



Sustainable Healing Practices among Indigenous Border Communities of Arunachal Pradesh: An Indigenous Knowledge Systems Perspective

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Abstract

Nocte, Nyishi, Adi, Tagin, Wancho and many other tribes constitute indigenous border communities in Arunachal Pradesh that are deeply rooted in ecological knowledge and their worldviews are embedded in their cultures. These populations live on ecologically sensitive and geopolitically strategic border areas where formal biomedical healthcare is still unavailable to them. As a result, their survival tactics and health behaviors are inherently connected to robust Indigenous Knowledge Systems (IKS) that have been developed over the course of generations of close relationship with forests, rivers, mountains and biodiversity-rich environments. Indigenous medicine includes medicinal plants, animal-derived medicine, spiritual and ritual healing, divination and community-based socio-cultural ceremonies, which deal with physical, psychological, and spiritual aspects of health. These knowledge systems are practice of sustainable healthcare paradigm based on locally accessible resources, ethical harvesting techniques, seasonal ecological consciousness, and group norms which help in preserving biodiversity. Within this worldview, health is not only a biomedical state but a state of balance between humans, nature, ancestors and the spiritual world. The traditional healers, older adults and ritual experts assume a key role in the diagnosis of illness, restoration of balance and strengthening the social bond within the communities. Based on a critical review and synthesis of the literature available, the paper will explore the diversity of ethnomedical practices of indigenous border communities of Arunachal Pradesh within a larger Indigenous Knowledge Systems context. It examines the issues that have been occasioned by modernization, the growth of formal healthcare systems, the loss of intergenerational knowledge transmission, and the changing socio-economic aspirations. Simultaneously, it sheds light on the importance of the indigenous healing systems in building the community resilience, cultural continuity, and environmental sustainability. The article provides contextual suggestions on how the indigenous knowledge of healing can be documented, preserved, and ethically incorporated into the modern healthcare systems. The paper highlights the importance of documenting and institutionalizing

Indigenous Knowledge Systems as significant environmental assets to cultural survival, ecological management, and sustainable health governance as urgent.

Keywords: *Arunachal Pradesh, Border Regions, Community Resilience, Indigenous Knowledge Systems, Sustainable Health Practices, Traditional Healthcare*

Introduction

The IKS of India form a huge dynamic and contextually specific body of knowledge that has been developing over centuries of tight interrelations between human populations and the natural worlds. IKS are based on lived experiences, oral traditions, observational learning and collective memory and are a part of a holistic epistemology whereby knowledge is internalized in cultural practices, social institutions, spiritual beliefs and ecological ethics (Berkes, 2018). In contrast to formal systems of scientific knowledge, indigenous knowledge is flexible, practical and place-based, and therefore enables communities to be creative in addressing environmental uncertainties and socio-ecological challenges. IKS provide approaches that are integrated and not divided by biomedical concepts of body, mind and environment but rather balance, harmony and sustainability in the context of health and healing.

The indigenous healing practices view health not only as the lack of illness but as a balance between people, society, nature, and the spiritual world. It is perceived that health, illness, and recovery are processes that are interrelated, and they are affected by the ecological conditions, social relations, moral behavior, and the forces of ancestors (WHO, 2013). The indigenous healing practices therefore include the use of medicinal plants, dieting, performance of rituals, mediation with the spirit and community involvement in the process hence a holistic view of the world in which healing is a social and ecological process. These systems have been identified by scholars as sustainable healthcare models that are based on biodiversity conservation, ethical exploitation of resources and cultural resilience (Cunningham, 2001; Berkes et al., 2000).

In the Indian context, the indigenous systems of healing have traditionally been extremely important in guaranteeing healthcare accessibility to rural, forest inhabiting, and geographically isolated communities. The World Health Organization estimates that close to 80 percent of the global population depends partially on traditional medicine as primary healthcare (WHO, 2019). In India, folk medical knowledge, including codified systems such as Ayurveda and Siddha, and non-codified tribal medical systems, still serve millions of people, especially in areas where modern healthcare facilities are still poor (Kala, 2005). Less institutionalized tribal healing systems are usually more receptive to local health demands and ecological situations than standardized biomedical models.

