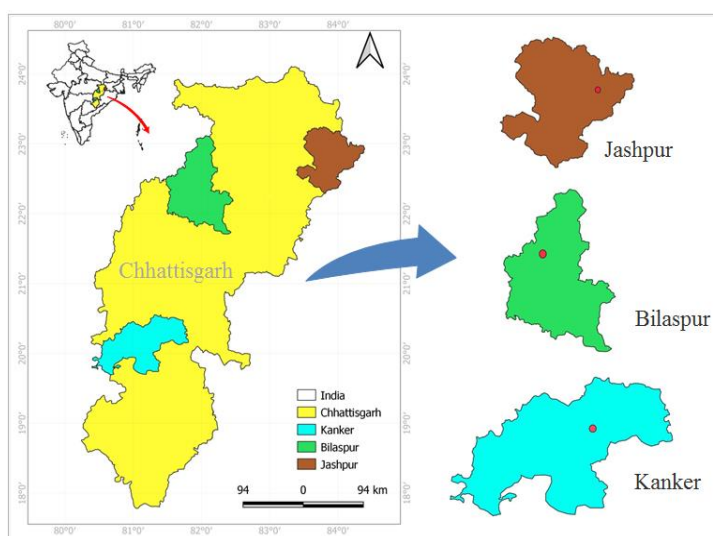
**Figure 1.** Indigenous Knowledge Transmission

## MATERIALS AND METHODS

### Data collection

#### Study area

The studied area is Chhattisgarh, India. The extensive field survey was carried out in three districts of Chhattisgarh, i.e. Kanker (20.06-20.24°N and 80.48-81.48°E), Bilaspur (22.09°N 82.15°E) and Jashpur (22.17-23.15 °N and 83.30-84.24°E) (**Figure 2**). According to the census of 2011, these three districts have 853,793, 3,036,537, and 970,903 populations respectively. As per the tribal population, there are many tribal districts in Chhattisgarh state with the highest tribal population. The climatic condition of the studied area represents the tropical and moist deciduous agro-climatic zone of India where the average temperature is recorded between 27-30 °C. Due to this agro-climatic zone, most of the forest cover is Teak (*Tectona grandis*) and Sal (*Shorea robusta*) forests in this region.



**Figure 2.** Study Area

*Method used*

In total, one hundred twenty-five informants were identified (n=125) who worked as traditional healers throughout the study location. This includes one hundred and four (n=104) male traditional healers and twenty-one females (n=21). The personal interviews were conducted from July 2019 to Jan 2020 with the help of a well-structured questionnaire. A pilot study was conducted to validate the questionnaire before the collection of final data. Chhattisgarhi is the local language of Chhattisgarh state. Most of the conversations have been done in the local language and authors translate gathered information into the standard language.

*Categories*

The collected data was sorted by 25 ailments categories viz., Asthenia, calculus, carcinoma, cardiovascular disorder, dental, diabetes, ear nose throat and eye, fertility disorder, gastroenteritis, gynecology, hepatic disease, hematological issues, hemorrhoids, inflammation, malaria, neurological, orthopedic, poisonous bite, postnatal care, pyrexia, respiratory disorder, skin disorders, stomach problem, urological, and varicella.

*Data interpretation*

Obtained raw survey data was arranged and interpreted according to the following heads i.e., demographic details of informants, medicinal plants and their parts used, botanical descriptions, mode of drug administration used by traditional healers, methods of drug preparation.

*Use value (UV)*

Use Value is numeric data about relatively important plant species used by the informants in the studied area. The UV helps to obtain the most commonly used plant species for a particular ailment. The highest and lowest use value denotes the high and low use report for a particular plant. It was calculated according to Phillips et. al., (1994) [27] described using the following formula:

$$UV = \Sigma U/n \quad (1)$$

Where U is the number of use reports cited by each informant for a given plant species and n is the total number of informants interviewed for a given plant.

