

Cultural Values, Health Literacy, and the Transformation of Traditional Medicine Practices in Modernized Societies: A Systematic Literature Review

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ABSTRACT

Traditional medicine (TM) remains an important component of healthcare systems worldwide because it is deeply embedded in cultural values, indigenous knowledge, and community-based health practices. However, modernization, scientific advancement, and changing health information environments have transformed the ways in which traditional medicine is understood, practiced, and integrated into contemporary healthcare systems. This study aims to examine the role of cultural values and health literacy in shaping the transformation of traditional medicine practices in modernized societies. A systematic literature review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines. Literature searches were performed across four international databases, namely Scopus, Web of Science, PubMed, and ScienceDirect. A total of 15 international scientific articles were selected through a systematic identification, screening, eligibility assessment, and inclusion process. The selected studies were examined using a descriptive-analytical approach to identify patterns related to cultural values, health literacy, knowledge transmission, transformation processes, and challenges associated with traditional medicine development. The findings indicate that cultural values play a central role in sustaining traditional medicine through beliefs, spirituality, social identity, and intergenerational transmission of indigenous knowledge. The review also demonstrates that health literacy influences how communities access, interpret, and evaluate traditional medicine practices, particularly regarding safety, scientific validation, and the integration of traditional and biomedical healthcare approaches. Furthermore, traditional medicine has undergone various transformation processes, including cultural persistence, adaptation to modern contexts, integration into formal healthcare systems, digitalization, biotechnology-based innovation, and evidence-based modernization. Nevertheless, challenges remain concerning regulatory frameworks, standardization, scientific validation, and the balance between cultural preservation and biomedical requirements. This study recommends strengthening culturally responsive health education, interdisciplinary research collaboration, and evidence-based policy development to support the sustainable transformation and integration of traditional medicine within modern healthcare systems.

Keywords: Traditional Medicine, Cultural Values, Health Literacy, Indigenous Knowledge, Healthcare Integration, Systematic Literature Review

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INTRODUCTION

Traditional medicine (TM) continues to play an important role in healthcare systems worldwide despite the rapid advancement of modern biomedical services. In recent years, global health institutions have increasingly recognized the relevance of traditional, complementary, and integrative medicine (TCIM) as part of people-centered healthcare and

universal health coverage strategies ([WHO, 2025](#)). This recognition reflects the growing understanding that healthcare practices are not shaped solely by biomedical effectiveness but are also influenced by cultural contexts, community values, accessibility, and health-related knowledge systems. Recent reviews indicate that TM remains widely practiced across diverse socioeconomic settings because it is embedded within cultural traditions, indigenous knowledge systems, and community-based health practices ([Najibi et al., 2025](#); [Maghrabi et al., 2025](#)). Therefore, understanding how traditional medicine persists and transforms within modern societies has become an important issue in contemporary health research.

Traditional medicine represents more than a therapeutic practice; it constitutes a complex knowledge system that integrates health beliefs, cultural identity, spirituality, and social relationships. Cultural values significantly shape how individuals conceptualize illness, interpret healing processes, and make decisions regarding healthcare utilization. Previous research has demonstrated that cultural beliefs, social norms, trust in traditional practitioners, and intergenerational knowledge transmission are key factors sustaining the utilization of traditional medicine across generations ([WHO, 2023](#); [Zhang et al., 2022](#)). In many communities, traditional medicine maintains its legitimacy not only because of its perceived therapeutic benefits but also because it serves as a means of preserving cultural identity and transmitting indigenous knowledge. Ethnomedical practices and traditional healing systems continue to be maintained through family networks, community interactions, and culturally embedded learning processes, particularly among indigenous and rural populations ([Kim et al., 2022](#); [Vandebroek & Balick, 2020](#)). Therefore, understanding the sustainability of traditional medicine requires consideration of both its health-related functions and its broader sociocultural significance.

However, the relationship between traditional medicine and modernization remains complex. Classical modernization theory suggests that scientific rationality, technological advancement, and expanded access to formal education gradually reduce dependence on traditional beliefs and practices. From this perspective, improvements in biomedical healthcare systems should weaken the role of traditional medicine. Nevertheless, empirical evidence challenges this assumption. Recent studies demonstrate that TM continues to exist in highly modernized societies and has undergone various forms of transformation, including adaptation, institutional recognition, scientific validation, and integration into formal healthcare systems ([Care et al., 2021](#); [WHO, 2025](#)). This indicates that modernization does not necessarily eliminate traditional medicine but may instead reshape its practices, meanings, and functions within contemporary healthcare environments.

The transformation of traditional medicine has been accelerated by developments in science, technology, and health information systems. Contemporary TM practices increasingly interact with biomedical research, biotechnology, digital technologies, and evidence-based healthcare approaches. For example, recent studies have explored the use of artificial intelligence for identifying medicinal plants, biotechnology applications for traditional compounds, and scientific approaches for validating traditional therapies. These developments demonstrate that traditional medicine is not a static cultural artifact but a dynamic knowledge system capable of adapting to changing social and technological environments.

Alongside cultural values, health literacy has become an important factor influencing how communities understand, evaluate, and utilize traditional medicine. Health literacy

determines individuals' ability to access, interpret, and apply health information when making healthcare decisions. In the context of TM, increased access to health information may influence how individuals assess traditional practices, distinguish between beneficial and potentially harmful treatments, and negotiate between traditional and biomedical healthcare options. However, existing evidence suggests that improved health literacy does not necessarily lead to the abandonment of traditional medicine. Instead, individuals may combine traditional and modern healthcare approaches based on personal beliefs, cultural backgrounds, and perceived health needs (Ung et al., 2023). Therefore, health literacy may function not as a replacement mechanism but as a factor shaping the adaptation and reinterpretation of traditional medicine in modern societies.

