



The Role of Indian Tribal Communities in Medicinal Plant-Based Healing Traditions

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Abstract

Indian tribal communities maintain diverse systems of plant-based healing that connect knowledge of local biodiversity with household care, specialist practice, cultural identity and resource management. This review examines their contributions to medicinal plant identification, therapeutic knowledge, preparation practices, intergenerational transmission, conservation and contemporary research. The work demonstrates substantial regional diversity and the importance of healers, elders and women as knowledge holders. Plant identity, preparation, dosage, contamination and interactions remain important safety considerations. Habitat degradation and changes in opportunities for learning threaten the continuity of healing knowledge, while commercial development can create both benefits and inequities.

Keywords: tribal communities, ethnobotany, medicinal plants, traditional healing, Indigenous knowledge, conservation, benefit sharing

Introduction

Healing with medicinal plants is an integral aspect of the interactions between Indian tribal groups and their environments. Knowledge extends beyond knowing the presence of a useful species; it can involve knowing where plants grow, which parts are gathered, how the materials are prepared, and how the remedy finds its place within local illness categories. Jain's (1965) work on Bastar as well as other regional research illustrates the importance of investigating these relationships in their local social and ecological context. Prajapati et al. (2024) Ethnobotany bridges the gap between plants and people by linking plant use to human practice and interpretation (Balick & Cox, 1996).

"Indian tribal communities" refers to myriad people, not a description of a single culture or form of medicine. Practices documented among Tamil Kani cannot be assumed to be solely the same as those reported for Arunachal Apatani, or for Assam Jaintia; even within a named community, domestic knowledge may differ from specialist knowledge, and practices may differ over generations, between villages, or between occupations. The review therefore considers studies in regional contexts as contextual reports, without presumption that plant uses are unique to a community, or that shared uses indicate a shared origin.

Traditional knowledge can help identify plants for study, but has more relevance than even this in terms of commercial drugs. Bhattacharjee (2024) It relates also to cultural survival, decision making in the community, access to appropriate care and use of valuable biological resources. Fabricant and Farnsworth (2001) address the contribution of traditional use of plants to drug discovery while Hamilton (2004) links medicinal plants to conservation and livelihoods; both models promote the inclusive discussion in which the potential for research and community needs are given equal concern.

Objectives and Scope of the Review

The paper discusses the role of tribal people in the identification and use of medicinal plants; transmission of healing knowledge; interdependence of medicinal plant use with conservation and modern health care; and the evidential limitations of ethnomedicinal reports as well as draws principles for ethical research and benefits sharing. Nath (2025) The study is confined to India while international literature are chosen for conceptual, methodological and policy significance. It does not give any treatment protocol, national level inventory of the plants used for tribal health care or the percentage of tribal people using traditional health care systems.

The Background of the Healing Methods of the Tribes

Historically, there is significant plant knowledge documented for tribal regions but a book recording a current practice is no substitute for chronologically dating that practice. In the case of Jain's (1965) historical information on medicinal plant usage in Bastar, it cannot be used to justify all the medicines and usages listed as unchanged for the last several thousand years. Perception of healing practices is also best understood as ongoing processes allowing for observation and change, sharing of information and, or, adapting to new circumstances. The label "traditional" just indicates something about a relationship to inherited knowledge, without a need for it to be static.

Berkes (2012) places traditional ecological knowledge in the context of relationships between experience, practice, belief and resource management. This understanding of resource use, when applied to medicinal plants, implies that recording a list of plants only records a piece of the healing system. A people may have a cultural

relationship with the gathering of plants associated with specific sites or time of year or limits or have the know-how of preparing them through apprenticeship instead of manual.

Tribal healing is closely linked to other types of medicine. Uniyal et al. (2006) found evidence of use of certain plants in Chhota Bhangal and in other recognized systems of healing. The combination shows the reluctance to assume knowledge to be entirely disconnected, as the same plant may be present in households, specialist healers and codified systems but it may be used differently and prepared in different ways. Evidence used to claim evidence for origin of use or ownership should only be taken from community sources or evidence as the presence of a species in various traditions is not enough.

Regional Diversity of Medicinal Plant Knowledge

Research from the Western Ghats demonstrates some complexity of localized knowledge. Ayyanar and Ignacimuthu (2005) record 54 plant species for the local Kani people in Kouthalai. In a later study in the Tirunelveli hills, the same authors used quantitative ethnobotanical methods to investigate 42 commonly used medicinal plants (Ayyanar & Ignacimuthu, 2011). Ignacimuthu et al. (2006) describe tribal healing practices in Madurai district and Ragupathy and Newmaster (2009) examine Irula knowledge of ethnomedicine in the Kodiakkarai Reserve Forest. These are not an all-indian tribal pharmaceutical.