Arunachal Pradesh is the state of Eastern Himalayan region, which is the most culturally and biologically diverse state of India. It has over 26 major tribes and over 100 sub-tribes, many of whom live in remote border regions that border China, Myanmar and Bhutan. These border communities of natives such as Nocte, Nyishi, Adi, Galo, Monpa, Tagin and the Wancho, Apatani, Mishmi among others have long been dependent on their local forests, rivers and landscapes to sustain themselves, to provide healthcare and cultural survival (Kala and Ratajc, 2012). The area is also identified as belonging to the Indo-Burma

biodiversity hot spot, which has an unprecedented number of medicinal plants, the basis of indigenous ethnomedical activities (Myers et al., 2000).

In Arunachal Pradesh, the local curative procedures can be used as a form of primary healthcare in the more remote villages where hospital access, the availability of trained physicians and advanced medicine are severely limited by topography, lack of connectivity and weather conditions. The traditional healers, mostly the aged, herbalists, shamans, or ritual experts, are at the heart of diagnosis, prescription of remedies, and even conducting healing rituals. These practices entail a lot of familiarity with medicinal plants, preparation methods, dosage, and availability of these plants in certain seasons, and spiritual means of treating the ailments that are thought to be caused by supernatural or social factors (Tangjang et al., 2011).

Hundreds of plant species have been reported in ethnobotanical studies in the Arunachal Pradesh to treat various disorders, including gastrointestinal diseases, respiratory infections, skin diseases, fevers, reproductive health, and mental disorders (Kala, 2005; Tangjang et al., 2011). Treatment techniques are decoctions, infusions, pastes, poultices, and dietary treatments, and are usually accompanied by ritual practices and communal involvement. This kind of practice demonstrates the high level of knowledge of pharmacological characteristics, ecological cycles, and human physiology that have been formed through experimental experience in the course of centuries and through the process of intergenerational transmission (Berkes, 2018).

In addition to the therapeutic purpose, indigenous healing in Arunachal Pradesh reflects the concept of sustainability and environmental custodianship. The harvesting of medicinal resources is under the customary norms governing the seasons, quantities, and methods of harvesting the resources hence avoiding overexploitation of the resources and ensuring regeneration of the plant species (Cunningham, 2001). Conservation ethics are further supported through sacred groves, taboo species and ritual restraints and these show how cultural values can be used in protecting biodiversity. In this regard, indigenous healthcare systems are considered as coherent socio-ecological institutions that concurrently maintain human wellbeing and ecological wellbeing.

Nevertheless, there is a growing threat to such systems through the fast socio-economic changes. Growth of formal education, marketization, urbanization, and increased superiority of biomedical care have all led to marginalization of indigenous knowledge of healing. The young generations tend to think of old practices as being out of date or unscientific and hence there is a loss of knowledge and continuity of the practitioners (Kala & Ratajc, 2012). Further, indigenous knowledge is mostly oral and, therefore, is easily lost unless it is systematically written and institutionalized.

This situation is complicated by the fact that Arunachal Pradesh is a border state. Communities that live on the borders are usually subjected to increased state monitoring, infrastructural abandonment, and development demands that may interfere with traditional livelihoods and knowledge regimes. However, such communities are also important in ensuring ecological stability and the continuity of culture in vulnerable border zones. Appreciating and empowering indigenous healing in these situations is, therefore, not just a cultural issue but also a strategic and sustainable development issue.

This paper contextualizes the healing practices of indigenous people of Arunachal Pradesh in the context of Indigenous Knowledge Systems and highlights its applicability to sustainable healthcare, ecological care, and community stability. The investigation of ethnomedical customs and cultural beliefs, as well as modern issues, aims to predict the future of indigenous healing as an authentic and precious knowledge system. The paper presents the thesis that respectful dialogue, participatory research and policy support can help to ensure that meaningful integration of indigenous knowledge with modern healthcare frameworks can bring more inclusive, culturally sensitive and sustainable health governance in the Indian border regions.

Review of Literature, Research Gap and Rationale

Ethnomedicinal Practices among Indigenous Tribes of Arunachal Pradesh

The ethnomedicinal practices and knowledge of the Arunachal Pradesh have always been enriched and diverse as scholarly literature on ethnomedicinal practices of Arunachal Pradesh has demonstrated. The rugged terrain, remoteness, and ecological diversity of Arunachal Pradesh have created a high reliance of traditional healthcare systems by the indigenous communities. The past several decades of ethnobotanical and ethnomedical research had recorded a rich array of applications of plant, animal and mineral resources in the treatment of a broad range of conditions, which represent a complex level of knowledge of local ecology and human health (Kala, 2005; Tangjang et al., 2011).