Furthermore, health literacy plays an important role in preserving and transforming traditional knowledge by fostering critical, informed, and culturally sensitive engagement with traditional health practices. Recent evidence highlights that culturally responsive health education can strengthen health literacy by acknowledging local knowledge systems while simultaneously promoting safe, effective, and evidence-based healthcare decision-making (Jarrar et al., 2024; Chen et al., 2025). Rather than positioning scientific knowledge and traditional knowledge as competing frameworks, contemporary healthcare perspectives increasingly emphasize dialogue, collaboration, and integration between different knowledge systems. This approach is particularly relevant because sustainable healthcare development requires a balance between cultural preservation, scientific validation, and community acceptance of health interventions.

Despite increasing scholarly attention toward traditional medicine, several research gaps remain. First, previous studies have frequently examined cultural values and health literacy as separate factors influencing healthcare behavior. Research on cultural values primarily focuses on explaining why traditional medicine persists, while studies related to health literacy tend to emphasize information access, healthcare decision-making, and acceptance of evidence-based practices (Maghrabi et al., 2025; Najibi et al., 2025). Limited attention has been given to understanding how cultural values and health literacy interact in shaping the transformation pathways of traditional medicine practices.

Second, existing studies have largely focused on the prevalence, utilization, or effectiveness of traditional medicine rather than examining the broader transformation processes that enable TM to survive, adapt, integrate, or change within modern healthcare systems. Based on the reviewed literature, traditional medicine demonstrates diverse trajectories, including cultural persistence, adaptation to contemporary conditions, digitalization, scientific modernization, and integration into formal healthcare structures. However, a comprehensive understanding of how sociocultural values and health-related knowledge contribute to these transformation processes remains limited.

Therefore, this systematic literature review aims to analyze the relationship between cultural values, health literacy, and the transformation of traditional medicine practices in modernized societies. Specifically, this study aims to: (1) identify the role of cultural values in maintaining and shaping traditional medicine practices; (2) examine how health literacy influences the interpretation, adaptation, and integration of traditional medicine; and (3) synthesize the transformation patterns of traditional medicine within contemporary healthcare systems. The novelty of this study lies in integrating sociocultural and health

literacy perspectives to explain the dynamic transformation of traditional medicine, providing broader insights into culturally responsive and evidence-based healthcare development.

METHODS OF RESEARCH

Research Design

This study employed a Systematic Literature Review (SLR) approach to identify, critically evaluate, and synthesize scientific evidence regarding the relationship between cultural values, health literacy, and the transformation of traditional medicine practices in modernized societies. The systematic review process followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines to ensure that all stages of identification, screening, eligibility assessment, and synthesis were conducted systematically, transparently, and reproducibly.

This study adopted a descriptive-analytical synthesis approach to examine how cultural values and health-related knowledge contribute to the persistence, adaptation, integration, and transformation of traditional medicine practices within contemporary healthcare systems.

Research Framework

The formulation of the research questions and literature search strategy was guided by the PICO framework, which consists of Population, Interest, and Context. The PICO framework was selected because it is particularly suitable for systematic reviews investigating complex social, cultural, and health-related phenomena, where the focus extends beyond clinical outcomes to include contextual experiences, beliefs, and knowledge systems. The application of the PICO framework in this study is presented in Table 1.

Table 1 Pico Framework Used to Develop the Research Questions and Search Strategy

Component	Description
P (Population)	Communities or societies that utilize traditional medicine practices
I (Interest)	Cultural values, health literacy, indigenous knowledge, and transformation processes of traditional medicine
Co (Context)	Modernized societies and contemporary healthcare systems

Research Questions (RQ)

This systematic review aims to examine the role, transformation, and future development of traditional medicine (TM) within the context of modernized societies. Guided by the PICO framework, this study addresses five research questions. RQ1 examines the characteristics and conceptual dimensions of studies investigating traditional medicine practices in modernized societies, including its role as a healthcare system, cultural knowledge system, social institution, and scientific resource. RQ2 explores how socio-cultural factors, including cultural values, spiritual beliefs, social structures, and indigenous knowledge transmission, contribute to the persistence and continuity of traditional medicine practices across generations. RQ3 investigates how traditional medicine adapts to modernization processes, including changes in knowledge transmission, community practices, and interactions with emerging sources of health information. RQ4 analyzes the pathways through which traditional medicine integrates with biomedical systems, scientific research, and

technological innovations, including digitalization, evidence-based evaluation, and biomedical applications. RQ5 examines the broader implications of traditional medicine development, including health outcomes, regulatory challenges, governance frameworks, health literacy, and policy strategies required to achieve sustainable and culturally responsive healthcare systems.

Data Sources and Search Strategy

This systematic literature review was conducted following the principles of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines to ensure transparency, reproducibility, and methodological rigor throughout the review process. The literature search was performed using four major international academic databases, namely Scopus, Web of Science, PubMed, and ScienceDirect. These databases were selected due to their extensive coverage of peer-reviewed scientific literature across multidisciplinary fields, including health sciences, social sciences, anthropology, cultural studies, healthcare systems, and technological innovation in healthcare. The selected databases were considered appropriate because the review focuses on the intersection between traditional medicine, cultural knowledge systems, health literacy, and the transformation of healthcare practices in the context of modernization.