Similarly, knowledge across classes was separate. Kala (2005) reported 158 plant species used medicinally by Apatani villages in Arunachal Pradesh. Sajem and Gosai (2006) identified 39 species used in Jaintia healers' practice of healerry in the former North Cachar Hills district in Assam. A more recent report from the westernmost part of Mizoram listed 124 ethnomedicinal species from 206 informants (Ralte et al., 2024). Reported richness alone cannot be used to compare across classes without detailed information on survey coverage and sampling, definitions, and local floras.

These accounts broaden the spatial scope. Kala (2009) recorded food, medicinal and various plant use in southern Surguja, Chhattisgarh and its management. Rout and Thatoi (2009) covered the Kol ethnomedicinal practices in and around Similipal, Odisha. Uniyal et al. (2006) assessed medicinal uses in Chhota Bhangal, Western Himalaya. In the various contexts, these accounts advocate for region-specific documentation rather than an undifferentiated national list. Table 1 encapsulates selected entries while retaining the reporting bounds.

Table 1: Selected regional ethnomedicinal records

Sr. No.	Community and location	Location	Documented record	Source
1	Kani, Kouthalai	Tamil Nadu	54 medicinal plant species	Ayyanar & Ignacimuthu (2005)
2	Apatani	Arunachal Pradesh	158 medicinal plant species	Kala (2005)
3	Jaintia, North Cachar Hills	Assam	39 medicinal plant species	Sajem & Gosai (2006)
4	Tribal and nontribal communities	southern Surguja	73 useful species, including 36 medicinal species	Kala (2009)
5	Mizo	Western Mizoram	124 medicinal species; 206 informants	Ralte et al. (2024)

Indigenous knowledge transmission by Traditional Healers

Healers bring expertise in plant selection and preparation and explanation of disease. Household practitioners may possess a different but no less important set of diagnostic and treatment skills for daily life. When only specialists are interviewed studies can overlook more general knowledge and when general plant collectors or others in the community are surveyed only, specialized knowledge may be under-reported. Ayyanar and Ignacimuthu (2011) chose to interview traditional healers, showing how to make clear the denominator of knowledge.

Learning is also gendered and generationed. Singh et al. (2013) explored the knowledge of plants and conservation of biodiversity of older Adi women. These results are a good example of why we need to verify specifically the knowledge of women and old people instead of presuming they have the most by proxy. But one regional study is not enough to decide who might be the most knowledgeable in all communities. We need to ask who is involved in gathering and preparation; teaching others and decisions about what to use.

Learning may take place by modelling, supervised gathering, ritualised preparation and training in social groups. A community-written species list will not fully reflect these activities. Accordingly this review suggests a number of documentation activities conducive to community-validated tuition, local-language literature and the potential to continue practical skills with plants. These suggestions build on the wider concept of knowledge as practice, as outlined by Berkes (2012), with community involvement rather than a prescriptive approach.

Medicinal Plants Used for Common Ailments

Regional studies have collected plant uses for various locally recognized conditions covering issues like pain and respiratory problems, wounds and other skin conditions, as well as digestive problems. The functions described for the plants include for example, those which result in descriptions such as that by Ayyanar and Ignacimuthu (2005) in categories like skin problems, wounds and rheumatism. Sajem and Gosai (2006) range through numerous *Jaintia* medicinal uses and Rout and Thatoi (2009) contribute remedies to several disease states from Kol.

Use of names of disease specific information demands special attention. A term used locally might not only denote symptoms but also incorporate a cultural background, which cannot be matched by a unique disease name. Use of translated term as specific disease name can be a perpetuating false claim of treatment. Weckerle et al. (2018) advise keeping the original vernacular term, with a detailed description of the translation process, and differentiating between the respondent's report and the medical diagnosis.

A medicinal plant is not a standardised remedy. Indeed the same species may be used in different preparations, combined with other substances, and administered by various means. Ralte et al. (2024) found common species and patterns of preparation in western Mizoram and highlight the use of decoctions. These observations are hypotheses to be explored, but a pharmacological test of the claim should examine the material and method used rather than initiate tests on an unspecified extract and then projects the effect on all traditional uses of the plant.

Plant Collection Preparation and Administration Practices

Collection knowledge connects treatment to local environment. Useful knowledge consists of habitat, plant size, seasonality and plant part usage. Differing chemical effects as well as levels of disruption on the plant population and habitat are produced by bark (whole or partial), root, leaf, and reproductive part collection, differences which cannot be separated by solely plant part selection. Population size and growth rate, degree of collection, and ability to recover are additional considerations (Chen et al., 2016).