The extent and volume of plant-based traditional medicine in Arunachal Pradesh is evidenced by a thorough survey by Bushi et al. (2021), which recorded 358 medicinal plant species used by 14 native communities to treat over 100 different conditions. This is a review that is published in *Ethnobotany Research and Applications*, and it emphasizes the prevalence of herbal remedies that are done by way of decoctions, infusions, pastes, and poultices, and the cultural guidelines that govern the use of the same. These results make indigenous healing practices the main healthcare tool, especially in geographically remote regions where the modern healthcare system is restricted or unavailable.

The heterogeneity of the systems of healing is further brought out by tribe-specific studies. The studies on the Nocte tribe have shown that the traditional medicinal system is highly established based on both floral and faunal sources to treat maladies of the gastrointestinal system, circulatory problems, skin diseases, fevers, and long-term illnesses. In the *Indian Journal of Traditional Knowledge*, Tangjang et al., (2025) record the comprehensive pharmacopoeia and culturally controlled harvesting of the Nocte community with a focus on the ecological ethics of their healing systems.

On the same note, the work on the Nyishi tribe, the biggest indigenous group in Arunachal Pradesh, indicates a fully integrated healing system, based on medicinal plants, animal-derived substances, ritual healing, and belief system. According to Chokio (2018), the practice of Nyishi healing cannot be discussed outside of spiritual cosmology as the illness is frequently explained by the lack of harmony between humans, nature, and supernatural powers. Healing thus consists of both herbal medicines and ritual healing done by the traditional healers or shamans.

Multi-species plant remedies with magico-religious practices have been ethnomedicinally recorded among the Adi people. According to Ramya and John (2021), Adi healing traditions are characterized by the

involvement of the community and ritual cleansing, which is a socio-cultural vision of health and disease. The customs are inextricably connected with festivals, oral culture, and worship of ancestors, which strengthens the wellbeing of communities.

Apatani tribe which is one of the most studied tribes has great ethnobotanical knowledge. In one of the most significant works, published in the Journal of Ethnobiology and Ethnomedicine, Kala (2005) documents the application of many different species of plants to treat respiratory, digestive, dermatological, and reproductive health problems. Apatani healing systems are also distinctive in the fact that they are interconnected with sustainable agricultural and forest management systems, which also proves that health and ecology can never be separated.

Even studies of the Tagin and Wancho tribes indicate the use of various plant and animal species as medicines. This is supported by studies published by the National Institute of Science Communication and Policy Research (NIScPR) that show that these communities have a meticulous knowledge of the habitat-specific medicinal resources, and the therapies are tailored to seasonal and environmental differences (Goswami et al., 2009; Gauri et al., 2025).

Altogether, these researches confirm that Indigenous Knowledge Systems are essential healthcare systems, especially in border and remote areas, where the biomedical facilities are still insufficient. The indigenous healing methods not only treat the physical illnesses, but also strengthen the cultural identity, social unity and ecological accountability.

Sustainability and Ecology Knowledge

There is an accumulating literature on the inherent sustainability of indigenous systems of healing. The medical traditions of the indigenous people are based on the biological resources that are local to them, ethical harvesting, and the preservation standards that are imposed by the culture. According to Cunningham (2001), traditionally practiced medicinal systems usually have self-regulating models that do not allow overexploitation of the resources and guarantee its intergenerational use.

In native ecological knowledge, the practices that are being made in terms of harvesting seasons, harvesting quantities, and harvesting practices are influenced by the indigenous ecological knowledge and hence the practice of healthcare is in line with the conservation of biodiversity. Ecological stewardship is further enhanced by sacred groves, ritual taboos, and customary laws (Berkes, 2018). According to the sustainability-oriented discussions, indigenous healing practices are low-carbon, community-based healthcare that fits the modern sustainability discourses well (Sustainability Directory, 2023).

Threats and Current Issues

The challenges to indigenous healing systems are very high, even though they are very resilient. The major issue that has been found in the literature is that there is no overall documentation across tribes. Numerous healing activities especially of smaller or remote groups like the Mishings in East Siang district are not recorded and the risk of the knowledge loss is irreparable (Sajem & Gosai, 2006).