The literature search was conducted for publications published between January 2020 and August 2025. Only articles written in English were included to ensure consistency in interpretation and accessibility of international scientific evidence. Only peer-reviewed journal articles were considered eligible for inclusion in this systematic review. Conference proceedings, editorials, commentaries, book chapters, dissertations, theses, and non-academic publications were excluded.

The search strategy was developed based on the main concepts of the review by applying Boolean operators (AND and OR) to combine related keywords and synonyms. The keywords were identified from four major conceptual domains: (1) traditional medicine and indigenous healthcare practices; (2) cultural values, beliefs, and knowledge transmission; (3) health literacy and health education; and (4) modernization, healthcare integration, and technological transformation. The search terms included *"traditional medicine," "traditional healing," "ethnomedicine," "indigenous knowledge," "traditional health practice," "cultural values," "cultural beliefs," "spirituality," "local knowledge," "knowledge transmission," "health literacy," "health education," "health information," "modernization," "transformation," "healthcare integration," "digitalization," "biotechnology,"* and *"modern healthcare."*

The search strategy applied in Scopus was formulated using the TITLE-ABS-KEY function to identify relevant terms appearing in the title, abstract, and keywords of indexed publications. The search string was formulated as follows:

```
TITLE-ABS-KEY(  
  ("traditional medicine" OR "traditional healing" OR ethnomedicine OR  
  "indigenous knowledge" OR "traditional health practice")  
  AND  
  ("cultural values" OR "cultural beliefs" OR spirituality OR  
  "local knowledge" OR "knowledge transmission")  
  AND  
  ("health literacy" OR "health education" OR "health information")
```

AND
(modernization OR transformation OR integration OR digitalization
OR biotechnology OR "modern healthcare")
)
AND PUBYEAR > 2019
AND LANGUAGE(English)

The search strategy was subsequently adapted to the specific search syntax, field identifiers, and indexing mechanisms of each database, including Web of Science, PubMed, and ScienceDirect, while maintaining the same conceptual framework and core keyword combinations derived from the PICO framework. Database-specific modifications were applied to optimize retrieval sensitivity and precision while ensuring consistency in identifying relevant studies across different information sources. The complete search strings for each database, including Scopus, Web of Science, PubMed, and ScienceDirect, along with the search dates and applied filters, are provided in Supplementary File 1 to enhance transparency and facilitate reproducibility of the review process in accordance with the PRISMA 2020 guidelines.

Supplementary File 1. Complete Search Strategies for All Databases

This supplementary file provides the complete search strategies applied in the systematic review. The search strings were adapted according to the syntax, field identifiers, and indexing mechanisms of each database while maintaining the same conceptual framework derived from the PICO approach.

Scopus Search Strategy

Database: Scopus
Search field: TITLE-ABS-KEY
TITLE-ABS-KEY(
("traditional medicine" OR "traditional healing" OR "indigenous medicine" OR
"ethnomedicine" OR "herbal medicine")
AND
("cultural value*" OR "cultural belief*" OR "indigenous knowledge" OR "health literacy"
OR "knowledge transmission")
AND
("modern society" OR "modern healthcare" OR "health system*" OR "healthcare
integration" OR modernization OR digitalization)
)
Filters applied:
- Document type: Article
- Language: English
- Publication years: January 2020 and August 2025

Web of Science Search Strategy

Database: Web of Science Core Collection
Search field: Topic (TS)
TS=(
("traditional medicine" OR "traditional healing" OR "indigenous medicine" OR

"ethnomedicine" OR "herbal medicine")
AND
("cultural value*" OR "cultural belief*" OR "indigenous knowledge" OR "health literacy"
OR "knowledge transmission")
AND
("modern society*" OR "modern healthcare" OR "health system*" OR "healthcare
integration" OR modernization OR digitalization)
)
Filters applied:
- Document type: Article
- Language: English
- Publication years: January 2020 and August 2025

Pubmed Search Strategy

Database: PubMed/MEDLINE
Search field: Title/Abstract
(
"traditional medicine"[Title/Abstract]
OR "traditional healing"[Title/Abstract]
OR "indigenous medicine"[Title/Abstract]
OR ethnomedicine[Title/Abstract]
OR "herbal medicine"[Title/Abstract]
)
AND
(
"cultural values"[Title/Abstract]
OR "cultural beliefs"[Title/Abstract]
OR "indigenous knowledge"[Title/Abstract]
OR "health literacy"[Title/Abstract]
OR "knowledge transmission"[Title/Abstract]
)
AND
(
"modern healthcare"[Title/Abstract]
OR "health system"[Title/Abstract]
OR modernization[Title/Abstract]
OR digitalization[Title/Abstract]
)
Filters applied:
- Article type: Journal Article
- Language: English
- Publication date: January 2020 and August 2025

Sciencedirect Search Strategy

Database: ScienceDirect

Search field: Title, Abstract, Keywords

("traditional medicine" OR "traditional healing" OR "indigenous medicine" OR "ethnomedicine" OR "herbal medicine")

AND

("cultural values" OR "cultural beliefs" OR "indigenous knowledge" OR "health literacy" OR "knowledge transmission")

AND

("modern healthcare" OR "health system" OR "modern society" OR modernization OR digitalization)

Filters applied:

- Research articles

- English language

- Publication years: January 2020 and August 2025

Note: The complete search strategies are provided to support transparency and reproducibility of the systematic review process in accordance with PRISMA 2020 recommendations.