Treatment preparations noted in the ethnobotanical literature are decoction, infusion, crushing and application to the skin (iatrogenic use), but these may not be used by all communities. Moreover, the use of a different solvent, or different processing techniques, may change the composition of the preparation. Records should include the material used, the sequence of preparation, administration route and reports (if any) of dosage. If verbal estimates are used, researchers should not convert these to standardized doses.

Quality starts before a remedy is used World Health Organization (WHO, 2003) has published guidelines on agricultural and collection practices of medicinal plants – covering some collection issues relating to raw-material quality and handling. These can guide working with collectors and farmers but will not define efficacy. Training that is suitable for local conditions should preserve ecological knowledge, but enhance botanical identification, drying, storage and traceability. Attention is required to prevent replacing community practices with standards that are technically complex, yet unlikely to be practical or achievable without resources and infrastructure.

Cultural Beliefs and Rituals Associated With Healing

Healing encompasses not only the use of plants but also cultural meanings, social relationships and ritual participation. Studies should explore those aspects through open-ended questioning before assuming that the same meanings of health and healing would be attached by all communities. Meanings might influence which practitioner to see, which remedies would be permissible, or how healed patients interpret their lives. Documents respectful of those meanings should be kept, not obscured by the scientific processes.

This differentiation holds up cultural sensitivities and critique. To dismiss any practice that involves any ritual would hide its social function; to accept all therapeutic claims because they are traditionally used hide uncertainty and risk. The biocultural perspective considers the function that such practices have within community and how particular biomedical claims might be evaluated. The works of Balick and Cox (1996) and Berkes (2012) provide additional complementary conceptual bases for understanding knowledge gained through relationships with people, plants and environments.

Scientific Evaluation of Traditional Medicinal Plant Uses

Historic use may suggest which plant and the way to prepare it to prioritise research. Fabricant and Farnsworth (2001) tell us the importance of this to the search for drugs and Rates (2001) tells us about plants as sources of drugs. Newman and Cragg (2020) tell us the broader importance of natural products to the search for pharmaceuticals. Natural-product research is only a part of the whole picture from many other sources than Indian tribal medicine.

Assessing treatment needs multiple steps. What was the material used? Botanical authentication and voucher deposition. What was the material characterized? Chemical characterization, preparation, and assays in the laboratory. Has toxicology been done and the proper clinical trials performed? Only then can we make claims about safety and efficacy in humans. Heinrich et al. (2020) outline common problems in phytopharmacology research: a positive cell-based assay may indicate activity, but won't translate into a clinically useful dose, absorption, or patient benefit.

Quantitative ethnobotanic indices are concerned with answering different questions. The number of citations, use value, and the level of agreement among informants are indicators of use agreement and cultural significance but do not measure efficacy. Heinrich et al. (1998) show how a consensus-based approach can be

used in a non-Indian context and Ragupathy et al. (2008) use a consensus approach with Malasar knowledge. Such projects can offer a means of interpreting shared use. However, agreement can also be a result of repeated education or repeated social contact Table 2: Types of evidence and the degree of certainty they can provide

Table 2: Evidence types and limits of interpretation

Evidence type	Reasonable interpretation	Claim not established
Documented traditional use	A reported practice in a defined setting	Clinical efficacy or a safe dose
Informant agreement	Shared knowledge or preferred use	A biologically effective treatment
Laboratory activity	Activity under specified assay conditions	Benefit in patients
Toxicological assessment	Safety information under tested conditions	Safety in every population
Clinical research	Patient outcomes for the tested preparation and design	Efficacy of all products from the same plant

Safety Dosage and Limitations of Traditional Remedies

Plant based origin does not ensure safety. Adverse reactions and issues in monitoring herbal medicines are reviewed by Ekor (2014), for example, with concerns about product quality and detecting harmful effects. Risks are associated with the plant itself, contamination, substitution, preparation or of combinations with other medicines. The safety profile needs to take into account the preparation and context of use, while a history of reported use is useful, rare or delayed harms may be missed if these outcomes are not monitored.

A second but linked issue is dosage. In an informal context, doses that are significant in the experience of a practitioner are rarely feasible to repeat in research or sale. Standardization should start with definition rather than resolution of the synergies between preparation and concentrate. The WHO (2003) collection guidance and Heinrich et al. (2020) guidelines for research on efficacy both suggest evidence for traceability and reproducibility but not for efficacy and dose determination.

Tribal Contributions to Medicinal Plant Conservation

Ethnobotanics can reveal appropriate species, vulnerable habitats and shifting availability. Kala (2009) shows use and management of Ethnobotico knowledge in Chhattisgarh; Singh et al. (2013) demonstrates the role of Adi women. These examples show how community involvement can be protective. They do not show that all harvesting is sustainable; conservation assessment should look at real regeneration or access rather than rely on these proxies of identity or traditional use.

