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Research Article

Ethnobotanical perspectives: conventional fever treatments of the gond tribe

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Abstract: This research explores the traditional medicinal practices of the Gond tribe with a particular emphasis on plant-based treatments for fever. An ethnomedicinal survey was carried out in 18 villages within the Nagri block of Dhamtari District to identify plant species utilized for the treatment of fever and related ailments. Despite the progress of modern medicine, rural populations continue to depend on traditional healers, with around 90% of individuals opting for indigenous remedies. The survey identified more than 60 plant species known for their antipyretic effects, highlighting the region's extensive ethnobotanical diversity. Data was collected from 465 individuals, including 23 traditional healers and 142 patients, encompassing details on plant names, the parts used, preparation methods, dosages, and safety precautions. This study underscores the importance of safeguarding indigenous medicinal knowledge and its potential incorporation into contemporary healthcare systems, particularly in tackling global health issues such as dengue. The results support the need for scientific validation of traditional practices to improve healthcare in rural areas

1. Introduction

Indigenous knowledge is a repository of cultural heritage, encompassing agriculture, medicine, and biodiversity, often expressed through folk art forms like music, dance, crafts, and storytelling. This knowledge evolves with environmental and societal changes, shaping cultural identity [1-4]. It includes traditional practices in agriculture, medicine, and biodiversity, as well as artistic and oral traditions [5-7]. Despite significant advancements in modern medicine, traditional health practices remain vital in rural India, where 90% of the population depends on local practitioners for healthcare [3]. This highlights the enduring relevance of indigenous knowledge in addressing healthcare needs.

1.1 Research Objectives

- Document plant species used by the Gond tribe for fever treatments.
- Analyze preparation methods, dosages, and precautions.
- Assess the integration potential of traditional practices with modern healthcare.

1.2 Background

The accumulated wisdom regarding the medicinal properties of plants—both organic (such as remains of plants and animals) and inorganic (like clay, ash, stone, or shaped wood)—has been preserved over generations. Natural resources are frequently utilized to treat illnesses such as fever, colds, coughs, vomiting, and diarrhea.
In Chhattisgarh, traditional healers and indigenous communities employ a diverse range of native plants to treat fever and related disorders. Ethnobotanical studies have identified over 60 plant species with antipyretic (fever-reducing) properties, although this number continues to grow as new plants are discovered and documented.

1.3 Global Context

The global burden of diseases like dengue has grown significantly in recent decades. According to the World Health Organization (WHO), approximately 390 million people are now at risk of dengue

infection. Reported cases have surged from 505,430 in 2000 to 5.2 million in 2019, underscoring the urgent need for effective treatments.

2. Materials and Methods

An ethnomedicinal survey was conducted in 18 villages within the Nagri block of Dhamtari District, Chhattisgarh. The study aimed to document the indigenous plant species used in treating fever disorders. Data collection included recording the botanical names, plant families, parts used, ethnomedical applications, methods of preparation, dosages, and precautions associated with each plant.

Several ethnomedicinal studies were conducted across 16 villages within the study area. A total of 465 individuals were interviewed, including traditional herbal practitioners [8,9], community leaders, household heads, elderly community members, and patients, irrespective of gender. The participants comprised 300 household members, 23 traditional healers, and 142 patients. Interviews were conducted in local languages to ensure clear communication, and the firsthand information they provided was documented as primary data.

With assistance from traditional healers and knowledgeable elders, plant specimens were collected based on their local names. These specimens were later identified and classified taxonomically for further analysis. Figure 1 is the scatter plot visualizing the distances of villages from Nagri Block in Chhattisgarh, categorized by proximity.

