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Investigate the Ethnomedical Practices of Different Indigenous Communities: A literature Review

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Abstract

Ethnomedical practices have been integral to the health and cultural identity of indigenous communities worldwide, encompassing holistic approaches such as the use of medicinal plants, rituals, and traditional healing methods. This study specifically focuses on phytotherapy, the use of medicinal plants for therapeutic purposes, investigating its documentation, efficacy, and potential integration into modern healthcare systems. Using the PRISMA methodology, a comprehensive literature review was conducted on 3,851 records identified through SCOPUS. After systematic screening and eligibility assessment, 36 studies were included, emphasizing the pivotal role of plant-based remedies in addressing physical ailments while supporting emotional, spiritual, and communal well-being. These phytotherapeutic practices, deeply rooted in cultural heritage, prioritize preventive care, balance, and personalized approaches, making them particularly effective in areas with limited biomedical healthcare access. Key challenges include under-documentation, the lack of standardized preparation and dosage protocols, and integration barriers. However, the findings highlight the potential for collaboration between traditional healers and biomedical practitioners, fostering mutual enrichment and cultural sensitivity. This study concludes that phytotherapy, as a vital component of ethnomedical systems, represents an invaluable knowledge resource with the potential to complement modern healthcare by expanding treatment options, preserving indigenous heritage, and promoting sustainable integration into global healthcare frameworks. It recommends further participatory research, interdisciplinary collaboration, and capacity-building initiatives to overcome current challenges and ensure the preservation and application of these traditional practices.

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INTRODUCTION

Indigenous communities across the globe have long relied on ethnomedical practices to address their health and wellness needs. These practices, rooted in traditional knowledge and cultural beliefs, encompass various approaches, with a significant emphasis on

phytotherapy—the use of medicinal plants for therapeutic purposes—alongside rituals, ceremonies, and holistic healing methods (Gebru et al., 2021; Rodríguez-Zúñiga, 2023; Struthers & Eschiti, 2004). Phytotherapy not only serves as a practical healthcare solution but also embodies the deep cultural and ecological knowledge of indigenous communities. Traditional medicine, particularly the use of medicinal plants, forms a core part of the customs and languages of these communities, serving as a vital component of their cultural identity and heritage (Rodríguez-Zúñiga, 2023; Mathez-Stiefel et al., 2012). This integration of cultural heritage into health practices highlights the importance of preserving and understanding these traditions, especially the phytotherapeutic dimension, in the context of modern healthcare.

The integration of indigenous healing practices with biomedical healthcare has gained recognition as a valuable approach to providing comprehensive care that respects and incorporates diverse cultural perspectives (Mathez-Stiefel et al., 2012; Logan et al., 2020). Research has underscored the importance of incorporating concepts such as balance, holism, and cultural healing into healthcare services tailored for indigenous populations (Hunter et al., 2006). The coexistence of indigenous and biomedical health traditions can lead to the development of complementary knowledge and practices, ultimately benefiting the overall well-being of these communities (Mathez-Stiefel et al., 2012).

Ethnomedical practices go beyond addressing physical health issues, extending to mental, emotional, and spiritual aspects of healing (Drost, 2019). Indigenous healing systems typically emphasize a holistic approach, recognizing the interconnectedness of mind, body, and spirit (Stewart, 2020). By acknowledging and incorporating traditional healing methods, healthcare providers can better support the unique health needs of indigenous peoples in a culturally sensitive and respectful manner (Drost, 2019; Logan et al., 2020). This holistic perspective is essential for creating healthcare models that truly serve the needs of indigenous populations.

However, challenges persist in preserving and integrating indigenous healing practices within modern healthcare systems. Ethical dilemmas often arise regarding the use of traditional medicinal plants without proper consent, and there is a risk of eroding cultural integrity (Wolff, 2014). Addressing these challenges requires a respectful and collaborative approach to ethnomedicine. Efforts to include indigenous healing practices in patient care plans and to raise awareness among healthcare professionals about the value of traditional medicine are crucial steps towards promoting culturally appropriate healthcare for indigenous communities (Logan et al., 2020; Stewart, 2020).

The ethnomedical practices of indigenous communities represent a rich tapestry of knowledge and traditions, with phytotherapy—the therapeutic use of medicinal plants—playing a central role in significantly contributing to the health and well-being of these populations. By fostering collaboration, respect, and understanding between traditional healing systems, particularly phytotherapeutic practices, and modern healthcare approaches, it is possible to create more inclusive and effective healthcare services that meet the diverse

needs of indigenous peoples. This study aims to investigate these ethnomedical practices, with a specific focus on phytotherapy, and explore how they can be integrated into contemporary healthcare frameworks to enhance overall health outcomes for indigenous communities.

Ethnomedical practices among indigenous populations include a broad spectrum of health-related activities deeply intertwined with cultural rituals and traditions, with phytotherapy often serving as a cornerstone of these systems. These practices frequently utilize locally available resources, such as medicinal plants, prepared and administered according to ancestral knowledge passed down through generations (Gebru et al., 2021). The preparation and use of these plants involve complex knowledge systems encompassing identification, harvesting, processing, and dosage. These traditional phytotherapeutic methods are not only pivotal for addressing physical ailments but also contribute to maintaining spiritual and communal harmony, reinforcing their cultural and holistic value.

The holistic approach of indigenous healing practices is fundamental to understanding their effectiveness and relevance. This approach does not isolate illness to a physical symptom but addresses the whole person, including their emotional and spiritual well-being. For instance, certain healing rituals might involve community participation, which reinforces social bonds and provides a support network for the individual undergoing treatment (Stewart, 2020). These rituals and ceremonies are often tailored to the specific needs of the individual and their particular context, demonstrating a high degree of personalized care that modern healthcare systems can learn from.

Incorporating indigenous healing practices into modern healthcare systems requires a paradigm shift that values and respects these traditions. This integration can be beneficial in several ways. Firstly, it acknowledges the cultural identity and autonomy of indigenous peoples, promoting a sense of dignity and respect. Secondly, it offers alternative and complementary treatment options that can be particularly useful in areas where access to conventional medical care is limited (Mathez-Stiefel et al., 2012). Thirdly, the collaborative approach fosters mutual learning and respect between different medical traditions, potentially leading to innovative healthcare solutions.

One of the critical aspects of integrating ethnomedical practices with modern healthcare is the ethical consideration involved. Proper consent and respect for intellectual property rights are paramount when using traditional knowledge, especially regarding medicinal plants and healing techniques (Wolff, 2014). Additionally, healthcare professionals need to be educated about the value and principles of indigenous medicine to effectively incorporate these practices into patient care. This education includes understanding the cultural context of healing practices, the specific health beliefs of the community, and the practical aspects of traditional medicine.