*Informant consensus factor (F<sub>ic</sub>)*

The Informant Consensus Factor (F<sub>ic</sub>) is a degree of agreement between the targeted informant's knowledge of the studied area and the applicability of important plants. This parameter is used for the quantitative evaluation of known plants used by different informants. It provides a range value between 0-1. The particular taxa were used by a large number of informants for a similar ailment the value of the informant consensus factor becomes highest. It was calculated by following the formula described by Trotter & Logan (1986) [28].

$$F_{ic} = N_{ur} - N_t / N_{ur} - 1 \quad (2)$$

Where N<sub>ur</sub> is the number of use reports for a particular ailment category and N<sub>t</sub> denote the number of taxa used for a particular ailment category by all informants.

*Fidelity level (FL)*

Fidelity level (FL) was used to determine the most frequently used plant species in a particular study area and that is based on the frequent citation of the particular medicinal plant by listed informants. The higher FL percentage denotes the high use frequency of a particular plant species. Friedman et al. (1986) [29] described the following formula to calculate fidelity level:

$$FL(\%) = N_p / N \times 100 \quad (3)$$

Where N<sub>p</sub> denoted the number of use reports cited by an informant for given species of a particular ailment category and N is the number of informants who have used the plants as a medicine to treat any given disease.

*Data analysis tools*

MS Excel and GraphPad Prism 6.0 open access version were used to calculate quantitative data collected from the informant's interviews.

**RESULTS AND DISCUSSION***Demographic overview and medicinal plant uses*

This study was conducted with 125 traditional healers, who were identified through the pilot survey. The pilot survey helps to identify the initial research tools including questionnaires, rating scales, attitude scales, etc., required on the ground. On the other side, it helps to make a familiar environment with the informants who are the prime elements of this study. **Table 1** represents the demographic data about the study area where 104 male and 21 female informants participated in the interview. 38.4 % of traditional healers belonged to the younger group 20-39 years old. The majority of the traditional healers, 49.6 %, come under the age group of 40-59. The geographically studied area comes under the tribal belt where 24% of the informants were illiterate. Further, the experience status of the informant was 1-15 years for 57 informants, 16-30 years for 38 informants, and above 30 years for 30 informants.

**Table 1.** Demographic Data

Particular	Count	%
<b>Gender</b>		
Male	104	83.2
Female	21	16.8
<b>The age group of informants (in years)</b>		
20-39	48	38.4
40-59	62	49.6
60-80	15	12
<b>Literacy status</b>		
Illiterate	30	24
Elementary	23	18.4
Middle level	27	21.6
High level	26	20.8
Higher level	19	15.2
<b>Experiences status (in years)</b>		
1-15	57	45.6
16-30	38	30.4
Above 30	30	24

The present study recorded 80 medicinal plant species from 41 different families with their local name, habitat, uses in different ailments, drug preparation method, use report, fidelity value, and informant consensus percent [30]. In this study, the most of medicinal plants were belong to Caesaliniaceae, Liliaceae, and Fabaceae families.

*Use categories*

As per the ethnobotanical survey data, the author has broadly classified the medicinal uses of plant species into 25 different groups. The traditional healers in the studied area effectively treat skin disorders, respiratory disorders, stomach, diabetes, and asthenia health issues (**Table 2**). There were 31 plant species used to treat skin and stomach-related health issues. Respiratory issues like asthma, cold, cough, and tuberculosis were treated with 28 plant species followed by diabetes mellitus (18 Species), Asthenia (17 species), Orthopedic (16 species), Gastroenteritis (14 species), Pyrexia (14 species), Poisonous bites (13 species). Some previous studies mention the health status of tribal peoples. The author found that the most frequent health issues reported by the informants were indigestion, constipation, itching, eczema, ringworm, fever, weakness, malaria, jaundice, arthritis, and bone fractures. Our study findings are well supported by previous studies done by different research groups [31-33].