Inclusion and Exclusion Criteria

The eligibility criteria were established prior to the literature screening process to ensure a systematic, transparent, and reproducible study selection procedure. These criteria were developed based on the research objectives and conceptual framework of this systematic literature review, which focuses on understanding traditional medicine practices in relation to cultural values, knowledge systems, health literacy, healthcare integration, and modernization processes.

Studies were included if they met the following criteria: (1) published between January 2020 and December 2025; (2) written in English; (3) published as peer-reviewed journal articles; (4) focused on traditional medicine practices within modernized societies; (5) discussed cultural values, health literacy, indigenous knowledge, or transformation processes; and (6) provided empirical or conceptual insights relevant to the research questions.

Additionally, eligible studies were required to discuss at least one of the following dimensions relevant to the review objectives: (a) cultural values and beliefs associated with traditional medicine practices; (b) health beliefs and perceptions toward traditional healthcare; (c) transmission, preservation, and transformation of indigenous or traditional knowledge; (d) health literacy related to traditional medicine use; (e) integration of traditional medicine into modern healthcare systems; (f) digitalization and technological innovation supporting traditional healthcare practices; or (g) scientific validation, standardization, and evidence-based development of traditional medicine. These criteria ensured that the selected studies provided insights beyond biomedical aspects and contributed to understanding traditional medicine as a multidimensional cultural and healthcare phenomenon.

Studies were excluded if they were duplicates, unrelated to traditional medicine transformation, lacked sufficient methodological information, or were not peer-reviewed journal articles, including conference proceedings, editorials, commentaries, book chapters,

dissertations, theses, and non-academic publications.

The application of these criteria enabled the review to identify studies that were not only relevant to the research topic but also provided sufficient methodological quality and conceptual depth for synthesizing evidence regarding the evolving role of traditional medicine within contemporary healthcare systems.

Study Selection Process

The study selection process was conducted following the four sequential stages outlined in the PRISMA 2020 framework, namely identification, screening, eligibility assessment, and inclusion. This systematic process was implemented to ensure that the selection of studies was transparent, reproducible, and consistent with the predefined eligibility criteria.

The identification stage involved retrieving potentially relevant studies from the selected electronic databases, including Scopus, Web of Science, PubMed, and ScienceDirect, using the established search strategy and predefined keywords. All retrieved records were collected and prepared for further screening. Duplicate records identified across multiple databases were removed before proceeding to the next stage.

The screening stage involved reviewing the titles and abstracts of the remaining articles to determine their initial relevance to the research objectives. Studies that were unrelated to traditional medicine practices, did not address the conceptual focus of the review, or clearly failed to meet the eligibility criteria were excluded at this stage.

Two independent reviewers performed the title, abstract, and full-text screening processes to minimize selection bias and ensure consistency in study selection. Any disagreements between reviewers regarding study eligibility were resolved through discussion and consensus. If consensus could not be reached, a third reviewer was consulted to make the final decision.

The eligibility stage consisted of a full-text assessment of potentially relevant studies. Each article was evaluated based on the predetermined inclusion and exclusion criteria, including relevance of research focus, availability of methodological information, publication characteristics, and contribution to understanding traditional medicine within cultural, social, healthcare, or modernization contexts.

The included stage involved selecting studies that fulfilled all eligibility requirements for final qualitative synthesis. The complete study selection process, including the number of identified, screened, assessed, excluded, and included studies, will be presented using the PRISMA 2020 flow diagram.

Data Extraction

Data extraction was performed using a structured and predefined extraction form developed according to the objectives and research questions of this systematic literature review. Data extraction was independently conducted by two reviewers using the predefined extraction form. The extracted information was cross-checked to ensure accuracy and consistency. Any discrepancies were resolved through discussion between reviewers or consultation with a third reviewer when necessary. The extraction process aimed to systematically capture relevant information from each included study and facilitate

comparative analysis across different research contexts.

The extracted data consisted of bibliographic characteristics, methodological information, and thematic findings. The extracted elements included author(s) and publication year, country or research setting, research objectives, study design, data collection methods, participant characteristics or data sources, cultural values explored, forms of traditional knowledge identified, health literacy-related factors, patterns of traditional medicine transformation, implementation challenges, and research implications.

All extracted information was systematically organized into data extraction tables to identify similarities, differences, emerging themes, and relationships among studies. This process enabled the researchers to develop a comprehensive understanding of how traditional medicine practices are maintained, transformed, and integrated within contemporary healthcare contexts.

Quality Assessment

The methodological quality of the included studies was assessed using the Mixed Methods Appraisal Tool (MMAT) Version 2018. The MMAT was selected because it provides a comprehensive and standardized framework for critically appraising studies employing different methodological approaches, including qualitative research, quantitative research, and mixed-methods studies.

The quality assessment focused on several methodological dimensions, including the appropriateness of the research design in relation to the research objectives, adequacy of data collection strategies, quality and reliability of measurements or analytical procedures, appropriateness of data analysis methods, and the consistency between research methods, findings, and conclusions.

For non-empirical studies, including narrative reviews, policy analyses, and conceptual perspectives, methodological appraisal was adapted using qualitative criteria because these studies primarily contributed contextual and conceptual evidence rather than empirical measurements. This adaptation was applied to maintain consistency in evaluating the methodological rigor and relevance of all included studies while acknowledging differences in study design.