The other issue of concern is the loss of intergenerational knowledge transfer. The younger generations are moving more to receive education and work with the perception that they are often not close to the

traditional ways of doing things and they are instead not in sync with the new ways of life (Kala & Ratajc, 2012). This is further worsened by the fact that indigenous knowledge is mainly oral.

Moreover, even though policy discourse is growing more accepting of the importance of traditional knowledge, there are poor institutional mechanisms of integration with mainstream healthcare. Recent debates in regional policy arenas and mass media have noted the lack of formal mechanisms of validating, supporting and ethically incorporating indigenous healing practices within the structures of public health (India Today NE, 2025).

Research Gap and Rationale

Despite the fact that the literature on the subject offers some important ethnobotanical and ethnographic information, there are still a number of gaps. To begin with, the majority of the literature use a descriptive ethnobotanical approach, with little interest in sustainability, resilience, and Indigenous Knowledge Systems as comprehensive systems. Second, cross-cultural and cross-tribal comparisons and integration are limited, particularly among tribes living in the border areas. Third, the role of modernization, policy neglect, and generational changes as an aggregate of influence on the perpetuation of indigenous healing knowledge is not thoroughly examined.

Furthermore, there has been little emphasis on cross-cultural healthcare integration, the knowledge security of ethics and the possible significance of indigenous healthcare systems in enhancing sustainable health governance in border settings. These gaps are even more urgent considering the ecological vulnerability and the strategic significance of the state of Arunachal Pradesh.

The current research is thus based on the fact that indigenous healing systems should not be seen as cultural artifacts but as dynamic systems that have a role in maintaining health, ecology, and community stability. Placing ethnomedical traditions in the framework of Indigenous Knowledge Systems, this paper aims to fill the gaps that are present and add to more inclusive, culturally responsive, and sustainable health discourse.

Research Questions

1. What is the conceptualization of the indigenous healing practice of the border communities of Arunachal Pradesh in the Indigenous Knowledge Systems as perceived in the existing literature?
2. To what extent are the following sustainability dimensions present in the documented indigenous healing methods of these communities: ecological, cultural and community-based.
3. What are the challenges and opportunities that are presented by scholarly and policy literature on the maintenance and incorporation of indigenous healing knowledge in modern healthcare systems?

Research Objectives

1. To critically analyze the Arunachal Pradesh indigenous healing practices of the border communities in the context of Indigenous Knowledge Systems based on the available academic sources.
2. To examine the sustainability elements of these curing practices, specifically, ecological custodianship, cultural sustainability, and community strength.

3. To investigate issues and possible avenues of protecting and ethically incorporating indigenous healing knowledge into wider health and development contexts.

Methodology

Research Design

The current research follows a qualitative, conceptual and interpretive research design, which is purely based on the review and synthesis of secondary sources. Instead of coming up with primary empirical data, the paper is based on the existing scholarly literature to analyze the state of indigenous healing practices among the border communities of Arunachal Pradesh in the light of Indigenous Knowledge Systems (IKS). This method is especially suitable to investigate the culturally imprinted knowledge systems that are scattered across the ethnographic, ethnobotanical, anthropological, and policy-based investigations. Qualitative desk-based design will provide an opportunity to engage critically with various kinds of knowledge documentation and have an integrative perception of sustainability, cultural continuity, and healthcare practices in indigenous settings (Berkes, 2018).

Nature and Sources of Data

The research is founded on the secondary data gathered in several authoritative and peer-reviewed sources. These include:

Peer-reviewed journal articles on ethnomedicine, ethnobotany, and indigenous healthcare practices in journals like Indian Journal of Traditional Knowledge, Journal of Ethnobiology and Ethnomedicine and Ethnobotany Research and Applications.

- a) Scientific articles and books on certain tribes of Arunachal Pradesh (e.g., Nyishi, Nocte, Adi, Apatani, Tagin, Wancho).
- b) The publications and archives of the research institutions of the country, including the National Institute of Science Communication and Policy Research (NIScPR).
- c) Indigenous Knowledge Systems, the traditional medicine and healthcare integration policy documents, reports, and analytical articles.
- d) Edited books and volumes on Indigenous Knowledge Systems, sustainability and ecological anthropology.
- e) Sources that were of definite academic credibility, institutional support and relevance to the study objectives were only included in order to maintain reliability and scholarly rigor.