*Use values (UV)*

The maximum use value (UV) was reported for the *Terminalia bellirica* Roxb. (0.99), *Andrographis paniculata* (0.98), *Terminalia chebula* (0.98), *Azadirachta indica* A. Juss. (0.97), *Madhuca indica* Gmel. (0.97), *Terminalia arjuna* Roxb. (0.97), *Zingiber officinale* Rosc. (0.95) and *Curcuma caesia* (0.95). The highest use value was obtained for those medicinal plants which were cited by more than 100 informants. Moreover, the author also listed the least use value of medicinal plants viz., *Centella asiatica* L. (0.03), *Lawsonia inermis* L., (0.04) *Barleria prionitis* L., *Chenopodium album* L., *Pueraria tuberosa* (0.07), *Bacopa monnieri* L. Pennell (0.09), etc. *Terminalia bellirica* Roxb. (0.99) was frequently used for abdominal pain, ulcer, diarrhea, cold & cough, blood pressure, and fever. *Centella asiatica* L. (0.03) found very less citations for fever and a poisonous bite (**Table 3**).

#### Informant consensus factor ( $F_{ic}$ )

Twenty-five different ailment categories were used to calculate the informant consensus factor ( $F_{ic}$ ). The author found  $F_{ic}$  value range from 0.98 to 1.00 where the lowest and highest value denoted a lesser or more agreement between the informant and medicinal plant uses under the described categories respectively. **Table 2** described the detailed information about the informant consensus factor whereas the highest value (1.0) was obtained under the calculus, hematological issues, and urological categories.

**Table 2.** Use Categories and Informant Consensus Factor

Categories	Ailment	Informant Consensus Factor
Asthenia	Weakness or Lack of Energy	0.986
Calculus	A stone-related health issues	1.000
Carcinoma	Cancer	0.994
Cardiovascular disorder	Heart and Blood pressure	0.900
Dental Problem	Toothache, gum, Abscess, Pyorrhea	0.986
Diabetes mellitus	Diabetes, blood sugar	0.989
ENTE	Ear, Nose, Throat, Eye	0.989
Fertility disorder	Gonorrhea, Fertility, STD	0.989
Gastroenteritis	Diarrhea	0.987
Gynecological issues	Menstrual, Pregnancy, Contraception, Leucorrhea	0.988
Hepatic disease	Jaundice, Liver diseases	0.988
Hematological issues	Blood-related issues, immunity, Anemia	1.000
Hemorrhoids	Piles	0.986
Inflammation	Swelling of body parts	0.991
Malaria	Malaria	0.992
Neurological disorder	Brain, Epilepsy, Alzheimer	0.987
Orthopedic	Arthritis, Rheumatoid, Bone fractures, Joints pain	0.986
Poisonous bite	Snake bite, Scorpion bite	0.986
Postnatal care	Care of mother and newborn babies	0.989
Pyrexia	Fever	0.988
Respiratory disorders	Tuberculosis, Asthma, Cold & cough, Pneumonia	0.987
Skin disorders	Itching, Eczema, Ringworm, Leprosy, Wound, Abscess, Scabies	0.986
Stomach problem	Indigestion, Constipation, Intestinal issues	0.985
Urological disorder	Urinary infections	1.000
Varicella	Chicken Pox	0.992

#### Fidelity level (FL)

*Andrographis paniculata*, *Azadirachta indica* A. Juss., *Curcuma caesia*, *Madhuca indica* Gmel., *Terminalia bellirica* Roxb. *Terminalia chebula*, *Zingiber officinale* Rosc. were found at 100% fidelity levels (**Table 3**). The highest FLs plant species were more frequently recommended by traditional healers for treating different kinds of health issues. On the contrary, lower fidelity values denoted a lesser use of recommendations of species for any kind of ailment.