Table 1. *The villages surveyed in Nagri Block, along with their respective distances from the central study area.*

S. No.	Village Name	Distance (km)	Category
1	Damkadeah	1 km	Close Proximity
2	Bhilbhadar	7 km	Close Proximity
3	Kallemeta	9 km	Close Proximity
4	Umargaon	11 km	Medium Distance
5	Lakhanpuri	11 km	Medium Distance
6	Bandha	11 km	Medium Distance
7	Sahnikhar	12 km	Medium Distance
8	Bokrabeda	13 km	Medium Distance
9	Mahuabahra	13 km	Medium Distance
10	Dugali	13 km	Medium Distance
11	Hirrideah	14 km	Medium Distance
12	Panderwahi	14 km	Medium Distance
13	Tangapani	15 km	Medium Distance
14	Palwadi	38 km	Far Distance
15	Khadadah	38 km	Far Distance
16	Karahiyya	45 km	Far Distance

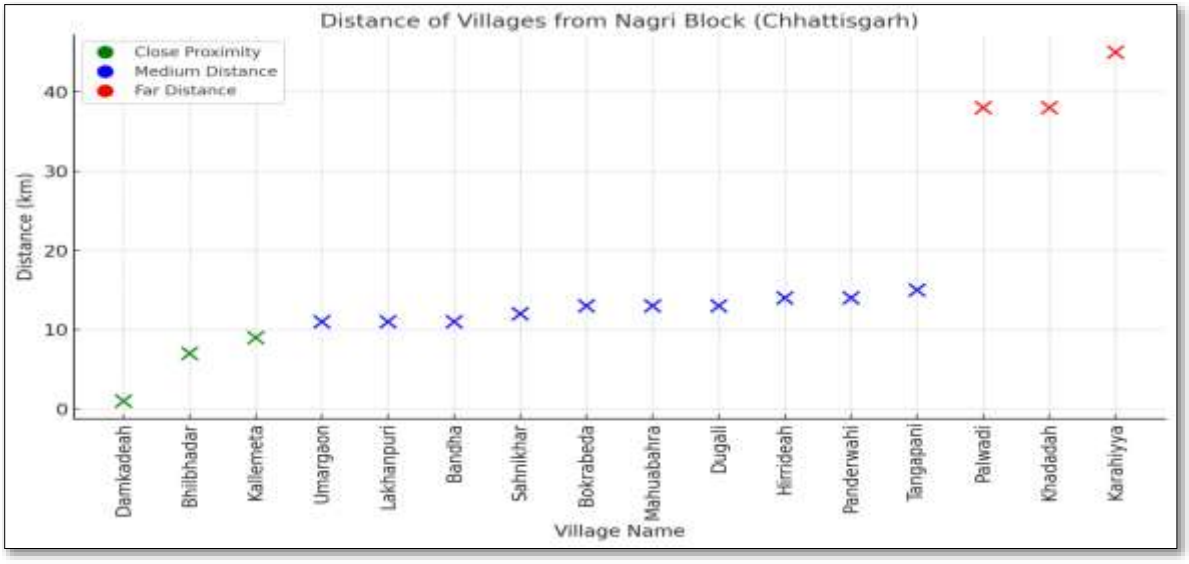

Figure 1. *Scatter plot visualizing the distances of villages from Nagri Block in Chhattisgarh.*

The x-axis shows the village names, and the y-axis represents the distance in kilometers. Table 1 represents the villages surveyed in Nagri Block, along with their respective distances from the central study area. **Close Proximity shows in Green Villages (≤10 km):** Villages like Damkadeah (1 km), Bhilbhadar (7 km), and Kallemeta (9 km) are closer to the central study area, ensuring easy access for data collection and advantageous for detailed follow-up studies due to their nearness.

Medium Distance shows in Blue Villages (11–20 km): Villages such as Bokrabeda, Hirrideah, and Tangapani are moderately distanced, accounting for the majority of surveyed locations.Making them relatively accessible for ethnomedicinal surveys.

Far Distance shows in Red Villages (>20 km): Villages like Palwadi (38 km), Khadadah (38 km), and Karahiyya (45 km) are the farthest, requiring more effort and time for surveys. Far Distance villages may require additional logistical planning for data collection but contribute to the diversity and inclusiveness of the study.