Literature Selection criteria

In order to ensure methodological consistency and relevance, the literature was selected under the following criteria:

- a) Thematic relevance: Thematic studies directly discussing indigenous healing practices, ethnomedicine, or traditional healthcare systems in Arunachal Pradesh or similar indigenous settings.
- b) Geographical focus: Preference was made to the literature pertaining to border and remote tribal areas of Arunachal Pradesh.

- c) Credibility of the scholarship: Preference was given to peer-reviewed articles, institutional publications, and well-cited academic publications.
- d) Conceptual alignment: The literature that addressed sustainability, Indigenous Knowledge Systems, ecological stewardship, and cultural resilience was focused on.
- e) Temporal relevancy: Seminal works were also considered, but much more weight was given to those studies published in the past two decades to reflect the recent debates and challenges.

Analytical Framework

It is analyzed using the Indigenous Knowledge Systems (IKS) framework that acknowledges indigenous knowledge to be holistic, relational, place-based and intergenerational. In this context, the analyses of healing practices are not only focused on the therapeutic intervention but also on the socio-cultural and ecological processes inherent in the life of the community.

Also, there was the use of the sustainability literature and traditional ecological knowledge (TEK) in interpreting the role of indigenous healing in conservation of biodiversity, ethical utilization of resources and the long-term wellbeing of the community (Cunningham, 2001; Berkes, 2018).

Method of Data Analysis

The chosen literature was analyzed by a thematic and interpretive content analysis approach. The process involved:

- a) Locating common themes based on aboriginal health and healing notions.
- b) Mapping ethnomedical practices in various tribes and ecological situations.
- c) Evaluating the sustainability aspects like ecological stewardship, cultural continuity, and resilience of the community.
- d) Synthesizing problems of modernization and gaps in policies and transmission of knowledge.
- e) Extrapolating opportunities of integration into modern healthcare systems.
- f) Statistical aggregation was not used but instead conceptual synthesis, comparison and critical interpretation between studies were emphasized.

Ethical Considerations

Even though the research does not imply any direct interaction with indigenous populations and working with primary data, ethical issues are still at the heart of the research. The paper recognizes the indigenous knowledge as a shared intellectual property and not extractive or commodifying. Any interpretation is based on the published literature that has adhered to ethical principles of research. The research gives priority to cultural integrity and knowledge ownership by the community and the significance of benefit-sharing and recognition in any integration undertaken in future.

Discussion

Knowledge Systems on Aboriginal Conceptualizations of Health and Healing

It is evident through the reviewed literature that indigenous border communities of Arunachal Pradesh have a holistic and relational view of the world that they conceptualize health and healing in the context of Indigenous Knowledge Systems (IKS). The health is not seen as a biological state but a balance

between the physical body, the social relations, the spiritual powers, and the natural ecological setting (Berkes, 2018; WHO, 2013). In most native epistemologies, sickness is perceived as a result of disproportion that is ecological, social, moral or spiritual and thus treatment should involve interventions on multiple levels.

The ethnographic and ethnomedicinal research of the tribes, including the Nyishi, Adi, Nocte, and Apatani, demonstrates that herbal treatments are combined with rituals, symbolic actions, and involvement of other members of the community (Chokio, 2018; Kala, 2005; Tangjang et al., 2025). These practices highlight an epistemological position in which medicinal efficacy cannot be separated and disentangled to cultural meaning and spiritual legitimacy. This system of healing, in IKS terms, opposes the reductionist biomedical approach through foregrounding culturally based and ecologically conscious approaches to wellbeing.

This holistic idea of conceptualization also supports the collective health responsibility making healing a communal and not an individual activity. Indigenous healing systems, therefore, are placed within the literature as social institutions that perpetuate the wellbeing of individuals and society.

Sustainability Aspects of Aboriginal Medicine

One of the major lessons that come out of the literature is the sustainability of indigenous healing practices. They are highly context-sensitive and ecologically adaptive and are based on local ecosystems and depend mainly on locally present medicinal plants, animal products, and natural resources (Cunningham, 2001; Kala & Ratajc, 2012). Ethnobotanical research always emphasizes indigenous rules of the harvesting process, restrictions of harvesting seasons, and regeneration periods which are all informal conservation systems.