**Table 3.** Use Value (UV) and Fidelity Level (FL)

Family	Botanical Name	Local Name	Habit	Ailments treated	Use value	Fidelity level (%)
Acanthaceae	<i>Adhatosa vasika</i>	Adusa	Shrubs	Tuberculosis, Fever, Asthma.	0.92	92
Acanthaceae	<i>Andrographis paniculata</i>	Kalmegh	Herbs	Malaria, Snake bite, Scorpion. Bite, Diabetes.	0.98	100
Acanthaceae	<i>Barleria prionitis</i> L.	Vajradanti,	Shrubs	Toothache, Wounds	0.07	30
Amaranthaceae	<i>Achyranthes aspera</i> L.	Apamarg	Herbs	Easy Delivery, Pneumonia, Tuberculosis, Itching, Fever, Cough & cold, Abscess, Pyorrhea, Mouth-blisters, Toothache, Indigestion, Cut & Wound, Asthma, Scorpion bite, Snake-bite.	0.68	75
Apiaceae	<i>Centella asiatica</i> L.	Mandupparni	Climber	Fever, Snakebite.	0.03	20
Apocnaceae	<i>Rauwolfia serpentina</i> L.	Sarpghandha	Herbs	Snakebite, Menstrual disorder, Blood pressure, Epilepsy.	0.88	80
Apocynaceae	<i>Catharanthus roseus</i> L.	Sdabahar	Herbs	Diabetes, High blood pressure.	0.84	86
Araceae	<i>Acorus calamus</i> L.	Bach	Herbs	Cough & Cold, Children for clarity of speech, Asthma-, Menstrual disorders, Throat problem, Epilepsy, Weakness.	0.89	90
Asclepiadaceae	<i>Gymnema sylvestre</i> R.Br.	Gudmar	Climber	Piles, Fever, Diabetes, Milk secretion, Snake-bite, Scorpion stings.	0.76	80
Asclepiadaceae	<i>Hemidesmus indicus</i> L.	Ananthamul	Climber	Scabies/Ringworm, Dog bite, Snake bite, Urinary disorders, Milk secretion.	0.55	60
Asteraceae	<i>Anacyclus pyrethrum</i> L.	Akarkara	Herbs	Toothache, Diarrhea, Weakness.	0.36	50
Asteraceae	<i>Emilia sonchifolia</i> L.	Hirankhuri	Herbs	Indigestion, Respiratory troubles, Stomach complaints.	0.2	20
Asteraceae	<i>Sphaeranthus indicus</i> L.	Gorakh Mundi	Herbs	Skin diseases, Piles, Weakness, and Jaundice.	0.52	60
Asteraceae	<i>Xanthium strumarium</i>	Chottaghokuru	Herbs	Tooth ache, Indigestion, Memory.	0.83	83.2
Basellaceae	<i>Basella alba</i> L.	Poi	Herbs	Mouth blisters.	0.17	20
Bixaceae	<i>Bixa orellana</i> L.	Sinduri	Shrubs	Burn treatment, Diarrhea, Epilepsy.	0.32	30
Burseraceae	<i>Commiphora mukul</i>	Guggul	Tree	Asthma, Epilepsy, Diabetes.	0.42	50
Caesalpiniaceae	<i>Bauhinia variegata</i> L.	Kachnar	Tree	Diarrhea, Cough, Tuberculosis.	0.26	30
Caesalpiniaceae	<i>Cassia fistula</i> L.	Amaltash	Tree	Constipation, Gonorrhoea, Rheumatism.	0.39	45
Caesalpiniaceae	<i>Cassia occidentalis</i> L.	Kasoundi	Tree	Snake bites, Rheumatism, Eczema, Fractures, Piles.	0.3	30
Caesalpiniaceae	<i>Cassia tora</i> L.	Charota	Herbs	Diabetes, Ringworm, Easy delivery, Malaria, Blood pressure.	0.89	90
Caesalpiniaceae	<i>Saraca asoca</i>	Ashok	Tree	Menstrual disorder.	0.1	20
Celastraceae	<i>Celastrus Paniculatus</i> Willd.	Malkagni	Shrubs	Rheumatism, Diarrhea, Leprosy, Piles.	0.37	40
Chenopodiaceae	<i>Chenopodium album</i> L.	Bhathua	Herbs	Constipation, Piles, Skin Disorders.	0.07	20
Cleomaceae	<i>Cleome viscosa</i> L.	HulHul	Herbs	Tuberculosis, Wound.	0.07	20
Combretaceae	<i>Terminalia arjuna</i> Roxb.	Arjuna	Tree	Diabetes, Wounds, Headache, Malaria.	0.97	100
Combretaceae	<i>Terminalia bellirica</i> Roxb.	Behera	Tree	Abdominal pain / Vomiting, Ulcer, Diarrhea, Heart ailments, Cough & Cold, Fever.	0.99	100
Combretaceae	<i>Terminalia chebula</i>	Harra	Tree	Indigestion, Scabies, Throat infection, Cough, Bleeding gums.	0.98	100