Herbal plants and livelihoods Hamilton (2004) links conservation to livelihoods and Chen et al. (2016) synthesis of approaches - habitat protection, cultivation and sustainable use. In situ preserves plants in a habitat, whereas cultivation and other ex situ methods may alleviate collection pressures or, in some instances, provide alternative supply systems. Both are inadequate alone: cultivation, for example, needs land, water, planting material and markets; protected habitats don't necessarily fulfil community demand if access and benefit sharing are weak.

A participatory approach should establish conservation priorities with knowledge holders and evaluate ecological and social impacts. Indicators proposed range from alterations in observed populations of local concern, to household availability, harvest method and distribution of benefits from cultivation or trade. Kala et al. (2006) highlight opportunities and challenges for the medicinal plant trade in northern India. Its more general sectoral perspective emphasizes the importance of linking management efforts to quality, livelihoods and community involvement, rather than focusing solely on production targets.

Threats to Knowledge and Medicinal Plant Resources

The natural resources of many medicinal practices are at risk through habitat destruction, practices of unsustainable demand and altered land use. At a larger scale, the conservation issues are outlined by Chen et al. (2016), but Indian examples provide an insight as to why resources of significance locally must undergo a context-specific evaluation. A species might be common countrywide and not locally available near that particular village.

...wise as well as willing teachers continue to be available. As livelihood options, migration, use of language or accessibility of experienced teachers, shifts in direct contact of young people with plants may also occur. How these mechanisms operate, rather than just assuming they do, needs research. Documentation projects tend to speed up appropriation if communities do not agree about who can access information and how, if sensitive information is placed in the public domain. Knowledge is not only to be documented, but also maintained.

Ethical Documentation Community Rights and Benefit Sharing

Research that takes account of rights acknowledges that knowledge holders are entitled to be active stakeholders in decision-making processes around research. The International Society of Ethnobiology (2006) sets out duties relating to consent and respect and issues relating to harm. The UN Declaration (2007) affirms Indigenous

interests in traditional knowledge and cultural expressions. They are not intended to constitute a comprehensive set of domestic legal obligations for all research in India.

The Convention on Biological Diversity (1992) associates relevant traditional knowledge with consent, participation and equitable sharing of benefits. The Nagoya Protocol to that Convention further defines access and benefit sharing principles relating to genetic resources and traditional knowledge associated with genetic resources, in the context of existing national legislation (Secretariat of the Convention on Biological Diversity, 2011). In research practice, communities should be aware of what is proposed to be collected, published, stored and possibly commercialized. Community consent to an interview should not be interpreted as authorising subsequent uses. Agreement should clarify obligations and expectations before material or information is transferred.

Opportunity plus complication The following was written by a WIPO, 2004 account of the research stimulated by Kani knowledge and the subsequent arrangements for product development and benefit sharing, identifying shortcomings and the reality of problems faced, not presenting the case as an 'easy success'. It is important to think about image, choice and distribution. This case is about innovation and governance, not clinical evidence for a new product.

Acknowledgement from the research itself is a good thing but should never be a substitute for material benefit. Sensitive knowledge, for example, could sometimes be kept behind a barrier or never published. And community members might have a chance to make sure their contributions are accurately portrayed. These suggestions incorporate these ethics into concrete research protocols.

Collaboration with Contemporary Healthcare

Collaboration needs to be for communication and safety, without undermining the differences between the knowledge systems. WHO's 2019 global report stated traditional and complementary medicine in health-system context, and WHO 2025 stresses evidence, safety, appropriate integration and sustainability. In these global reports not all tribal remedies are advocated, and not everything should be translated into clinical services, but integration can be thought of only for specific interventions, given sufficient evidence and ensuring patient choice.

Partnership opportunities might involve botanical authentication, quality evaluation, conservation planning, or research into a particular preparation. The healer and health professional may also work together on referral and communication if roles are well defined. The community should identify whether the priorities is based on knowledge preservation, access or product development – and success monitored in terms of tangible outcome (safe participation, meaningful feedback, equitability of benefit and resource) or science.

Conclusion

Across India, tribal peoples have added to our knowledge of medicinal plants, provided nuanced, place-based knowledge of biodiversity and preserved cultural practices. Case studies from across India show heterogeneity that can't be 'scaled down' to a single national healing system. Central to future work is linking acknowledgement of these contributions to robust evidence and community choice. Ethical collecting, sustainable use of resources and considered scientific assessment can enable meaningful engagement, where traditional use is correctly recorded, therapeutic claims aligned to available evidence and knowledge holders maintain a significant role in decision-making.

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