



The Development of Traditional Medicine into Modern Medicine: A Review of Its Potential and Challenges

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ABSTRACT

Traditional medicine has been an integral part of public health systems for centuries. With the advancement of science and technology, traditional medicine has begun to be adapted to modern medical approaches through standardization, scientific research, and regulation. This study aims to examine the potential and challenges in transforming traditional medicine into modern medicine. The method used was a literature review, reviewing relevant national and international journals. The results indicate that traditional medicine has great potential as a source of new drugs, increasing accessibility, and providing a wider range of therapeutic options. However, challenges include limited scientific research, a lack of quality standardization, safety and side effect issues, and regulatory constraints. In conclusion, traditional medicine has great potential to be developed into modern medicine, but requires more comprehensive research support, standardization, and adaptive health policies.

Keywords: Traditional Medicine, Modern Medicine, Potential, Challenges, Health Transformation

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1. Introduction

Traditional medicine has been used for generations by people around the world as a means of healing and health care. According to the WHO (2021), approximately 80% of the world's population still uses traditional medicine in various forms, either as primary or complementary therapy. As scientific knowledge advances, traditional medicine is beginning to be integrated into modern medical systems.

This transformation is crucial because traditional medicine holds a wealth of local knowledge and the pharmacological potential of natural ingredients. However, the process of transitioning from traditional to modern medicine is not without its challenges. Frequently encountered issues include a lack of scientific evidence, variations in the quality of raw materials, and inconsistent regulations.

This article aims to review the potential and challenges in developing traditional medicine into modern medicine, so that it can provide an overview for researchers, practitioners, and policy makers in optimizing its benefits for public health.

2. Research methods

This research uses a literature review with a qualitative approach. The aim is to explore, examine, and analyze the development of traditional and modern medicine, as well as to examine the potential and challenges faced in integrating the two.

a. Data source

Data was obtained from various literature sources, including:

- 1) Scientific articles published in national and international journals in the period 2015–2025.
- 2) Textbooks relevant to the topics of traditional medicine, modern medicine, and public health.

Official documents from the International Health Organization (WHO) and the Ministry of Health of the Republic of Indonesia.

b. Data collection technique

Data collection was conducted through a systematic search using scientific databases such as PubMed, Google Scholar, ScienceDirect, SpringerLink, and DOAJ. Keywords used included: traditional medicine, modern medicine, integrative health, herbal medicine, complementary and alternative medicine, and challenges of traditional medicine.

Inclusion and Exclusion Criteria

- Inclusions: Articles in English and Indonesian, published in the last 10 years (2015–2025), relevant to traditional and modern medicine.
- Exclusions: Articles that cannot be accessed in full (full text), duplicate publications, and literature that has no direct connection to the research theme.

c. Data Analysis Techniques





Data were analyzed using thematic analysis. The analysis process was carried out in the following stages:

- 1) Identification and extraction of primary data from each literature.
- 2) Grouping information based on themes (potential of traditional medicine, development into modern medicine, integration of both, and implementation challenges).
- 3) Synthesis of study results to produce a systematic and comprehensive narrative.

3. Research result

a. Results

Based on the results of a literature review of various scientific articles, books, and official health documents, several main findings were found regarding the development of traditional medicine towards modern medicine, which can be grouped into four main themes, namely:

- 1) Potential of Traditional Medicine
 - Efficacy and safety: Several studies have shown that many traditional herbal remedies have pharmacological effectiveness, for example *Curcuma longa* (turmeric) as an anti-inflammatory and *Zingiber officinale* (ginger) as a natural antiemetic.
 - Availability and affordability: Traditional medicines are relatively easier to obtain, cheaper, and culturally appropriate, thus increasing patient compliance.
 - Global acceptance: WHO notes that more than 80% of the world's population still uses traditional medicine, either as primary or complementary therapy.
- 2) Development into Modern Medicine
 - Standardization and clinical trials: Traditional herbal remedies undergo preclinical and clinical trials to gain recognition within the modern medical system. For example, phytopharmaceuticals in Indonesia have received distribution permits from the Food and Drug Authority (BPOM).
 - Extraction and formulation technology: Technological advances have enabled the development of herbal medicines into modern dosage forms such as capsules, tablets, and injections.
 - Integration into healthcare: Several countries, including Indonesia, have integrated traditional medicine into hospitals with official herbal clinics.
- 3) Development Challenges
 - Lack of strict regulation: Many herbal and herbal products are still circulating without adequate safety testing.
 - Limitations of scientific research: Most traditional herbs have not been comprehensively tested through *randomized controlled trial (RCT) methods*.