Convolvulaceae	<i>Cuscuta reflexa</i> Roxb	Amarbel	Shrubs	Diabetes, Fracture, Ringworms, Malaria, Antifertility.	0.71	70
Costaceae	<i>Costus speciosus</i>	Kevukand	Herbs	Headache, Weakness.	0.29	30
Crassulaceae	<i>Bryophyllum pinnatum</i>	Patharchata	Herbs	Fracture	0.6	60
Cucurbitaceae	<i>Citrullus lanatus</i> Nakai	Indrayan	Shrubs	Jaundice, Sunstroke, Tuberculosis.	0.05	20
Cyperaceae	<i>Cyperus rotundus</i> L.	Nagarmotha	Herbs	Arthritis, Scorpion bite, Milk secretion.	0.57	60
Euphorbiaceae	<i>Emblica officinalis</i> Gaertn.	Aonla	Tree	Diabetes, Indigestion, cough, and cold.	0.82	82.4
Euphorbiaceae	<i>Euphorbia hirta</i> L.	Dudhi	Herbs	Milk secretion, Wounds.	0.3	30
Euphorbiaceae	<i>Jatropha curcas</i> L.	Ratanjot	Shrubs	Rheumatism, Menstrual disorder, Toothache.	0.47	50
Fabaceae	<i>Abrus precatorius</i> L.	Ratti Gunja	Climber	Fever, Menstrual disorders, Diabetes, Asthma, Skin diseases, Snakebite, Scorpion bites.	0.48	60
Fabaceae	<i>Butea monosperma</i> (LAM.)	Palas	Tree	Contraception, Leucorrhoea, Indigestion, Gonorrhea, Fracture.	0.71	70
Fabaceae	<i>Clitoria ternatea</i> L.	Aparajita	Climber	Indigestion, Headache.	0.1	20
Fabaceae	<i>Mucuna pruriens</i> L.	Kaunch	Climber	Weakness, Worm infection, Fever, Diabetes.	0.87	90
Fabaceae	<i>Pongamia pinnata</i>	Karanj	Tree	Weakness, Indigestion, Piles.	0.82	50
Fabaceae	<i>Pueraria tuberosa</i>	Pataalkumhda	Herbs	Snake bite, Weakness.	0.07	20
Gentianaceae	<i>Swertia angustifolia</i> Ham.	Chirayata	Herbs	Diabetes.	0.13	20
Lamiaceae	<i>Coleus ambionicus</i> Lour.	Patharchur	Herbs	Stones, Indigestion.	0.17	20
Lamiaceae	<i>Mentha arvensis</i> L.	Pudina	Herbs	Indigestion.	0.7	70
Lamiaceae	<i>Ocimum americanum</i> L.	Van tulsi	Herbs	Piles, Dog bite, Cough and Cold, Skin disease, Malaria, Burns/Cuts/ wounds.	0.75	20
Liliaceae	<i>Aloe vera</i> L. Burm.	Ghikumari	Herbs	Arthritis, Diabetes, Easy delivery-, Burns & wounds.	0.52	50
Liliaceae	<i>Asparagus racemosus</i> Wild.	Satavar	Climber	Weakness, Menstrual disorder, Tuberculosis, Easy delivery, Stomachache.	0.77	80
Liliaceae	<i>Chlorophytum tuberosum</i>	SafedMusli	Herbs	Weakness, Diabetes.	0.5	50
Liliaceae	<i>Crinum latifolium</i> L.	Sudarshan	Herbs	Boils, Blood pressure, Rheumatism, Weakness.	0.56	60
Liliaceae	<i>Curculigo orchioides</i> Gaertn.	Kali musli	Herbs	Weakness, Nose bleeding, Diarrhea.	0.78	80
Liliaceae	<i>Gloriosa superba</i> L.	Kalihari	Climber	Leprosy, Smallpox.	0.34	30
Liliaceae	<i>Smilax zeylanica</i>	Ram Dataun	Climber	Blood pressure.	0.15	20
Loganiaceae	<i>Strychnos potatorum</i> L.	Nirmali	Herbs	Constipation.	0.1	20
Lythraceae	<i>Lawsonia inermis</i> L.	Mehandi	Shrubs	Bleeding gums.	0.04	20
Malvaceae	<i>Abutilon indicum</i> L.	Atibala	Shrubs	Diarrhea, Piles, Dental problems, Fever.	0.36	70
Meliaceae	<i>Azadirachta indica</i> A. Juss.	Neem	Tree	Cough & Cold, Toothache, Malaria, Fever, Tuberculosis, Chicken-pox, Skin diseases.	0.97	100
Menispermaceae	<i>Tinospora cordifolia</i>	Giloy	Climber	Fever, Anemia, Tuberculosis, Wounds, Stomach trouble Indigestion, Scabies, Throat infection, Cough, Bleeding gums.	0.83	85