The ecological ethics are further incorporated in the healing practices through the dependence on sacred groves, taboo species, and ritual restraints (Berkes et al., 2000). These conservation practices which are culturally imposed make sure that the medicinal resources will be available in the long run and ecological degradation will be eliminated. These sustainable practices are especially important in border regions of Arunachal Pradesh, which have weak mountain ecosystems.

In terms of sustainability discourse, indigenous healing systems would be low-cost, low-carbon, and community-based healthcare models (WHO, 2019). They also have valuable insights on the modern sustainability discussions as they show how health systems can be integrated with biodiversity preservation and cultural continuity.

Native Healing, Cultural and Community Strength

In addition to their medicinal role, the indigenous healing practice is critical in preserving cultural identity and communal resilience especially in the border setting characterized by geographical isolation and marginality of socio-political factors. Intergenerational connections and communal memory are strengthened by healing ceremonies, the process of teaching and passing medicinal knowledge orally, and traditional healers (Ramya & John, 2021).

According to the literature, the practices may serve as a memory of cultural knowledge, passing values of respect towards nature, solidarity of the community, and wisdom of the ancestors (Berkes, 2018). In border

areas, where communities are frequently neglected in terms of infrastructure and the state, the indigenous healing systems serve as the adaptive strategies contributing to self-sufficiency and resilience.

Moreover, the fact that the healing practices are embedded in the festivals, rituals, and the daily life of the culture enhances the social cohesion, which empowers the community to address environmental uncertainties, health crisis, and socio-economic shifts. This aspect of resilience makes indigenous healing knowledge a strategic cultural resource and not a leftover tradition.

Constraints on the Continuity of Indigenous Healing Knowledge

The challenges that pose a threat to the persistence of indigenous healing systems are described in the literature in spite of their resilience. Among the most significant ones, there is the loss of intergenerational knowledge transmission, which is caused by the modernization process, formal education that marginalizes the indigenous epistemologies, and migration of young people (Kala & Ratajc, 2012). With the increasing urbanization and biomedical health inclinations of the younger generations, traditional knowledge in healing has been at risk of being eroded away gradually since most of it is performed orally. The other issue that is noted is the disjointed and inconsistent records of indigenous healing practices. Although some tribes like the Apatani and Nyishi are fairly well represented in literature, smaller or isolated tribes have not been well represented in literature (Sajem & Gosai, 2006). This disproportionate visibility helps to lose knowledge and restrict policy participation.

Also, despite the increasing rhetorical awareness of Indigenous Knowledge Systems in policy-making, the institutional practices of linking these systems with mainstream healthcare are still underdeveloped. Lack of formal systems of validation, ethical safeguarding, and collaboration usually leads to marginalization or commodification of indigenous knowledge (India Today NE, 2025).

Opportunities of Ethical and Sustainable Integration with Contemporary Healthcare

According to the reviewed literature, the process of the integration of indigenous healing practices with modern healthcare systems should be viewed as a dialogic and ethical process, but not as the unidirectional absorption of the indigenous healthcare systems by the biomedical ones. Researchers support the idea of pluralistic health models whereby the diversity of epistemological perspectives is valuable, safe, effective, and community-approved (WHO, 2013; Berkes, 2018).

The possible ways are collaborative documentation, community-based validation studies, and culturally competent referral systems with traditional healers and biomedical practitioners working in complementary modes. Notably, any form of integration should protect intellectual property rights, benefit-sharing tools, and cultural autonomy of the indigenous people (Cunningham, 2001).

In areas such as Arunachal Pradesh with borders, these type of integrative strategies may improve access to healthcare and boost cultural sustainability. The literature therefore indicates that there is a need to establish policy frameworks that acknowledge indigenous healing systems as valid sources of healthy governance and not as an alternative.

Recommendations

Following the synthesis of the current literature and the Indigenous Knowledge Systems (IKS) approach that is taken in the study, the following recommendations can be offered to the key stakeholders in order to secure the preservation, ethical use, and sustainable incorporation of the indigenous healing practices among the border communities in Arunachal Pradesh.