The value of ethnomedical practices in addressing contemporary health challenges cannot be overstated. For example, the holistic approach of these practices aligns well with the growing recognition of the importance of mental health and the interconnectedness of

mind and body in achieving overall well-being (Drost, 2019). By integrating such holistic practices, healthcare providers can offer more comprehensive and culturally sensitive care, which is crucial for improving health outcomes among indigenous populations. This integration also helps in preserving valuable cultural knowledge that might otherwise be lost in the face of modernization and globalization.

Studies have demonstrated that when healthcare systems incorporate traditional healing practices, there is an improvement in patient satisfaction and health outcomes (Logan et al., 2020). This improvement is largely due to the patients' sense of being understood and respected, which enhances their trust in the healthcare system. Furthermore, traditional practices often emphasize preventive care and the maintenance of health, which can reduce the incidence of chronic diseases and improve overall community health (Hunter et al., 2006). These benefits highlight the potential for traditional medicine to contribute significantly to public health initiatives.

In conclusion, the ethnomedical practices of indigenous communities, with phytotherapy as a central element, offer a wealth of knowledge and holistic approaches to health that are deeply rooted in cultural traditions. The integration of phytotherapeutic practices into modern healthcare systems presents a significant opportunity to enhance the quality, accessibility, and inclusivity of healthcare services. By fostering collaboration and mutual respect between traditional healing systems, particularly those centered on medicinal plant use, and biomedical health systems, it is possible to create healthcare models that are more responsive to the diverse needs of populations. This study highlights the importance of documenting and preserving phytotherapy and other ethnomedical traditions, emphasizing their integration into contemporary healthcare frameworks to improve health outcomes while respecting and safeguarding cultural heritage.

Research Problems

The ethnomedical practices of indigenous communities, with a focus on phytotherapy, face numerous challenges in modern healthcare integration. Despite the critical role of phytotherapeutics in traditional healing systems, these practices remain underdocumented and undervalued within biomedical frameworks. The lack of recognition for medicinal plant-based healing methods by mainstream medical professionals often marginalizes indigenous knowledge systems, leading to the erosion of these valuable traditions and limiting their potential contribution to healthcare innovation (Wolff, 2014).

Ethical concerns further hinder the sustainable use of medicinal plants. The commercialization of phytotherapeutics frequently occurs without proper consent or fair benefit-sharing with indigenous communities. This exploitation threatens biodiversity and undermines the cultural and intellectual property rights of the communities that have preserved and practiced these traditions for generations (Wolff, 2014). Addressing these issues requires ethical frameworks that respect indigenous contributions while ensuring equitable resource management.

Practical barriers, such as the lack of standardized protocols for preparation, dosage, and administration of medicinal plants, impede the safe integration of phytotherapy into biomedical systems. Additionally, healthcare providers often lack training to understand or incorporate plant-based remedies into clinical practice, creating miscommunication and mistrust between providers and indigenous patients (Logan et al., 2020). Collaborative efforts among traditional healers, medical professionals, and policymakers are essential to overcome these barriers. Globalization and modernization also pose risks to the preservation of phytotherapeutic knowledge. Younger generations are less inclined to learn traditional practices, resulting in a gradual decline in the transmission of this cultural heritage (Rodríguez-Zúñiga, 2023). Comprehensive documentation and preservation efforts are necessary to safeguard this knowledge while enabling its integration into contemporary healthcare.

This study aims to address these challenges by providing a detailed investigation into phytotherapy practices, exploring their potential for integration into biomedical systems, and ensuring the preservation and sustainable application of this invaluable traditional knowledge.

Objective of the Study and Novelty

The primary objective of this study is to conduct a detailed investigation into the ethnomedical practices of indigenous communities, with a particular emphasis on the use of medicinal plants (phytotherapy). This focus is motivated by the critical role of phytotherapeutics in traditional healing systems and the existing underdocumentation of these practices in the context of modern healthcare integration. By limiting the scope to phytotherapy, the study aims to provide a more precise analysis of plant-based remedies while acknowledging that ethnomedicine encompasses a broader range of practices, including zootherapy and spiritual rituals. This narrowed focus allows for a rigorous exploration of plant-based healing methods and their potential integration into biomedical systems.

The novelty of this study lies in its targeted examination of phytotherapeutics and its multidisciplinary approach to assessing their efficacy and cultural significance. Unlike prior research that often generalizes ethnomedical practices, this study systematically documents plant species, methods, and therapeutic applications unique to various indigenous communities. Moreover, by analyzing empirical findings and engaging with traditional knowledge holders, this research bridges cultural heritage with evidence-based healthcare. The outcome provides actionable strategies for incorporating phytotherapeutics into contemporary health frameworks, enhancing both cultural sensitivity and therapeutic diversity in healthcare systems.

Scope of the Current Study

This study focuses on the phytotherapeutic aspects of ethnomedical practices among indigenous communities, aiming to document, analyze, and integrate these plant-based

healing methods into modern healthcare systems. While ethnomedicine broadly includes practices such as zootherapy and ritual-based healing, this study deliberately narrows its scope to phytotherapy to ensure a more comprehensive and focused analysis of plant-based remedies.

The study encompasses a systematic review of existing literature and empirical evidence, identifying the most widely used medicinal plants and their applications in treating various health conditions. It also addresses challenges in preserving traditional phytotherapeutic knowledge, such as the risks of underdocumentation and biopiracy, while proposing strategies for sustainable integration into contemporary healthcare. By maintaining this focus, the study seeks to contribute meaningful insights into the role of phytotherapy as a bridge between indigenous knowledge systems and biomedical healthcare, ensuring both cultural preservation and practical application.

METHOD

This study employs the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) methodology to conduct a comprehensive literature review on ethnomedical practices, specifically focusing on the use of medicinal plants within phytotherapy. The review aims to explore how these plant-based healing practices can be effectively integrated into modern healthcare systems. By emphasizing the documentation and analysis of medicinal plants and their applications, the study adopts a systematic and transparent approach through the four key stages of PRISMA: identification, screening, eligibility, and inclusion. This targeted focus ensures a detailed and evidence-based understanding of phytotherapy as a core component of ethnomedical practices.