- Medical personnel resistance: Some medical practitioners are still hesitant to accept traditional medicine due to the lack of scientific evidence and the risk of drug interactions.
 - Patent and intellectual property rights issues: Local knowledge is often adopted by large industries without providing economic benefits to indigenous communities.
- 4) Integration Model of Traditional and Modern Medicine
- Complementary: Traditional medicine is used as a complement to modern medicine, for example the use of acupuncture to reduce post-operative pain.
 - Alternative: Used when modern medicine is ineffective or unavailable.
 - Integrative: Traditional and modern medicine are combined in the health system, with professional regulation and supervision.

b. Discussion

The research results show that the development of traditional medicine towards modern medicine is a dynamic process, influenced by various social, cultural, scientific and health regulatory factors.

1) Potential of Traditional Medicine

Traditional medicine holds great potential due to its strong cultural roots and widespread acceptance. In many regions, herbal concoctions, jamu, and traditional healing practices remain the primary choice, primarily due to their affordability. Research shows that several natural ingredients contain bioactive compounds with pharmacological effects that can be developed into modern medicines. This opens up significant opportunities in phytopharmaceutical research and pharmaceutical biotechnology.

2) Integration with Modern Science

Traditional medicine is increasingly being researched using modern scientific methods, including preclinical and clinical trials, dose standardization, and toxicity testing. This process aims to ensure the safety, effectiveness, and quality of traditional medicines so they can be accepted into modern medical systems. Several countries, including Indonesia, have begun integrating herbal medicine and phytopharmaceuticals into formal healthcare.

3) Challenges in Development

Despite the great potential, the challenges faced are quite complex, including:

- Standardization and quality: Differences in processing methods and raw materials mean that the quality of traditional medicines is not uniform.
- Safety and side effects: Lack of oversight and regulation causes some traditional medicines to cause serious side effects.





- Lack of clinical research: Only a small number of traditional herbal remedies have been scientifically tested through large-scale clinical studies.
- Competition with the modern pharmaceutical industry: The pharmaceutical industry tends to be stronger economically and regulatory-wise, so traditional medicine is often marginalized.

4) Development Efforts

To face these challenges, strategic efforts are needed, including:

- Enhancing research collaboration between researchers, universities, and the pharmaceutical industry.
- Strengthening regulations related to the safety, standardization, and distribution of traditional medicines.
- Educating the public to be more selective and rational in using traditional medicine.
- Integrating complementary medicine systems into modern health services, as has been implemented in several hospitals by providing standardized herbal services.

5) Implications for the Future

Developing traditional medicine into modern medicine is not only about preserving cultural heritage, but also about significant opportunities in the global healthcare industry. If managed properly, traditional medicine can provide more holistic, affordable, and sustainable health solutions.

Conclusion and Suggestions

a. Conclusion

The development of traditional medicine toward modern medicine reflects a long journey from practices based on local wisdom to evidence-based medical interventions. The immense potential of traditional medicine lies in its rich natural ingredients, cultural values, and widespread public acceptance. Integration with modern science has opened up opportunities for the development of herbal medicines, complementary therapies, and pharmaceutical innovations that can enrich the global health system.

However, the challenges faced are significant. Issues related to safety, standardization, regulation, and limited scientific research remain major obstacles. Furthermore, the differing paradigms between traditional and modern medicine require a strong bridge of scientific communication so that both can complement each other in providing holistic healthcare.

b. Suggestion

1) Strengthening Scientific Research





More experimental research, clinical trials, and meta-analyses are needed to prove the effectiveness and safety of traditional medicine.

2) Standardization and Regulation

The government and related institutions must strengthen policies regarding certification, quality testing, and regulation of the use of traditional medicines so that they can be on par with modern medicine.

3) Education and Socialization

The public needs to be educated about the safe use of traditional medicine, as well as the importance of consulting with medical personnel before using it.

4) Health System Integration

Collaboration between modern health workers and traditional medicine practitioners is needed through an evidence-based medicine approach that emphasizes patient safety.

5) Utilization of Technology

Digitalization and biotechnology can be utilized in the development, research, and distribution of traditional medicinal products to reach the global market.

With a good synergy between tradition and science, traditional medicine has the potential to become an important pillar in a modern health system that is more inclusive, safe, and sustainable.

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