Table 2. *Summary of medicinal plants, their families, parts used, preparation methods, and precautions for use.*

S. No.	Botanical Name (Local Name)	Family	Useful Plant Part	Method of Preparation	Precautions
1	Andrographis paniculata (Kalmegh)	Acanthaceae	Leaves and Root	Mix 15 grams of crushed leaves and roots with 500 ml of water. Take 25 ml three times daily.	Avoid spicy food. Drink boiled water. Use separate cloth.
2	Pistacia integerrima (Kakra Singhi)	Anacardiaceae	Fruit	Mix 3–4 grams of powdered fruit with jaggery and a pinch of turmeric. Consume thrice daily.	Avoid sour food.
	Piper cubeba (Kabachini)	Piperaceae	Fruit	Same preparation method as above.	Same precautions as above.
	Nardostachysjatamansi (Jatamansi)	Caprifoliaceae	Root	Same preparation method as above.	Same precautions as above.
	Mesua ferrea (Nagkesar)	Calophyllaceae	Flower	Same preparation method as above.	Same precautions as above.
	Myristica fragrans (Jaiphal)	Myristicaceae	Seed	Same preparation method as above.	Same precautions as above.
3	Ficus glomerata (Gular)	Moraceae (Mulberry)	Latex	Apply latex drops on clean cotton and place over wounds or sores for healing.	Avoid dirty hands during application.
4	Withaniasomnifera (Ashwagandha)	Solanaceae	Root	Mix equal parts of powdered root and Tinospora cordifolia (Guduchi) stem. Consume 5 grams of the mixture thrice daily with lukewarm water.	Drink boiled water and avoid spicy food.
	Tinospora cordifolia (Guduchi)	Fabaceae	Stem	Same preparation method as above.	Same precautions as above.
5	Justicia adhatoda (Vasaka)	Acanthaceae	Leaves	Prepare and use as directed in previous examples.	Same precautions as above.
	Emblica officinalis (Amla)	Euphorbiaceae	Fruit	Prepare and use as directed in previous examples.	Same precautions as above.
6	Ficus religiosa (Peepal)	Moraceae	Root	Mix 3-4 grams of root powder with 5 grams of ginger powder. Consume 3 times a day.	Avoid excessive use of hot spices.
	Zingiber officinale (Ginger)	Zingiberaceae	Rhizome	Same as above.	Same precautions as above.

7	Justicia adhatoda (Vasaka)	Acanthaceae	Leaves	Crush the leaves and mix with equal amounts of Ocimum sanctum (Tulsi) leaves and Glycyrrhiza glabra (Licorice). Boil and take 2-3 grams once daily.	Avoid cold and sour foods.
	Ocimum sanctum (Tulsi)	Lamiaceae	Leaves	As above.	Same precautions as above.
	Zingiber officinale (Ginger)	Zingiberaceae	Rhizome	As above.	Same precautions as above.
	Glycyrrhiza glabra (Licorice)	Fabaceae	Root	As above.	Same precautions as above.
8	Elettaria cardamomum (Cardamom)	Zingiberaceae	Seed	Crush the seeds and mix with a pinch of Aegle marmelos (Bael) and Boerhaviadiffusa (Punarnava). Take 2-3 grams daily with warm water.	Avoid sour foods and excessive spicy dishes.
	Aegle marmelos(Bael)	Rutaceae	Fruit	Same as above.	Same precautions as above.
	Boerhaviadiffusa (Punarnava)	Nyctaginaceae	Whole plant	Same as above.	Same precautions as above.
9	Echinochloa frumentacea (Nakeera)	Poaceae	Seed	Mix 100-400 grams of this plant in water and take thrice daily in 3 doses.	Take care to avoid overconsumption.
	Swertia chirayata (Chirayata)	Gentianaceae	Whole plant	Same as above.	Same precautions as above.
	Wrightia tinctoria (Pala)	Apocynaceae	Leaves and Roots	Use the same preparation method as above.	Same precautions as above.
10	Wrightia tinctoria (Pala)	Apocynaceae	Leaves and Roots	Mix and prepare as above.	Same precautions as above.
	Cyperus scariosus (Nagarmotha)	Cyperaceae	Root	Use the root in powdered form, mixed in water. Take 3 times a day.	Same precautions as above.
	Fumaria officinalis (Fumitory)	Papaveraceae	Herb	Same method of preparation as above.	Same precautions as above.
	Echinochloa frumentacea (Nakeera)	Poaceae	Seed	Same preparation method as above.	Same precautions as above.