The methodological quality assessment results were used to evaluate the methodological rigor of the included studies and to inform the interpretation of the synthesized findings. Studies were not excluded solely based on their MMAT assessment results; instead, the appraisal outcomes were considered during the synthesis process by weighting the strength, credibility, and reliability of the evidence.

Data Synthesis

Due to substantial heterogeneity among the included studies in terms of research designs, geographical settings, cultural contexts, populations, and methodological approaches, a narrative synthesis approach was employed. A quantitative meta-analysis was considered inappropriate because the included studies did not provide sufficiently comparable variables, measurement instruments, or statistical outcomes required for pooled analysis. Therefore, the synthesis focused on identifying conceptual relationships, contextual variations, and transformation patterns of traditional medicine across different social and healthcare

environments.

The findings were synthesized using a thematic analysis approach to identify recurring concepts, patterns, and relationships across the included studies. The thematic synthesis process involved systematic examination of extracted data from each study, including research objectives, methodological characteristics, geographical contexts, main findings, and identified transformation processes. Initial codes were generated by comparing similarities and differences among studies, followed by the grouping of related concepts into broader analytical categories. Through an iterative process of comparison, interpretation, and refinement, five overarching themes were developed to represent the multidimensional transformation of traditional medicine in modern societies.

The first theme, "Socio-Cultural Foundations and Cultural Continuity of Traditional Medicine," examined how cultural values, spiritual beliefs, social identity, and indigenous knowledge transmission contribute to the persistence and preservation of traditional medicine practices. This theme emphasized that traditional medicine functions not only as a healthcare practice but also as a cultural knowledge system embedded within community beliefs, historical experiences, and collective identity.

The second theme, "Persistence and Adaptation of Traditional Medicine in Changing Societies," explored how traditional medicine continues to exist despite modernization and expanding access to biomedical healthcare. This theme highlighted processes of knowledge negotiation, hybridization, and adaptation, in which communities maintain inherited practices while incorporating new sources of information, including education, media, and digital technologies.

The third theme, "Integration of Traditional Medicine with Biomedical Systems and Technological Innovation," analyzed the increasing interaction between traditional knowledge and scientific advancement. This theme included evidence-based validation, biotechnology applications, artificial intelligence-based documentation, medicinal compound research, and other technological approaches that contribute to the transformation of traditional medicine from experience-based knowledge toward scientifically supported healthcare innovation.

The fourth theme, "Modernization, Regulation, and Structural Challenges," addressed the institutional and governance issues affecting the development of traditional medicine. This theme focused on challenges related to regulatory frameworks, intellectual property protection, scientific standardization, quality control, and tensions between modernization efforts and cultural authenticity.

The fifth theme, "Health Implications and Policy Development for Sustainable Integration," examined the broader implications of traditional medicine for healthcare systems, including health literacy, public acceptance, stakeholder collaboration, and policy development. This theme emphasized the importance of balancing cultural preservation, scientific evaluation, and responsible integration to establish sustainable and culturally responsive healthcare models.

The synthesized findings were presented through study characteristic tables, methodological quality assessment, and narrative comparative analysis. This approach enabled the identification of dominant research trends, methodological limitations, evidence gaps, and future research directions related to the transformation of traditional medicine within contemporary healthcare systems.

RESULTS AND DISCUSSION

Article Selection Process

The article selection process in this systematic literature review was conducted following the PRISMA 2020 framework. The initial identification stage resulted in 1,017 records retrieved from multiple electronic databases based on the predetermined search strategy. After removing duplicate records and conducting title and abstract screening, studies that did not meet the eligibility criteria were excluded. The remaining articles were subsequently assessed through full-text evaluation based on the established inclusion and exclusion criteria. Following the complete screening process, a total of 15 articles were considered eligible and included for further analysis and qualitative synthesis. The detailed process of article identification, screening, eligibility assessment, and final inclusion is presented in Figure 1 (PRISMA Flow Diagram).

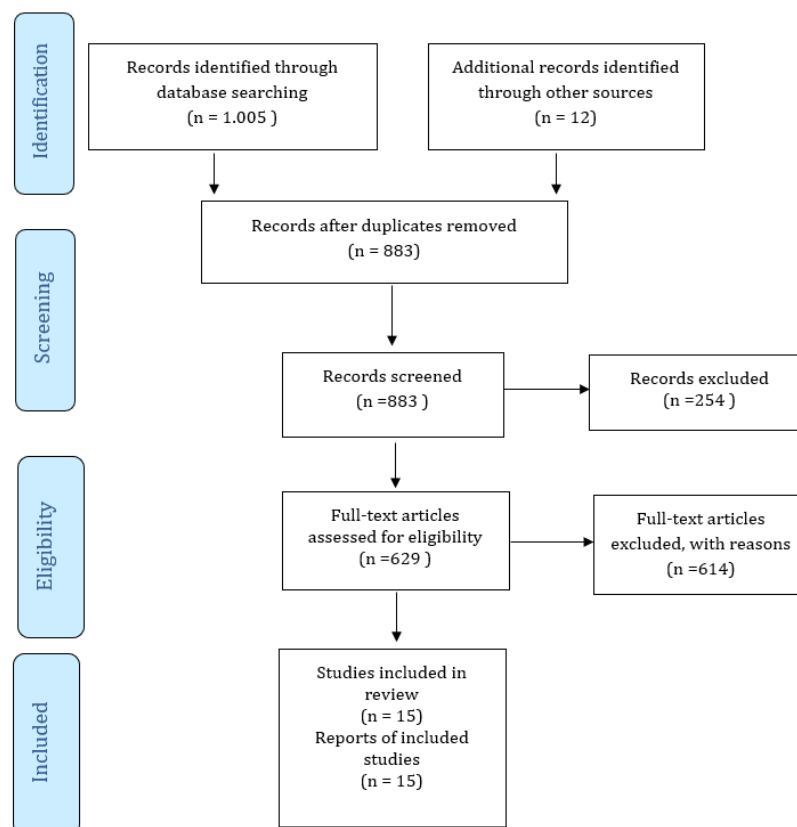


Figure 1 (Prisma Flow Diagram)