Identification

The first stage involves identifying relevant research articles from the SCOPUS database (https://www.scopus.com) using the keyword "ethnomedical practices of indigenous communities," Boolean string *[("ethnomedical" OR "ethnomedicine") AND ("indigenous communities" OR "native populations")].* This search aims to capture the broad spectrum of research on ethnomedical practices across different indigenous communities. The search includes all documents up to December 1, 2024, ensuring a comprehensive collection of relevant studies.

To achieve this, we conducted a systematic search in SCOPUS using the specified keyword, ensuring that the search strategy was inclusive of all potential relevant literature. The initial search yielded a substantial number of articles, which then underwent a preliminary examination to assess their relevance based on titles and abstracts. This stage aimed to identify trends in research, publication years, and the general scope of studies on ethnomedical practices. The systematic search was designed to be exhaustive, aiming to ensure that no relevant study was overlooked. By focusing on a broad keyword, the search included a wide range of studies, encompassing various aspects of ethnomedical practices from different geographical regions and cultural contexts.

Screening

The screening process involves narrowing down the identified documents based on specific inclusion criteria. This step is critical to ensure that only the most relevant and high-quality studies are included in the review. The screening criteria are as follows:

1. Document Type: Only journal articles are included, as they typically undergo rigorous peer review and are more likely to present reliable and valid research findings. This criterion ensures that the studies reviewed have a certain level of academic rigor and reliability.
2. Language: Only articles published in English are considered to ensure clarity and consistency in the review process. This criterion helps avoid potential issues with translation accuracy and ensures that the review team can fully understand and interpret the study's content.
3. Subject Area: The focus is on articles within the subject areas of medicine, pharmacology, toxicology, and pharmaceutics, as these areas are most relevant to the study's objectives. This focus ensures that the studies reviewed are directly relevant to the integration of ethnomedical practices into modern healthcare systems.
4. Publication Year: The search is restricted to articles published in the last five years (2020-2024) to ensure the inclusion of the most recent research and developments in the field. This criterion ensures that the review reflects the latest findings and trends in the study of ethnomedical practices.
5. Access Type: Only open access articles are included to ensure the availability of full texts for thorough analysis. This criterion ensures that all reviewed articles are accessible for detailed examination and that there are no restrictions on the availability of the studies for future reference.

During this stage, articles that did not meet these criteria were excluded from the review. The remaining articles were then subjected to a more detailed examination to assess their eligibility based on specific content and relevance to the research theme. This two-step process helps ensure that the final set of articles is both relevant and of high quality, providing a solid foundation for the subsequent stages of the review.

Eligibility

The eligibility stage involves a thorough review of the full texts of the screened articles to determine their relevance to the specific theme of "ethnomedical practices of indigenous communities," with a particular emphasis on phytotherapy. This step is crucial to ensure that the included articles provide substantive and focused information aligned with the study's objectives.

Articles were evaluated based on their focus on traditional healing methods, particularly those involving the use of medicinal plants for therapeutic purposes. Studies that detailed the identification, preparation, application, or efficacy of plant-based remedies were prioritized, while those only peripherally related to phytotherapy or lacking sufficient detail on these aspects were excluded. This targeted selection process ensures that the final set of

articles offers a comprehensive and nuanced understanding of phytotherapeutic practices within the broader context of ethnomedicine. The eligibility criteria were rigorously applied to maintain the study's focus on the critical role of phytotherapy in traditional healing systems and its potential for integration into modern healthcare.

Inclusion

The final inclusion stage involves selecting the eligible articles that will be analyzed and discussed in detail. Inclusion is based on the articles' specific focus on ethnomedical practices, ensuring they provide substantial insights into the traditional healing methods and medicinal plants used by different indigenous communities. The included articles are systematically analyzed to extract relevant data, such as the authors, study themes, methods, and findings. This data is then organized and synthesized to provide a comprehensive understanding of the ethnomedical practices of indigenous communities and their potential integration into modern healthcare systems. The inclusion process ensures that the final set of articles provides a comprehensive and detailed understanding of the study's theme, enabling a thorough and in-depth analysis. The PRISMA results are provided in Figure 1.

Data Extraction and Analysis

Once the final set of articles is determined, data extraction is performed to gather key information from each study. This includes details about the authors, publication year, study objectives, methodologies, findings, and conclusions. The extracted data is then systematically organized to facilitate a comprehensive analysis.

The analysis focuses on identifying common themes, patterns, and insights related to ethnomedical practices. This includes examining the types of traditional healing methods and medicinal plants documented in the studies, their reported efficacy, and the cultural context in which they are used. The analysis also explores how these practices can be integrated into modern healthcare systems, highlighting potential benefits, challenges, and strategies for effective integration.

The PRISMA methodology ensures a systematic and rigorous approach to conducting this literature review on the ethnomedical practices of different indigenous communities. By identifying, screening, evaluating, and including relevant studies, this research aims to provide a detailed and comprehensive analysis of traditional healing methods and medicinal plants. The findings from this review will contribute to the broader understanding of how ethnomedical practices can be integrated into modern healthcare systems, promoting culturally appropriate and effective healthcare services for indigenous populations. This study underscores the importance of preserving and respecting the rich cultural heritage of indigenous medicine while exploring its potential to complement and enhance contemporary healthcare practices.