The table 2 provides a comprehensive overview of various medicinal plants used in traditional medicine, including their botanical names, local names, plant family, useful parts, methods of preparation, and precautions associated with their use. Table 3 shows a list of diseases with their Gondi/local names, common names, the number of cases, and the percentage of total cases for each disease

2.1. Botanical Diversity & Family Composition:

- The plants listed in the table belong to various plant families, with the most common being Acanthaceae, Zingiberaceae, Fabaceae, Moraceae, Poaceae, Gentianaceae, and Rutaceae.

- Acanthaceae (e.g., Justicia adhatoda), Zingiberaceae (e.g., Zingiber officinale), and Fabaceae (e.g., Tinospora cordifolia) appear multiple times, indicating that these plant families play a significant role in traditional medicine for treating various ailments.

2.2 Common Medicinal Parts

- The leaves are the most commonly used plant part (e.g., Justicia adhatoda, Andrographis paniculata), suggesting their widespread use in therapeutic preparations.
- Roots are also commonly used (e.g., Ashwagandha, Tinospora cordifolia, Pistacia integerrima), highlighting their role in promoting strength, vitality, and immunity.
- Fruits (e.g., Emblica officinalis, Pistacia integerrima) and seeds (e.g., Myristica fragrans, Elettaria cardamomum) are also significant, often used for digestive and anti-inflammatory purposes.
- Latex from Ficus glomerata is used for topical treatments, indicating its local therapeutic significance.

2.3 Preparation Methods

- Decoctions and infusions are the most common methods of preparation. This typically involves boiling or soaking plant material (roots, leaves, or seeds) in water or other liquids (e.g., milk or honey). This highlights the use of aqueous solutions to extract medicinal properties.
- Powders of roots, fruits, and leaves are commonly mixed with other substances like jaggery or turmeric. For instance, Pistacia integerrima powder is mixed with jaggery and turmeric.
- Topical application (e.g., Ficus glomerata) uses latex or extracts applied directly to wounds.

2.4 Medicinal Uses

- Anti-inflammatory & Immune-Boosting: Many of the plants listed are known for their anti-inflammatory and immune-boosting properties. For example, Withaniasomnifera (Ashwagandha) and Andrographis paniculata are widely used to enhance immunity and treat inflammation.
- Digestive and Antioxidant Properties: Many of the plants are also used for digestive health (e.g., Piper cubeba, Zingiber officinale), indicating their role in treating indigestion, nausea, and promoting gut health.
- Anti-stress & Sedative Effects: Some plants, like Withaniasomnifera (Ashwagandha), are considered adaptogens, helping the body adapt to stress, while others have sedative properties (e.g., Withaniasomnifera in combination with Tinospora cordifolia).
- Topical Wound Healing: Plants like Ficus glomerata (Gular) and Mesua ferrea are used topically to heal wounds and promote skin regeneration.