Mimosaceae	<i>Acacia catechu</i> L. F. Willd.	Khair	Tree	Cancer, Cough and cold, Diarrhea.	0.64	60
Moraceae	<i>Ficus bengalensis</i> L.	Bargad	Tree	Pain, Fracture, Weakness, Diabetes,	0.74	75
Moraceae	<i>Ficus racemosa</i> L.	Gular	Tree	Weakness, Piles, Jaundice, Diarrhea.	0.53	60
Moraceae	<i>Ficus religiosa</i> L.	Pipal	Tree	Weakness, Body pain.	0.73	75
Myrtaceae	<i>Syzygium cumini</i> L.	Jamun	Tree	Diabetes, Wounds, Diarrhea, Asthma.	0.85	90
Nyctaginaceae	<i>Boerhaavia diffusa</i> L.	Punarnava	Herbs	Dog bite, Jaundice, Stomach disorder, Swelling, Headache, Cough, Jaundice.	0.61	60
Papaveraceae	<i>Argemone mexicana</i> L.	Satyanasi	Shrubs	Sunstroke, Regulating fertility, Cough & Cold.	0.43	45
Piperaceae	<i>Piper nigrum</i> L.	Kalimirsch	Climber	Throat problem, Cough & cold, Asthma.	0.47	50
Plumbaginaceae	<i>Plumbago zeylanica</i> L.	Chitrak	Shrubs	Arthritis, Skin diseases, Anemia.	0.39	40
Rutaceae	<i>Aegle marmelos</i> L. Corr.	Bael	Tree	Sunstroke, Ulcer, Fever, Jaundice, Intestinal worms, Diabetes, Wounds, Eye diseases, Diarrhea.	0.65	70
Rutaceae	<i>Murraya koenigii</i> L. SPR.	Mitha Neem	Tree	Scorpion bite, Diabetes.	0.54	60
Rutaceae	<i>Zanthoxylum alatum</i> Roxb	Tejabala	Shrubs	Ulcers, Diarrhea, Intestinal worms, Wound, Indigestion.	0.58	60
Sapotaceae	<i>Madhuca indica</i> Gmel.	Mahua	Herbs	Indigestion, Skin disease, Diabetes.	0.97	100
Sapotaceae	<i>Mimusops elengi</i> L.	Bakul	Tree	Weakness, Diarrhea, Wound, Constipation, Toothache.	0.45	50
Scrophulariaceae	<i>Bacopa monnieri</i> L. Pennell	Brabmbhi	Herbs	Constipation, Fever.	0.09	30
Solanaceae	<i>Datura metel</i> L.	Dhatura	Shrubs	Leprosy, Menstrual disorder, Earache, Asthma, Arthritis.	0.75	80
Solanaceae	<i>Solanum nigrum</i> L.	Makoi	Herbs	Cough, Weakness, Swelling-, Skin disease Asthma, Arthritis.	0.31	30
Solanaceae	<i>Withania somniferan</i> L.	Asgandh	Shrubs	Ear pain, Ulcer, Rheumatism, Weakness, Restore fertility, Skin disease.	0.92	100
Verbenaceae	<i>Clerodendrum serratum</i> L.	Padma	Shrubs	Stomach disorder, Rheumatism, Asthma.	0.03	20
Verbeneceae	<i>Vitex negundo</i> L.	Nirgundi	Shrubs	Menstrual disorders, Headache, Cough & cold, Fever.	0.52	60
Vitaceae	<i>Cissus quadrangularis</i> L.	Hadjod	Climber	Fracture, Indigestion.	0.58	60
Zingiberaceae	<i>Curcuma aromatica</i> Salisb.	Van haldi	Herbs	Cancer, Wound, Indigestion, Cough & Cold.	0.76	80
Zingiberaceae	<i>Curcuma caesia</i>	Kali Haldi	Herbs	Cough & Cold, Fever, Skin diseases, Ringworms, Jaundice.	0.95	100
Zingiberaceae	<i>Zingiber officinale</i> Rosc.	Adarak	Herbs	Jaundice, Cold, Indigestion, Diarrhea, Skin diseases, Blood pressure.	0.95	100