Policy Makers and Government Institutions

Policy frameworks that shift towards institutional protection and support of indigenous knowledge are urgently required and must go beyond token acknowledgment of indigenous knowledge. The state and national governments should:

- a) Establish institutionalized ways of recording indigenous healing knowledge by use of community-based and consent-based programs so that such recording does not result in misappropriation and biopiracy (Cunningham, 2001).
- b) Incorporate the use of Indigenous Knowledge Systems into the public health planning in culturally sensitive manners, especially in remote border areas where indigenous methods of healing remain the major sources of primary healthcare (WHO, 2019).
- c) Develop legal protections and benefit-sharing mechanisms in order to safeguard group intellectual property of indigenous communities, in accordance with national biodiversity and traditional knowledge protection models.
- d) Encourage health, tribal affairs, environment, and education departments to work together instead of working in isolation to focus on indigenous healthcare.

Research and Academic Institutions

Research institutions and universities are very important in enhancing the epistemic authority of indigenous knowledge systems. They should:

- a) Foster interdisciplinary research that cuts across ethnobotany, anthropology, public health, sustainability studies and Indigenous Knowledge Systems.
- b) Encourage participatory and community-based research paradigms, in which indigenous healers and elders are viewed as knowledge bearers but not the research subjects (Berkes, 2018).
- c) Integrate Indigenous Knowledge Systems into school curricula within the provisions of the National Education Policy (NEP) 2020, and make indigenous epistemologies a respectable subject among students.
- d) Create regional archives or online archives of indigenous knowledge, which contain ethical access measures and communal possession.

Healthcare Practitioners and Public Health systems

Culturally responsive engagement with indigenous healing traditions can be of great use to the public health systems. It is recommended that:

- a) Cultural competence training is provided to healthcare professionals working in tribal and border regions so that they can learn more about the indigenous beliefs concerning health and illness (WHO, 2013).

- b) Pluralistic models of healthcare should also be considered, in which the traditional healers and the biomedical practitioners work in a complementary and not a competitive relationship.
- c) Referral and collaboration systems be established carefully, with safety in mind, respect and consent of the community.

These strategies have the potential to enhance the healthcare outreach and increase trust between the indigenous populations and official health facilities.

Indigenous Communities and Civil Society Organizations

The sustainability of the healing traditions of indigenous communities is focused on them. It is essential to make internal knowledge transmission mechanisms stronger. The communities and supporting organizations should:

- a) Promote knowledge exchange across generations by means of oral traditions, apprenticeship and community rituals.
- b) Enhance local conservation in communities who conserve medicinal plant habitats and sacred ecological areas.
- c) Be proactive on academic and policy platforms to exercise control over the form in which indigenous knowledge is constructed, documented, and used.
- d) The civil society organizations may play the role of mediator, which helps in capacity-building and at the same time, protects cultural autonomy.

Conclusion

Aboriginal medical activities of the communities living in the border of Arunachal Pradesh are living examples of Indigenous Knowledge Systems that combine health, environment, spirituality, and culture into a coherent and sustainable worldview. These practices as evidenced by review and synthesis of existing literature are not a fringe of residual traditions but are adaptive systems, which have allowed communities to maintain wellbeing in ecologically vulnerable and geographically distant settings.

The paper indicates that indigenous health systems play an important role in promoting sustainable health care, biodiversity, cultural survival, and resilience of communities. Their dependency on local resources, moral ecological practices, and their involvement gives useful insights to the contemporary discussions of sustainability and inclusive health governance. Concurrently, these systems experience mounting challenges due to modernization, loss of intergenerational transmission of knowledge, poor documentation, and poor policy integration.

It is in this context that this paper demonstrates the necessity of shifting the nature of extractive or instrumental treatment of the indigenous knowledge to the respectful, dialogic, and ethical treatment of the indigenous knowledge by positioning indigenous healing practices within an Indigenous Knowledge Systems perspective. Protecting such systems involves concerted efforts among policymakers, researchers, healthcare professionals and indigenous communities themselves.

Within the borders of the Arunachal Pradesh, where ecological management, cultural integrity and human wellbeing are inseparable, it is not only the developmental but moral obligation to identify and empower

the indigenous healing knowledge. The future directions should see to it that the indigenous knowledge systems remain vibrant as dynamic and community-owned and sustainable health and wellbeing pillars in the fast changing world.

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