2.5 Precautions

- Dietary Precautions: Many plants recommend avoiding specific foods (e.g., spicy, sour, or cold foods) during treatment to ensure the medicinal properties work effectively. For example, Andrographis paniculata recommends avoiding spicy food, while Ashwagandha suggests drinking boiled water.
- Excessive Use & Handling: Some plants require careful handling to avoid side effects. For example, Ficus glomerata (Gular) latex should not be applied with dirty hands, and Echinochloa frumentacea (Nakeera) should be consumed in moderation to avoid overconsumption.
- Combined Use Cautions: Certain plant preparations recommend combining specific plants but warn about the risk of interactions. For instance, the combination of Justicia adhatoda with Ocimum sanctum and Glycyrrhiza glabra must be used with caution, as indicated by the instructions to avoid sour foods.

2.6 Therapeutic Synergy

- Many of the plants are used in combination therapies, where one plant's effects are enhanced by another's, particularly for conditions like digestive issues, immune support, and stress relief. For

instance, combining Justicia adhatoda with Ocimum sanctum and Glycyrrhiza glabra enhances the anti-inflammatory effects.

2.7 Popularity in Traditional Systems

- The frequency of local herbs like Emblica officinalis (Amla), Tinospora cordifolia (Guduchi), and Withaniasomnifera (Ashwagandha) suggests their critical role in indigenous healing systems, especially in Ayurveda and Unani medicine.

Table 3. *List of diseases with their Gondi/local names, common names, the number of cases, and the percentage of total cases for each disease.*

S.No.	Disease	Gondi/Local Names	Common Name	Cases	%
1	Common fever	Akir	Fever	54	38.02
2	Cold-Cough	Pinkata-Khokali	Cold & Cough	34	23.94
3	Joint Pain	Ghutna aur Kohni Dard	Joint Pain	11	7.74
4	Malaria	Pini Akir	Malaria Fever	6	4.22
5	Headache	Mud Peera	Headache	3	2.11
6	Jaundice	Kumkagira	Jaundice	3	2.11
7	Eye infection	Aakh Dard	Eye Pain	3	2.11
8	Weakness (Body)	Kamjori	Weakness	3	2.11
9	Typhoid	Navjer Akir	Typhoid Fever	2	1.40
10	Diarrhoea	Pelkod	Diarrhoea	2	1.40
11	Epilepsy	Tirkey Gira	Epilepsy	2	1.40
12	Irregular Periods	Mahvari me Antraal	Menopause Gap	2	1.40
13	Tuberculosis	Hadga Tinne	Tuberculosis	2	1.40
14	Anaemia	Sickilin	Sickle Cell Anaemia	2	1.40
15	Stomach Pain	Peleuddina	Stomach Pain	2	1.40
16	Bone Pain	Haddi Dard	Bone Pain	2	1.40
17	Vomiting	Kokkina	Vomiting	1	0.70
18	Paralysis	Thudga, Lakwa	Paralysis	1	0.70
19	Pus Boils	Alcha, Funsi	Boils	1	0.70
20	Skin Disease	Bemchi	Skin Disease	1	0.70
21	Diabetes	Shakkar Bimari	Diabetes	1	0.70
22	Low Blood Pressure	NimnRaktchap	Low Blood Pressure	1	0.70
23	Asthma	Dama	Asthma	1	0.70
24	Piles	Muryad	Piles	1	0.70
25	Be Kernels Leg	Guthlu Hona	Leg Swelling	1	0.70
Total				**142**	**100.00**

3. Brief analysis

3.1 Common Disease Trends

- Common Fever (Bukhar) is the most prevalent condition, accounting for 38.02% of the cases (54 cases). This suggests that fever-related illnesses are the leading health concern in the population.
- Cold-Cough (Sardi Khasi) is the second most common condition, comprising 23.94% (34 cases). Respiratory issues are also a significant health concern in this community.

3.2 Other Notable Diseases

- Joint Pain (Jodo me Dard) is a common issue, with 7.74% (11 cases). This could indicate a higher prevalence of musculoskeletal problems in the population, possibly due to lifestyle or aging factors.
- Malaria (MaleriaBukhar) also appears with 4.22% (6 cases), which could suggest regional environmental factors such as stagnant water sources contributing to mosquito breeding.