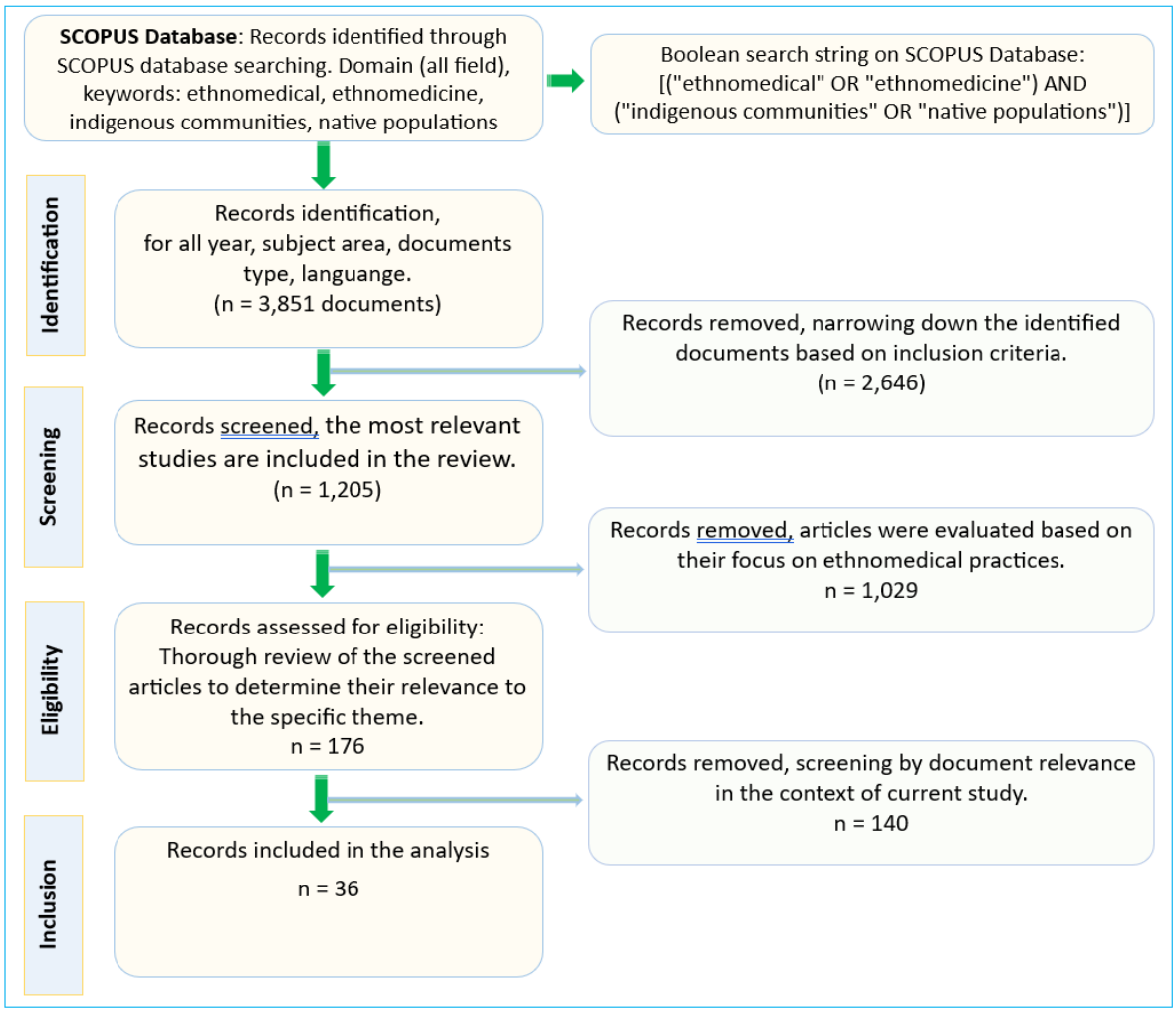

Figure 1. The PRISMA results

RESULTS AND DISCUSSION

Based on the findings summarized in Figure 1, the systematic identification and screening of 3,851 records in the SCOPUS database underscore the extensive research landscape surrounding ethnomedical practices among indigenous communities. The initial identification phase excluded 2,646 articles that did not meet the inclusion criteria, focusing only on peer-reviewed journal articles in English within relevant disciplines like medicine and pharmacology. This rigorous narrowing down reflects the need for precision in selecting studies that delve deeply into traditional healing practices. Despite the abundance of initial results, it became evident that much of the available literature only tangentially addresses ethnomedical practices, underscoring the importance of a focused selection process for obtaining meaningful insights.

The eligibility phase further refined the dataset by thoroughly reviewing the full texts of 176 studies, leading to the exclusion of 140 articles that lacked sufficient relevance or detailed information about traditional healing methods, medicinal plants, or cultural contexts. The final inclusion of 36 studies demonstrates the robustness of the PRISMA approach, which ensured that the selected studies provide in-depth, high-quality documentation of traditional

knowledge systems. The eligible studies collectively represent a comprehensive exploration of the diversity of ethnomedical practices, capturing the unique blend of holistic care, spiritual rituals, and the use of medicinal plants central to indigenous healing traditions. This rigorous process highlights the difficulty of finding detailed, targeted research on such a nuanced topic while also reflecting the richness of knowledge within the selected works.

The final set of studies documents over 200 medicinal plants and a wide variety of phytotherapeutic methods across different indigenous communities. For instance, *Tinospora crispa* and *Artemisia afra* stand out for their demonstrated therapeutic benefits in treating inflammatory and respiratory conditions, respectively, showcasing the efficacy of plant-based remedies in addressing diverse health needs. The studies also emphasize the holistic approach of indigenous practices, where emotional, mental, and spiritual health are inseparable from physical well-being. While rituals and ceremonies often complement phytotherapy, their community-centered nature reinforces social bonds and cultural continuity, integral to many healing processes. This rich diversity, as summarized in Table 1, highlights not only the pharmacological potential of phytotherapeutic practices but also their cultural significance, providing valuable insights for the integration of these plant-based healing methods into healthcare frameworks.

Table 1. Overview of ethnomedical practices documented across indigenous communities

Author(s) & year	Traditional healing types	Medicinal plants documented	Reported efficacy	Cultural context
1. Pisanti et al. (2024)	Decoction of Couroupita guianensis bark.	Couroupita guianensis.	Anticancer activity against gastric adenocarcinoma cell line.	Traditional healing practices in South America.
2. Mpungose et al. (2024)	Traditional veterinary uses.	Strychnos gerrardii morphotypes.	Treatment of animal diseases.	Indigenous practices in South Africa.
3. Kacholi et al. (2024)	Use of medicinal plants.	Plants for gastrointestinal issues.	Effective for digestive health.	Nyamwezi traditional healing in Tanzania.
4. Darro & Khan (2024)	Ethno-medicinal and phytochemical use.	Selected endangered plants from Chhattisgarh.	Noted therapeutic properties.	Indigenous communities in Chhattisgarh, India.
5. Aboua et al. (2024)	Plants for chronic diseases.	Plants for hypertension and ulcers.	Effective for targeted conditions.	Traditional Benin practices.