Quality Assessment of Included Studies

The methodological quality of the 15 included studies was assessed using the MMAT 2018 framework. The assessment showed that most studies fulfilled four to five MMAT criteria. Qualitative empirical studies generally achieved strong ratings due to clear alignment between research objectives, data collection procedures, and interpretation of findings. Quantitative and experimental studies also demonstrated strong methodological rigor, particularly in relation to measurement procedures and analytical approaches.

Studies involving narrative review, policy analysis, and conceptual perspectives were interpreted with consideration of their methodological characteristics, as these studies primarily contributed contextual and theoretical insights rather than empirical measurements. Overall, the quality assessment supported the reliability of the synthesized themes, including cultural continuity, knowledge transformation, scientific integration, technological innovation, and governance challenges in traditional medicine. The complete quality appraisal results for each included study are presented in Table 2.

Table 2. Quality Assessment of Included Studies Using Mmat 2018

Study ID	Author (Year)	Study Design	MMAT Category	MMAT Result	Quality Interpretation
S1	Gakuya et al. (2020)	Narrative review and policy analysis	Qualitative studies*	4/5	High
S2	Mattalia et al. (2020)	Ethnobotanical qualitative study (interviews and field observation)	Qualitative studies	5/5	High
S3	Wang et al. (2021)	Experimental biomedical research	Quantitative non-randomized studies	5/5	High
S4	Eze et al. (2021)	Conceptual review and policy perspective	Qualitative studies*	4/5	High
S5	Mbongwa et al. (2021)	Qualitative ethnobotanical research	Qualitative studies	5/5	High
S6	Bhattacharjya et al. (2023)	Ethnobotanical survey	Quantitative descriptive studies	4/5	High
S7	Xia (2023)	Legal and policy analysis	Qualitative studies*	4/5	High
S8	Ung et al. (2023)	Systematic review	Qualitative studies*	4/5	High
S9	Kropi et al. (2024)	Cross-cultural qualitative study	Qualitative studies	5/5	High
S10	Musyaffa et al. (2024)	Deep learning and computer vision experiment	Quantitative non-randomized studies	5/5	High
S11	Galvin et al. (2025)	Qualitative interview study	Qualitative studies	5/5	High
S12	Madlala & Shange (2025)	Qualitative descriptive study	Qualitative studies	5/5	High
S13	Sharma & Tabasum (2025)	Qualitative ethnographic study	Qualitative studies	4/5	High
S14	Tian et al. (2025)	Molecular docking and pharmacological analysis	Quantitative non-randomized studies	5/5	High
S15	Gerner et al. (2025)	Qualitative stakeholder analysis	Qualitative studies	4/5	High

Characteristics of Included Articles

The characteristics of the 15 included articles demonstrate considerable diversity in terms of geographical contexts, research approaches, and transformation patterns of traditional medicine (TM) within various healthcare systems worldwide. The selected studies originated from different regions, including Asia (Indonesia, India, and China), Africa (Kenya, South Africa, and several multi-country studies), and Europe (Italy and the Ukraine–Romania border region). This geographical distribution indicates that traditional medicine represents a global phenomenon that continues to exist and evolve alongside modernization and changes in contemporary healthcare systems.

From a methodological perspective, the included studies employed diverse research approaches. The majority of studies utilized qualitative and ethnographic methods, including in-depth interviews, participant observations, field studies, and thematic analysis, to explore cultural meanings, community practices, and knowledge transmission processes associated with traditional medicine. Several studies adopted quantitative and technology-oriented approaches, including artificial intelligence-based analysis, deep learning applications, biomaterial engineering, and computational approaches for identifying potential therapeutic innovations. In addition, some studies applied policy analysis and regulatory reviews to examine institutional challenges and opportunities in integrating traditional medicine into formal healthcare systems. This methodological diversity demonstrates that contemporary traditional medicine research has expanded beyond socio-cultural investigations and increasingly intersects with biomedical sciences, digital technology, and healthcare governance.

Regarding cultural dimensions, all included studies emphasized the strong relationship between traditional medicine and broader cultural systems. Traditional medicine practices were consistently associated with belief systems, cultural identity, spirituality, indigenous knowledge, and intergenerational knowledge transmission. In many communities, traditional medicine was not merely perceived as an alternative treatment option but also represented a fundamental component of social structures and everyday life. The practice was often influenced by family roles, community relationships, gender dynamics, ancestral beliefs, and culturally constructed understandings of health and illness. These findings indicate that traditional medicine functions not only as a healthcare practice but also as a cultural expression that reflects collective identity and social values.