3.3 Less Common Diseases

- Several diseases, including Headache (Sar Dard), Jaundice (Peeliya), and Eye Infection (Aakh Dard), have been reported in 2-3 cases, each accounting for 2.11% of the total cases. These may point to smaller but still notable health concerns in the community.

3.4 Health Issues with Equal Representation

- Some conditions, such as Typhoid, Diarrhoea, Epilepsy, and Irregular Periods, are reported at 1.40% (2 cases) each. These issues appear across various systems (digestive, neurological, and reproductive), suggesting diverse health concerns.

3.5 Minor Issues but Still Present

- Diseases such as Vomiting (Ualti), Paralysis (Lakawa), Pus Boils (Foda), Skin Disease (Bemchi), Diabetes (Maduhmeh), Low Blood Pressure (Low B.P.), Asthma (Dama), Piles (Bawaseer), and Be Kernels Leg (Ganth Hona) have been recorded as rare cases, each at 0.70% (1 case).

3.6 Distribution Insights

- A majority of the diseases are concentrated in the Common Fever and Cold-Cough categories, showing that viral or bacterial infections, often seasonal, dominate the health profile of this community.
- There is a noticeable drop-off in the number of cases as the severity of the diseases increases, with more serious conditions like Paralysis and Diabetes having a significantly lower prevalence.

3.7 Potential Public Health Focus

- Fever and respiratory infections should be a primary focus for healthcare intervention programs, particularly given their high prevalence.
- Joint Pain, Malaria, and Musculoskeletal issues like bone pain may indicate the need for targeted health interventions to address these common concerns.
- Health education on hygiene, mosquito control, and nutrition could help mitigate diseases like malaria, typhoid, and diarrhea.

This analysis provides valuable insight into the health priorities of the community, emphasizing areas that require intervention, prevention, and improved healthcare resources.

4. Results and Discussion

The present study identifies 30 plant species belonging to 20 different families that are utilized in the treatment of impotency disorders. Various parts of these plants, including leaves, barks, flowers, gum, seeds, stems, roots, tubers, and fruits, are used in different medicinal preparations by traditional healers and local herbal practitioners. Specifically, the leaves of 3 species, roots of 11 species, stems of 1 species, tubers of 2 species, barks of 2 species, flowers of 2 species, seeds of 2 species, and fruits of 11 species are involved in the formulation of herbal remedies. These remedies are typically prepared in the form of juice, decoction, paste, or pills, with all treatments being administered orally.

The results underscore the significance of preserving indigenous knowledge systems, particularly in rural healthcare settings, where such traditional remedies continue to be a trusted source for managing health conditions. The widespread reliance on these plant-based treatments for first aid and illness management reflects the deep-rooted faith in these practices among local communities. Furthermore, the increasing global prevalence of diseases such as dengue and other infectious diseases highlights the urgent need to integrate traditional knowledge with modern healthcare frameworks, ensuring a more holistic approach to disease prevention and treatment. This integration can potentially enhance the efficacy of current medical practices and improve healthcare accessibility, especially in underserved regions.

5. Conclusion

This study highlights the traditional medicinal practices of the Gond tribe in Nagri block, Chhattisgarh, focusing on fever treatment. It underscores the importance of ethnobotanical knowledge in improving healthcare access for rural and tribal communities. Future research should validate these practices scientifically and integrate them with modern medicine. The survey covers diverse geographical areas, ensuring comprehensive data collection. The identified plants offer a range of therapeutic benefits, including immune support, anti-inflammatory effects, and wound healing. Preparation methods involve simple techniques like boiling, mixing, and topical application, with precautions for safe use. The findings reveal that while fever and cold-related illnesses are most common, other health issues like joint pain, digestive disorders, and diabetes also affect the population. This highlights the need for preventive healthcare measures and improved access to care for a variety of health concerns.

Author Statements:

- **Ethical approval:** The conducted research is not related to either human or animal use.
- **Conflict of interest:** The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper
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