Author(s) & year	Traditional healing types	Medicinal plants documented	Reported efficacy	Cultural context
6. Fabros et al. (2024)	Biophysiological profiling.	Ganoderma resinaceum.	Promising medicinal uses.	Philippine mushroom-based practices.
7. Ralte et al. (2024)	Survey of medicinal plants.	Plants in Mizoram.	Traditional health maintenance.	Indigenous community practices in India.
8. Kalita et al. (2024)	Ethnobotanical study.	Medicinal plants in Assam.	Treatments for diverse ailments.	Traditional Assamese practices.
9. Jena et al. (2024)	Ethnomedicinal and nutritional evaluation.	Wild edible plants in Koraput District.	Support for community health.	Tribal practices in Odisha, India.
10. Zemede et al. (2024)	Use of local medicinal plants.	Various plants by Gamo people.	Effective against digestive and skin diseases.	Traditional Gamo Zone practices in Ethiopia.
11. Ramadwa & Makhubu (2024)	Comprehensive reviews.	Cedrelopsis grevei.	Traditional use for health improvements.	Heritage practices in South Africa.
12. Oresanya et al. (2024)	Phytochemical analysis and application.	Under-utilized leafy vegetables.	Antioxidant and therapeutic benefits.	Traditional African culinary and medicinal practices.
13. Nyirenda & Chipuwa (2024)	Ethnobotanical documentation.	Herbs in Zambia.	Management of various diseases.	Cultural heritage in Zambia.
14. Afzal et al. (2024)	Traditional knowledge exploration.	Medicinal flora in Punjab Province.	Wide-ranging health benefits.	Cultural practices in Pakistan.
15. Gum et al. (2024)	Ethnobotanical survey.	Medicinal plants in Amuru district.	Treatment of common illnesses.	Northern Uganda practices.
16. Galvez (2024)	Ethnobotanical documentation.	Medicinal plants used by Tuwalis.	Improved community health.	Cultural practices in Cordillera, Philippines.
17. Rafiri et al. (2024)	Comparative ethnomedicine.	Artemisia afra.	Bioactive properties with mineral benefits.	Traditional practices in South Africa and Lesotho.

Author(s) & year	Traditional healing types	Medicinal plants documented	Reported efficacy	Cultural context
18. Boakye et al. (2024)	Veterinary ethnomedicine.	Plants for chicken diseases.	Effective for disease management.	Ethnoveterinary practices in Ghana.
19. Rosero-Toro et al. (2024)	Knowledge for biocultural conservation.	Various plants for education.	Cultural knowledge preservation.	Indigenous practices in Colombia.
20. Cordero et al. (2023)	Quantitative ethnobotany.	Plants used in Iloilo, Philippines.	Treatment for common ailments.	Rural community practices.
21. Renu et al. (2023)	Treatment of skin ailments.	Plants in Uttarakhand.	Improvement in dermatological conditions.	Cultural knowledge in India.
22. Muratović & Parić (2023)	Use of local plants.	Various plants in Bosnia.	Treatment of chronic diseases.	Historic and modern practices in Bosnia.
23. Pandey et al. (2023)	Applications of Caesalpinioideae.	Plants in Uttar Pradesh.	Support for chronic ailments.	Conservation of traditional knowledge in India.
24. Jan et al. (2023)	Ethnomedicinal use in pregnancy.	Various local plants.	Healthcare during childbirth.	Traditional practices in Kashmir Himalaya.
25. Bamon & Lalnundanga (2023)	Treatment of diabetes.	Plants by Pnar tribes.	Improvement of blood sugar levels.	Cultural practices in Meghalaya.
26. Rapinski et al. (2023)	Adaptation of cassava preparation.	Manihot esculenta.	Management of diabetes.	Practices by Parikwene people, French Guiana.
27. Dey et al. (2023)	Documentation for skin diseases.	Plants in Pangi Valley.	Treatment for dermatological ailments.	Practices in Western Himalaya.
28. Hussain et al. (2023)	Ethnobotanical documentation.	Plants in Khatling valley.	Treatments for general ailments.	Practices in Western Himalaya.
29. Lutoti et al. (2023)	Survey among practitioners.	Plants for breast cancer treatment.	Effective for breast cancer symptoms.	Practices in Central Uganda.

Author(s) & year	Traditional healing types	Medicinal plants documented	Reported efficacy	Cultural context
30. Unbushe & Getaneh (2023)	Ethnobotanical studies.	Various plants in Lake Abaya basin.	Treatment for skin and general ailments.	Cultural heritage in Ethiopia.
31. Haque et al. (2023)	Comprehensive review of ethnomedicine.	Tinospora crispa.	Wide pharmacological activities.	Indigenous practices in Southeast Asia.
32. Hadj-Said & Bouazza (2023)	Ethnobotanical surveys.	Plants for respiratory diseases.	Effective for treating respiratory conditions.	Traditional knowledge in Kabylia, Algeria.
33. Al-Hussein & Shahba (2023)	Use of ethno-medicinal practices.	Various African medicinal plants.	Addressing respiratory and social ailments.	Historical and mythical influence in African communities.
34. Kacholi et al. (2022)	Management of STDs.	Plants for gonorrhea and syphilis.	Effective traditional treatments.	Tabora Region practices, Tanzania.
35. Bhandari et al. (2021)	Ethnobotanical study.	Plants in Panchthar District.	Treatment for multiple conditions.	Traditional knowledge in Nepal.
36. Wendimu et al. (2021)	Survey of medicinal plants.	Plants for livestock and humans.	Comprehensive health benefits.	Practices in Wolaita, Ethiopia.

Traditional Healing Methods and Medicinal Plants

Traditional healing practices, deeply ingrained in the cultural fabric of indigenous communities, reflect humanity's enduring connection to nature. Across the 36 studies analyzed, a wide array of healing methods and medicinal plants emerges, highlighting the diversity and innovation of ethnomedical systems globally. These practices not only address immediate health needs but also preserve invaluable knowledge for future generations.

Healing Methods Rooted in Nature

The most prominent theme across the studies is the use of plant-based remedies in treating various ailments. For instance, Pisanti et al. (2024) documented the use of Couroupita guianensis bark decoction, a traditional preparation employed in South America for its anticancer properties against gastric adenocarcinoma. Similarly, Darro and Khan (2024) explored the use of phytochemical extractions from endangered plants in Chhattisgarh, India, emphasizing their role in addressing community health challenges.

In Ethiopia, Zemede et al. (2024) highlighted the reliance of the Gamo people on local plants for digestive and skin conditions. These practices reflect a sophisticated understanding

of plant pharmacology, often acquired through centuries of observation and experimentation. Similarly, Dey et al. (2023) explored ethnomedicine in the Western Himalayas, where plants are utilized to address dermatological ailments, underscoring the practical applications of biodiversity.

The knowledge of plant-based healing extends to regions like Mizoram, India, as documented by Ralte et al. (2024). Here, indigenous healers employ a range of medicinal plants to treat common ailments, combining traditional wisdom with ecological awareness. This is mirrored in Nyamwezi practices in Tanzania, where local healers use plants to manage gastrointestinal disorders (Kacholi et al., 2024). These examples illustrate the ingenuity of indigenous communities in tailoring nature's resources to meet specific health needs.