The analysis further identified various patterns of traditional medicine transformation in response to modernization processes. The transformation pathways included persistence, integration, adaptation, modernization, digitalization, and biotechnology-based innovation. Persistence refers to the continuation of traditional practices with minimal modification, particularly in communities where cultural and spiritual values remain dominant. Integration describes efforts to incorporate traditional medicine into formal healthcare systems through collaboration between traditional practitioners and biomedical professionals. Adaptation reflects adjustments made by traditional medicine practices in response to social, technological, and healthcare developments. Modernization involves processes of standardization, regulation, scientific validation, and evidence-based evaluation. Digitalization represents the application of emerging technologies, including artificial intelligence,

computational modelling, and digital health platforms, to support traditional medicine research and practice. Meanwhile, biotechnology-based transformation includes approaches such as biomaterial engineering, molecular research, and drug repurposing to explore the scientific potential of traditional medicinal resources.

Despite various opportunities for development, several studies also identified forms of resistance toward modernization. Such resistance primarily occurred when traditional medicine practices were closely connected with spiritual meanings, cultural authenticity, and community identity. Excessive standardization or commercialization was sometimes perceived as a threat to the cultural integrity and traditional knowledge systems underlying these practices.

The reviewed studies further revealed that traditional medicine continues to play a significant role within global health systems, particularly in addressing chronic diseases, reproductive health issues, preventive care, and community-based healthcare needs. However, traditional medicine development is still confronted with several challenges, including limited regulatory frameworks, insufficient scientific validation, inconsistent safety standards, and differences in public perceptions regarding effectiveness and reliability. These challenges highlight the need for systematic approaches that balance cultural preservation with scientific advancement.

At the same time, advances in science and technology provide substantial opportunities for strengthening the role of traditional medicine in contemporary healthcare. Scientific validation, digital technologies, and interdisciplinary research approaches can support the documentation, standardization, safety assessment, and innovation of traditional medicinal practices. Therefore, the findings suggest that future development of traditional medicine requires collaboration among multiple stakeholders, including researchers, healthcare professionals, policymakers, governments, and traditional practitioners.

Overall, the synthesized evidence indicates that traditional medicine should not be viewed solely as an alternative healthcare system but rather as a dynamic knowledge system that connects cultural heritage, community health practices, scientific innovation, and technological transformation. Sustainable development of traditional medicine requires a multidisciplinary approach that integrates healthcare policy, strengthens public health literacy, protects indigenous knowledge, and promotes evidence-based innovation while maintaining cultural values.

DISCUSSION

The synthesis of 15 included studies demonstrates that traditional medicine (TM) represents a multidimensional healthcare system that extends beyond therapeutic practices. TM functions simultaneously as a cultural knowledge system, a social institution, an economic resource, and an emerging field of scientific innovation that continues to transform in response to globalization, modernization, and technological advancement. Although the number of included studies was limited, the selected articles demonstrated substantial conceptual diversity across geographical regions, cultural contexts, and methodological approaches. This diversity enabled the identification of recurring patterns and transformation pathways of traditional medicine across different social and healthcare environments, thereby providing

meaningful insights despite the limited number of available studies. This finding supports the World Health Organization (WHO) perspective, which conceptualizes traditional medicine as an accumulation of knowledge, skills, and practices derived from cultural experiences and beliefs that are utilized for health maintenance, disease prevention, diagnosis, and treatment (Gakuya et al., 2020). Therefore, TM should not be positioned merely as an alternative healthcare approach but rather as a dynamic system embedded within historical, cultural, and scientific contexts.

Socio-Cultural Dimension as the Foundation of Traditional Medicine

The findings indicate that cultural values, spiritual beliefs, and social structures constitute fundamental elements underlying the existence and continuity of TM practices. Across different geographical contexts, traditional medicine is closely associated with local interpretations of health, illness, and healing processes. In many communities, disease is not perceived solely as a biological condition but is also understood through spiritual, moral, and social dimensions.

For example, in South Africa, the practice of “Go wela” illustrates that illness perception may involve spiritual and moral interpretations, including beliefs related to ritual contamination and ancestral influences (Galvin et al., 2025). Similarly, the utilization of isihlambezo among pregnant women in KwaZulu-Natal demonstrates that decisions regarding traditional medicine use are shaped by cultural narratives, community beliefs, and socio-economic conditions, including poverty and limited educational opportunities (Madlala & Shange, 2025). These findings highlight that healthcare decisions are often influenced by culturally constructed meanings rather than solely by biomedical considerations.

Comparable patterns are observed in India and the Himalayan region, where TM is conceptualized as a holistic healthcare system integrating physical, psychological, spiritual, and social dimensions within diagnosis and treatment processes (Sharma & Tabasum, 2025). Such perspectives demonstrate that TM is inseparable from indigenous knowledge systems that are transmitted across generations and contribute to collective cultural identity (Bhattacharjya et al., 2023). Consequently, efforts to develop or integrate TM into modern healthcare systems must consider its cultural foundations rather than approaching it exclusively from a biomedical perspective.

Persistence and Adaptation of Traditional Medicine Practices

The reviewed studies reveal that modernization does not necessarily eliminate traditional medicine practices. Instead, TM demonstrates considerable resilience through processes of persistence and adaptation. Traditional medicine continues to survive because communities actively negotiate between inherited knowledge systems and emerging sources of health information.

Several studies indicate that medicinal plant use and traditional healing practices remain prevalent even in contexts where modern healthcare services are increasingly accessible (Setianti et al., 2025). In Northeast India, ethnomedical knowledge continues to be preserved through family-based transmission and community practices, although contemporary information sources, including the internet and mass media, increasingly influence how traditional knowledge is interpreted and applied (Kropi et al., 2024).