#### Sources of indigenous ethnobotanical knowledge

The study found that 79 informants out of 125 belong to vertical transmission of knowledge. That means 79 traditional healers adopted their traditional occupation and carry precious knowledge from ancestors. These traditional healers are blood relatives and it is the oldest form of indigenous ethnobotanical knowledge transfer. The 30 informants of this study are the results of the horizontal transmission of knowledge. These informants belong to the ethnic communities who work as traditional healers for many years but they are not in direct blood relations. Likewise, 16 traditional healers were not related to any traditional community, therefore, belong to the oblique transmission of indigenous knowledge. They obtained indigenous knowledge from different knowledge reservoirs or community heads.

The ethnomedicinal documentation of traditional medicinal knowledge was conducted in three tribal districts of Chhattisgarh, India. Detailed demographic data represent the current status of traditional healer's ethnic groups. The author also observed that 16.8 % of the informant were women who actively participate in this field. The literacy status was found quite well where only 30 traditional healers were illiterate but effectively treated different ailments with the administration of herbal medicine, the rest of the 95 informants were educated only with primary level schooling. The age of the informant and their experience in the field of ethnomedicinal practices are closely related. Younger traditional healers have less experience as compared to old aged because they have been practicing for many years. More than 30 years of experience were recorded for the 60-80 age group informants. The traditional healers lived around the forest or in forest villages. The forest is the major source as well as a natural habitat to obtain medicinal herbs. The author provides detailed notes on use value, informant consensus factors, and fidelity levels. All the used parameters well defined the ability and agreement among informant and medicinal herbs. The indigenous knowledge transmissions represent the importance of traditional medicinal knowledge in the present time. Very few communities are actively engaged to maintain the uniqueness and purity of ethnic knowledge. Even today it is the first line of choice for rural and forest dwellers as a primary health clinic.

## CONCLUSION

Traditional medicine plays an important role in tribal society. Our study shows that traditional medicine practices using medicinal herb help in treating different ailments in the tribal belt of Chhattisgarh. The local people benefited from this health service effectively. The use value of various medicinal plants in Chhattisgarh, India is well documented in this study. Our study revealed the use value of the medicinal plants which provides a clear picture that the particular plant species are under effective use in traditional medicine practice. Traditional healers are the promising bridge between indigenous medicinal knowledge and the modern drug discovery system. Our study compiles traditional medicinal knowledge from the tribal belt of Chhattisgarh which could provide better insight into drug discovery and the use of medicinal plants for treating diseases. Although, this study concludes that documentation of traditional knowledge is a significant approach to the scientific validation of indigenous intellectual properties. We hope that this research will also help to determine challenges, issues, opportunities, and correlations between indigenous and scientific medicinal knowledge.

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