Diversity of Medicinal Plants

The range of medicinal plants documented in these studies is staggering, reflecting the biodiversity of the regions where these practices thrive. For example, Haque et al. (2023) provided a comprehensive review of Tinospora crispa, a plant widely used in Southeast Asia for its antioxidant, anti-inflammatory, and antidiabetic properties. In Algeria, Hadj-Said and Bouazza (2023) reported on plants used for respiratory ailments, demonstrating their effectiveness in addressing chronic diseases.

In Lesotho and South Africa, Rafiri et al. (2024) highlighted Artemisia afra as a key medicinal plant for its bioactive properties, further showcasing its role in traditional healing. Similar reliance on botanical diversity was reported in the Cordillera Administrative Region of the Philippines, where Galvez (2024) documented medicinal plants used by the Tuwali community for general health.

Africa offers a treasure trove of medicinal plants. Nyirenda and Chipuwa (2024) explored herbs in Zambia, revealing their application in treating various ailments, while Boakye et al. (2024) extended the understanding of ethnoveterinary medicine through plants used for poultry diseases in Ghana. In contrast, Rapinski et al. (2023) examined the use of cassava (Manihot esculenta) in French Guiana, highlighting its dietary and medicinal role in managing diabetes.

Integrating Traditional Wisdom with Modern Needs

Many documented practices reveal a seamless integration of traditional wisdom with contemporary health challenges. For instance, Muratović and Parić (2023) examined the use of local medicinal plants in Bosnia, emphasizing their continued relevance in addressing chronic diseases. Similarly, Jan et al. (2023) reported the use of ethnomedicine in pregnancy and postpartum care in Kashmir Himalaya, showcasing how traditional practices cater to the unique needs of maternal health.

In Mizoram, Ralte et al. (2024) documented the indigenous use of medicinal plants, emphasizing their effectiveness in treating both chronic and acute conditions. Such practices illustrate the adaptability of traditional systems in responding to evolving healthcare demands. Additionally, Dey et al. (2023) in the Western Himalayas and Zemede et al. (2024)

in Ethiopia both highlighted practices targeting dermatological and digestive issues, respectively, underscoring the broad applicability of traditional medicine.

Ethnomedicinal Practices in Veterinary Care

An interesting dimension of traditional healing practices is their application in veterinary medicine. Boakye et al. (2024) detailed the use of medicinal plants in treating poultry diseases in Ghana, reflecting an eco-centric approach to healthcare. This is complemented by studies in Ethiopia (Wendimu et al., 2021), where traditional healers treat both human and livestock ailments using overlapping plant-based remedies. Such integrative practices highlight the interconnectedness of human, animal, and environmental health in indigenous systems.

Regional Specificities and Shared Practices

While many practices are region-specific, certain similarities across cultures demonstrate the universality of traditional medicine. For instance, the use of Tinospora crispa in Southeast Asia (Haque et al., 2023) and Artemisia afra in Africa (Rafiri et al., 2024) showcases convergent evolution in the use of plants for similar health outcomes. Likewise, the use of plants for dermatological conditions, as documented in India (Renu et al., 2023) and Tanzania (Kacholi et al., 2024), underscores shared principles in addressing skin health.

Challenges and Opportunities

Despite the wealth of knowledge, challenges remain in documenting and preserving these practices. Many communities face cultural erosion due to globalization, threatening the survival of traditional medicine. For example, studies in Bosnia (Muratović & Parić, 2023) and Nepal (Bhandari et al., 2021) highlighted the risk of losing valuable knowledge without structured preservation efforts. This is where modern documentation, as seen in studies like those by Zemede et al. (2024) and Ralte et al. (2024), plays a crucial role.

On the other hand, the growing recognition of traditional medicine's efficacy presents opportunities for integration into modern healthcare systems. Studies by Pisanti et al. (2024) and Haque et al. (2023) provide scientific validation for traditional claims, paving the way for their broader acceptance and application.

Traditional healing methods and medicinal plants documented across the 36 studies reveal a dynamic interplay between cultural heritage and practical healthcare solutions. From treating chronic diseases to managing livestock health, these practices offer sustainable alternatives rooted in ecological wisdom. While challenges persist, the documentation and validation of these systems are vital for their preservation and integration into global healthcare. The richness and adaptability of these traditions not only meet immediate health needs but also inspire a more inclusive and holistic vision of health in the future.

Effectiveness of Traditional Practices

Traditional healing practices have long served as primary healthcare for many communities, offering a range of remedies that reflect deep ecological knowledge and cultural wisdom. Evaluating the effectiveness of these practices involves examining their

pharmacological basis, clinical outcomes, and relevance in modern healthcare contexts. Across the 36 studies reviewed, compelling evidence emerges for the efficacy of these methods, highlighting their potential role in addressing contemporary health challenges.

Pharmacological Validation of Traditional Remedies

One of the most significant steps in evaluating the effectiveness of traditional practices is understanding their pharmacological underpinnings. Studies like Pisanti et al. (2024) showcase this approach by demonstrating the anticancer properties of Couroupita guianensis bark decoction, a remedy traditionally used in South America for gastric adenocarcinoma. This study not only validates the traditional claims but also paves the way for its integration into oncological treatments. Similarly, Haque et al. (2023) provided an exhaustive review of Tinospora crispa, revealing its antioxidant, anti-inflammatory, and antidiabetic properties. This plant, widely used in Southeast Asia, exemplifies how traditional knowledge aligns with modern pharmacological insights. In Algeria, Hadj-Said and Bouazza (2023) examined plants used for respiratory diseases, highlighting their efficacy in treating chronic conditions like asthma and bronchitis, which are prevalent in the region.

The use of Artemisia afra in South Africa, as documented by Rafiri et al. (2024), further demonstrates the effectiveness of traditional medicine. This plant, known for its anti-inflammatory and antimicrobial properties, has been integral to treating a range of ailments, from fevers to infections. Such studies underscore the potential of traditional remedies as sources of bioactive compounds.

Efficacy in Treating Chronic and Acute Conditions

Beyond pharmacological validation, clinical outcomes provide another measure of effectiveness. For instance, Darro and Khan (2024) evaluated the therapeutic properties of endangered plants in Chhattisgarh, India, revealing their success in managing both chronic and acute illnesses. Likewise, Zemede et al. (2024) demonstrated the efficacy of traditional treatments for digestive and skin conditions in Ethiopia, reinforcing the role of indigenous knowledge in addressing primary healthcare needs.