This process reflects the emergence of knowledge hybridization, in which traditional knowledge interacts with external knowledge systems and undergoes transformation. The Hutsul community located along the Ukraine–Romania border provides an example of how local ecological knowledge evolves through interaction with external influences while maintaining its cultural significance ([Mattalia et al., 2020](#)). These findings suggest that TM should not be viewed as a static or disappearing practice but as an adaptive knowledge system capable of responding to social, technological, and political changes.

Integration of Traditional Medicine with Biomedical Systems and Modern Technology

A significant transformation identified in recent studies is the increasing interaction between TM and modern scientific approaches. Rather than existing separately from biomedical systems, traditional medicine is increasingly being examined through technological innovation, computational methods, and evidence-based research frameworks.

A study from Indonesia demonstrated the application of deep learning technology and convolutional neural networks (CNN) for automated medicinal plant identification, achieving high classification accuracy and providing opportunities for digital preservation of ethnobotanical knowledge ([Musyaffa et al., 2024](#)). This development indicates a transition from orally transmitted and experience-based knowledge toward digitally supported knowledge systems, where artificial intelligence can contribute to documentation, identification, and accessibility of traditional medicinal resources.

In the biomedical domain, traditional medicine compounds have also gained attention in advanced therapeutic research. The application of Chinese Traditional Medicines (CTMs) in tissue engineering and regenerative medicine, particularly through their influence on mesenchymal stem cell proliferation, demonstrates the potential integration of traditional medicinal compounds with modern biomedical technologies ([Wang et al., 2021](#)). Similarly, molecular-based approaches such as molecular docking have been utilized to investigate the therapeutic potential of herbal compounds for chronic inflammatory diseases, including psoriasis and ulcerative colitis ([Tian et al., 2025](#)).

These developments demonstrate a paradigm shift in TM research, where traditional knowledge is increasingly evaluated through scientific methodologies. However, scientific integration should not disregard cultural contexts, as the value of TM lies not only in pharmacological properties but also in the knowledge systems and social practices surrounding its use.

Modernization, Regulation, and Structural Challenges

Despite its potential contribution to healthcare development, TM continues to face significant structural and institutional challenges. One major challenge is the lack of comprehensive regulatory frameworks, limited scientific validation, and insufficient institutional recognition within formal healthcare systems.

In Kenya, for instance, TM development remains constrained by inadequate regulation, limited research infrastructure, and weak integration with national healthcare systems ([Gakuya et al., 2020](#)). Similar challenges are evident in China, where existing intellectual property frameworks have not fully accommodated the characteristics of traditional medical knowledge, which is often collectively owned, transmitted across generations, and difficult to

align with conventional legal concepts of ownership (Xia, 2023).

Furthermore, modernization efforts may encounter resistance when they are perceived as threatening cultural authenticity. In South Africa, some traditional practitioners oppose the cultivation of medicinal plants because cultivated plants are believed to lose their spiritual qualities and sacred significance compared with naturally occurring plants (Mbongwa et al., 2021). This illustrates that barriers to TM modernization are not only technical or institutional but also deeply connected with cultural perceptions and belief systems.

Therefore, successful modernization of TM requires culturally sensitive approaches that balance scientific validation, regulatory development, and preservation of indigenous knowledge systems.

Health Implications and Policy Development

The overall findings indicate that TM continues to play an important role in global healthcare systems, particularly in primary healthcare settings and communities with limited access to biomedical services. However, sustainable integration of TM into formal healthcare systems requires more than recognition of its therapeutic potential. It requires evidence-based evaluation, adaptive regulatory frameworks, improved health literacy, and collaboration among multiple stakeholders (Setianti et al., 2025).

Several studies emphasize the importance of interdisciplinary and international collaboration to strengthen TM research capacity. For example, a Pan-African collaborative framework has been proposed to enhance traditional medicine research and innovation, particularly in responding to emerging global health challenges such as pandemics (Eze et al., 2021). Similarly, multi-stakeholder strategies involving researchers, policymakers, healthcare providers, and traditional practitioners are necessary to address governance issues, quality control, and standardization challenges associated with medicinal plant utilization (Gerner et al., 2025).

Overall, the evidence suggests that the future development of TM depends on achieving a balance between cultural preservation and scientific advancement. Traditional medicine should be recognized as both a valuable cultural heritage and a potential source of healthcare innovation. Policies that promote scientific validation, protect indigenous knowledge, strengthen public literacy, and encourage responsible technological integration will be essential for developing sustainable and culturally responsive healthcare systems.

CONCLUSIONS

This systematic literature review aimed to examine the transformation of traditional medicine (TM) practices in relation to cultural values, knowledge systems, health literacy, healthcare integration, and modernization processes based on recent scientific evidence. The findings from 15 reviewed studies demonstrate that traditional medicine remains a dynamic and globally relevant healthcare system that continues to evolve through pathways of persistence, adaptation, integration, digitalization, and modernization. The study contributes to a broader understanding of TM as not only a therapeutic practice but also as a multidimensional knowledge system influenced by cultural identity, social structures, scientific advancement, and technological innovation. However, this review has several limitations, including the restriction to English-language publications, the inclusion of studies

published only between 2020 and 2025, the limited number of eligible studies analyzed, and the methodological heterogeneity among the included articles, which prevented quantitative meta-analysis. Future research should expand the scope of investigation by incorporating broader databases, multilingual publications, longitudinal research designs, and interdisciplinary approaches that integrate cultural studies, public health, biomedical science, and digital technology to further explore sustainable and evidence-based development of traditional medicine within modern healthcare systems.

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