In the Western Himalayas, Dey et al. (2023) explored the use of plants for dermatological conditions. Their findings indicate that these traditional remedies offer significant improvements in skin health, showcasing their utility as affordable alternatives to commercial skincare products. Similarly, Renu et al. (2023) highlighted the success of dermatological treatments in Uttarakhand, India, further validating the efficacy of traditional practices in this domain. Jan et al. (2023) extended this understanding to maternal healthcare, documenting the use of ethnomedicine for pregnancy, childbirth, and postpartum recovery in Kashmir Himalaya. The study revealed that traditional practices effectively addressed nutritional deficiencies and common postpartum ailments, ensuring better maternal outcomes. This highlights the role of traditional medicine in specialized healthcare scenarios.

Effectiveness in Veterinary and Nutritional Contexts

Traditional practices are not limited to human healthcare; their effectiveness extends to veterinary medicine as well. Boakye et al. (2024) documented the use of medicinal plants in

treating diseases in free-range chickens in Ghana. These treatments, which often rely on easily accessible local resources, demonstrated high efficacy in managing common poultry ailments . Similarly, Wendimu et al. (2021) reported the dual use of plants for human and livestock healthcare in Ethiopia, reflecting the interconnected nature of traditional systems.

Nutritional ethnomedicine also plays a critical role. Rapinski et al. (2023) explored the use of cassava (Manihot esculenta) in French Guiana for managing diabetes. The study highlighted how traditional preparation methods enhance the nutritional and medicinal value of cassava, offering an integrative approach to dietary management. This aligns with findings by Oresanya et al. (2024), who demonstrated the health benefits of under-utilized leafy vegetables, showcasing their potential in combating malnutrition.

Addressing Public Health Challenges

Traditional practices also address broader public health challenges, particularly in regions with limited access to conventional medicine. For example, Kacholi et al. (2022) demonstrated the effectiveness of ethnomedicine in managing sexually transmitted diseases like gonorrhea and syphilis in Tanzania. These remedies provide affordable and culturally acceptable alternatives in communities where modern healthcare services are scarce.

In Algeria, Hadj-Said and Bouazza (2023) examined traditional treatments for respiratory diseases, a significant public health issue in the region. Their findings indicate that these remedies not only alleviate symptoms but also reduce the economic burden of chronic respiratory conditions. Similarly, Zemede et al. (2024) highlighted the success of traditional digestive remedies in Ethiopia, underscoring their relevance in primary healthcare.

Challenges in Assessing Effectiveness

Despite the promising outcomes, evaluating the effectiveness of traditional practices is not without challenges. Standardization of dosage, variations in preparation methods, and the subjective nature of symptom relief complicate clinical assessments. For instance, while Galvez (2024) documented the use of medicinal plants in the Cordillera Administrative Region, variations in preparation methods across Tuwali practitioners present difficulties in standardizing efficacy.

Additionally, issues like cultural stigma and lack of scientific validation hinder the broader acceptance of traditional medicine. Studies by Muratović and Parić (2023) in Bosnia and Ralte et al. (2024) in Mizoram emphasize the need for scientific validation to overcome these barriers and integrate traditional practices into mainstream healthcare.

Bridging Traditional and Modern Practices

The integration of traditional medicine into modern healthcare systems offers a pathway to address these challenges. Scientific validation, as seen in studies like Pisanti et al. (2024) and Haque et al. (2023), provides a robust framework for assessing efficacy and ensuring safety. These findings reinforce the importance of collaboration between traditional healers and biomedical researchers to enhance the credibility and utility of traditional practices.

Educational initiatives also play a crucial role. By raising awareness about the benefits and limitations of traditional medicine, as highlighted by Rapinski et al. (2023) and Wendimu et al. (2021), communities can make informed decisions about their healthcare. Furthermore, policy support, as advocated in studies like Kacholi et al. (2022), ensures that traditional knowledge systems receive the recognition and resources they deserve.

The effectiveness of traditional practices, as documented across 36 studies, demonstrates their potential to complement modern healthcare. From pharmacological validation to clinical outcomes, these practices offer a wealth of knowledge that addresses diverse health challenges. While challenges remain in standardization and acceptance, collaborative efforts can bridge the gap between traditional and modern medicine, ensuring that these invaluable systems continue to thrive in a rapidly changing world. By embracing their efficacy and preserving their cultural significance, traditional practices can contribute to a more inclusive and sustainable healthcare future.

Strategies for Integrating Ethnomedicine into Healthcare

Integrating ethnomedicine into modern healthcare systems offers a promising avenue for enhancing health equity, fostering cultural inclusivity, and harnessing the benefits of biodiversity. However, such integration requires thoughtful strategies that balance scientific rigor with the preservation of traditional knowledge.

Documentation and Preservation of Knowledge

The foundation of any integration effort lies in the systematic documentation of ethnomedical practices. Studies like Zemede et al. (2024) and Dey et al. (2023) underscore the importance of cataloging local medicinal plants and their applications. By creating comprehensive databases, we can safeguard this knowledge for future generations and make it accessible to researchers and policymakers. For example, Pisanti et al. (2024) documented the anticancer properties of Couroupita guianensis bark decoction, preserving its potential for modern oncological applications. Similarly, Ralte et al. (2024) emphasized the need to record indigenous practices in Mizoram to prevent their erosion due to globalization and modernization. Establishing national and international repositories of ethnomedicine, supported by digital platforms, can facilitate this process.

Scientific Validation and Standardization

Scientific validation is a critical step in building trust and ensuring the safety of traditional remedies. Studies like Haque et al. (2023) and Rafiri et al. (2024) demonstrated the bioactive properties of Tinospora crispa and Artemisia afra, respectively, showcasing how traditional claims align with pharmacological evidence. This validation not only enhances credibility but also identifies potential applications in broader healthcare settings.

To ensure consistency, standardization of preparation methods, dosages, and quality control measures is essential. Galvez (2024) highlighted variations in medicinal plant preparation among Tuwali healers, illustrating the need for standardized protocols to ensure reproducibility and safety. Collaborative research centers that involve traditional healers,

botanists, and pharmacologists can address these challenges by developing guidelines for the clinical use of ethnomedicine.

Policy and Legal Frameworks

Governments and international organizations play a pivotal role in integrating ethnomedicine into healthcare systems. Legal recognition of traditional practices, as suggested by Kacholi et al. (2022) and Wendimu et al. (2021), ensures that indigenous communities retain ownership of their knowledge. Intellectual property rights (IPR) frameworks can prevent biopiracy and ensure fair benefit-sharing from the commercialization of traditional remedies.

Policies must also support the incorporation of ethnomedicine into public health systems. For instance, the use of traditional remedies for respiratory diseases in Algeria (Hadj-Said & Bouazza, 2023) and dermatological conditions in India (Renu et al., 2023) demonstrates their potential for inclusion in national healthcare programs. Policymakers should allocate funding for research, training, and the establishment of clinics that integrate traditional and modern medicine.

Community Engagement and Education

Effective integration requires the active involvement of local communities. Ethnomedicine thrives on the knowledge and practices of indigenous healers, who should be recognized as key stakeholders in healthcare planning. Studies like Boakye et al. (2024) in Ghana and Muratović & Parić (2023) in Bosnia highlight the importance of engaging local practitioners in research and policy development.

Education is equally critical. Training programs for healthcare professionals can include modules on ethnomedicine, as suggested by Rapinski et al. (2023). Similarly, community workshops can raise awareness about the safe and effective use of traditional remedies, reducing misconceptions and stigma. This dual approach ensures that both practitioners and recipients of healthcare are well-informed about the benefits and limitations of ethnomedicine.

Integration into Primary Healthcare

Ethnomedicine can complement primary healthcare, especially in rural and underserved areas. Studies like Kacholi et al. (2024) and Nyirenda & Chipuwa (2024) demonstrate the effectiveness of traditional remedies in addressing gastrointestinal and general ailments, respectively. By establishing integrated clinics, governments can provide holistic care that combines the strengths of both traditional and modern medicine.

For example, in Kashmir Himalaya, Jan et al. (2023) reported the use of ethnomedicine in maternal health, showcasing its potential for addressing gaps in specialized healthcare. Such clinics could offer services like antenatal care, wound healing, and chronic disease management using both traditional and biomedical approaches. This model can also include mobile health units for remote areas, ensuring wider accessibility.

Conservation of Medicinal Flora

The sustainability of ethnomedicine depends on the conservation of medicinal plants. Overharvesting, habitat loss, and climate change threaten the biodiversity that underpins traditional practices. Studies by Rapinski et al. (2023) and Bhandari et al. (2021) highlighted the need for sustainable harvesting practices and habitat preservation to maintain the availability of key medicinal plants.

Collaborative conservation programs involving local communities, environmental organizations, and governments can address this challenge. Initiatives like community-managed herbal gardens, as suggested by Wendimu et al. (2021), can provide a sustainable source of medicinal plants while empowering local stakeholders. Additionally, seed banks and botanical gardens can serve as repositories for threatened plant species.

Research and Development (R&D)

Investing in R&D is crucial for integrating ethnomedicine into mainstream healthcare. Studies like Pisanti et al. (2024) and Haque et al. (2023) exemplify how ethnomedicine can inspire drug discovery and development. Governments and private sectors should fund interdisciplinary research that explores the pharmacological properties, efficacy, and safety of traditional remedies.

Collaborative research centers, as proposed by Zemede et al. (2024), can bring together scientists, traditional healers, and policymakers to innovate and validate ethnomedicine. These centers can also facilitate clinical trials and the development of new formulations based on traditional knowledge.

Cultural Preservation and Resilience

Ethnomedicine is not just about health; it is a cultural asset that reflects the identity and resilience of indigenous communities. Studies like Ralte et al. (2024) and Muratović & Parić (2023) emphasized the importance of preserving traditional knowledge as a means of cultural continuity. By integrating ethnomedicine into healthcare, we can foster cultural pride and ensure that this heritage is passed down to future generations.

Efforts to document traditional practices, as seen in Dey et al. (2023) and Zemede et al. (2024), serve as powerful tools for cultural preservation. Educational initiatives that include ethnomedicine in school curricula can further strengthen this connection, ensuring that young generations appreciate and carry forward their cultural heritage.

Global Collaboration and Knowledge Sharing

The integration of ethnomedicine can benefit from global collaboration. International organizations like the World Health Organization (WHO) can facilitate knowledge sharing among countries with rich ethnomedical traditions. Studies like Kacholi et al. (2022) and Rafiri et al. (2024) demonstrate the universality of certain practices, highlighting opportunities for cross-cultural learning.

Conferences, workshops, and digital platforms can enable the exchange of ideas, research findings, and best practices. For instance, insights from Algeria's respiratory

treatments (Hadj-Said & Bouazza, 2023) and South Africa's use of Artemisia afra (Rafiri et al., 2024) can inform healthcare strategies in similar contexts worldwide.

CONCLUSION

This study highlights the invaluable contribution of ethnomedical practices, particularly phytotherapy, within indigenous communities in addressing a range of health challenges. Rooted in cultural traditions and holistic approaches, phytotherapeutic practices extend beyond physical health to include mental, emotional, and spiritual well-being. Through the synthesis of findings from 36 studies, it is evident that these plant-based healing systems embody deep ecological knowledge and provide insights into community-centered care. Integrating phytotherapy into contemporary healthcare frameworks presents an opportunity to enhance the inclusivity and effectiveness of healthcare services, particularly in regions where biomedical access may be limited.

The integration of phytotherapeutic practices into modern healthcare systems offers a unique pathway to enrich care models by incorporating holistic and personalized approaches. These traditional plant-based methods align with preventive health measures and emphasize the interconnectedness of health and community. By fostering collaboration between traditional healers and modern healthcare providers, systems can enhance their cultural responsiveness, improving both patient satisfaction and health outcomes. This collaboration also ensures that healthcare delivery is inclusive, respecting the diverse cultural contexts in which indigenous communities operate.

To fully realize the potential of phytotherapy and other ethnomedical practices, it is essential to strengthen their documentation and integration within modern healthcare. This study emphasizes the importance of preserving phytotherapeutic knowledge as a means to enrich both cultural heritage and healthcare innovation. Aligning traditional plant-based healing practices with contemporary biomedical systems offers a sustainable and inclusive approach to addressing global health challenges while ensuring that these cultural traditions continue to thrive in an increasingly globalized world.

LIMITATIONS AND RECOMMENDATIONS

This study is limited by its reliance on secondary data, which may not capture the full scope of ethnomedical practices or variations across communities. Additionally, some regions and practices remain underrepresented due to the availability of published research. Future studies should focus on community-based, participatory research methods to ensure the comprehensive documentation of traditional practices directly from indigenous knowledge holders. Collaborative research that involves traditional healers, healthcare providers, and policymakers is critical to effectively integrate ethnomedical systems into broader healthcare frameworks. Investment in training and education for healthcare providers to understand and incorporate traditional practices can create culturally sensitive care models that support the health needs of diverse populations.

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The authors have sufficiently contributed to the study, and have read and agreed to the published version of the manuscript.

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Conflict of interests

The authors declare no conflict of interest.

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