

From Tradition to Translational Practice: Expanding the Frontiers and Scope of Integrative Medicine in the Present Era

Pankaj Sharma^{1*}  and Sanyogeeta A Dixit¹ 

¹Department of Rejuvenative & Reproductive Medicine in Ayurveda, Shri BM Kankanawadi Ayurveda Mahavidyalaya, PG Studies & Research Centre, KLE Academy of Higher Education & Research, Belagavi, Karnataka, India.

*vaidyapankajsharma@gmail.com (Corresponding Author)

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ABSTRACT

Background: The integrative approach in medicine is steadily on the rise in the modern era. Combining knowledge from several fields allows for a deeper comprehension of complicated phenomena and creative answers to critical issues. By bridging the gaps, this holistic approach fosters synergy and advances knowledge in an array of domains.

Purpose: The purpose of this paper is to explore the scope and potential of Ayurveda-based integrative approaches in contemporary healthcare for developing evidence-based, holistic, and globally relevant models.

Methods: The scope of integrative medicine in the present era has been assimilated and analyzed through the Samhitas, standard Ayurvedic texts, PubMed, Scopus, Web of Science-indexed scientific journals, standard textbooks of medicine and allied health sciences, news and updates, online articles, and resources from international healthcare and medical institutions. Intending to develop evidence-based complementary and alternative medicine data and initiate collaborative integrative healthcare models, Ayurveda takes an integrative approach that considers individualized treatment plans, evidence-based practices, cultural and societal considerations, and translational methodology to achieve the P4 Medicine, aptly the Integrative Ayurveda Medicine.

Results: Ayurveda, with its holistic approach to healthcare management, has the longest uninterrupted tradition of healthcare practice. Incorporating emerging knowledge into Ayurveda whilst maintaining fundamentals shall certainly provide comprehensive opportunities to address global healthcare requirements. Western medicine has gained its current acknowledged position as mainstream modern medicine through its openness to learn from the contemporary disciplines of sciences, application of technological advancements, and continued adoption of evidence-based approach.

Conclusion: The concept of an integrative healthcare approach, particularly concerning Ayurveda, has the potential to yield significant benefits in addressing the long-term requirements of creating a more contented, joyful, and peaceful global community.



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1. Introduction

Healthcare systems need to recognize the intricate interactions between behavior, biology, socioeconomics, and the environment that influence health. Planning an effective treatment strategy is a complex interplay of the above factors (Locke, 2024). Considering this, Ayurveda, the established system of Indian Medicine, aims to provide a fresh approach to both the development and delivery of new medications that are safer and more effective, while also offering a path toward healthy lifestyle treatments. The fundamental concepts of Ayurveda mirror the building

blocks of the universe. Body, mind, and spirit are all taken into account, as well as their interactions with nature, in Ayurveda's distinctive, sympathetic, individualized, and holistic approach. Ayurveda is a holistic, all-inclusive, and continuously evolving knowledge system. The fundamental framework of Ayurvedic practice has always been an integrative approach to healing and health care. Since Aristotelian logic is the foundation of modern medicine, it needs to conform to analytical reductionist-scientific rigor to be accepted worldwide. Accordingly, an integrative systems approach, which makes the most of the information available from various angles without

introducing hierarchies or even intending to undermine any, should have greater success in producing reasonably priced global healthcare solutions. India's healthcare system reflects this diversity with a range of treatment modalities that begin with a variety of easy remedies and end with the most advanced modern tertiary care technologies. Due to the coexistence of numerous healthcare systems, medical pluralism has flourished in India, benefiting public health overall by fostering an in-depth understanding of various healthcare systems and broadening the country's public health landscape.

1.1. Definitions and Core Concepts

Integration is a unified approach towards maximizing the provision of care by ensuring simple access to healthcare based on each person's preferences and perceived needs, while assisting in the alignment of all health systems and their functions for efficient administration (Goodwin, 2016). Integrated medicine merges conventional healthcare with traditional practices, offering potential solutions for global healthcare challenges (Hunter *et al.*, 2023). This integrated approach, championed by renowned academic health centers like Arizona, Duke, and Harvard, advocates for its incorporation into mainstream healthcare systems. Nations worldwide, including India, Norway, and China, are embracing integrative medicine initiatives to enhance healthcare accessibility and address the diverse needs of populations. There are multiple notions of medicine, apart from modern medicine, like complementary medicine, herbal medicine, traditional medicine, etc. (Lim *et al.*, 2017). The term complementary medicine (CM) refers to a set of healthcare practices which are not part of that country's own traditional medicine and are not fully integrated into the dominant healthcare system. They are utilized interchangeably with conventional medicine in some countries (Ng *et al.*, 2023). Traditional medicine (TM) is knowledge, skill, and practices based on the theories, experiences, and beliefs indigenous to varied cultures, whether explicable or not, utilized to maintain health as well as in the prevention, diagnosis, improvement, or treatment of physical and mental illness. Traditional and complementary medicine (T&CM) merges the terms TM and CM, encompassing products, practices, and practitioners (Traditional, Complementary and Integrative Medicine, n.d.). Herbal medicine comprises plants, plant materials, herbal preparations, and products that include plant parts, other plant materials, or combinations of these as active ingredients. Integrated care is nowadays commonly accepted across the globe, but there remains persistent and enduring confusion of languages when it comes to understanding it (Kodner, 2009).

Integrated care is defined as health services that are managed and delivered so that people receive a continuum of health promotion, disease prevention, diagnosis, treatment, disease management, rehabilitation, and palliative care services, coordinated across the various levels and sites of care within and beyond the health sector, and according to their needs throughout the life course (Denis & Rodríguez, n.d.). When people benefit from such multifaceted attempts to foster integration, the outcome is referred to as integrated care (A Narrative for Person-Centred Coordinated Care – National Voices, n.d.). In contrast, person-centered coordinated care, which defines care from the patient's viewpoint, states that one can plan his/her care with people who work together to understand him/her and his/her carer(s), allow them to control, and bring together services to achieve the outcomes important to him/her (Lewis *et al.*, n.d.). Integrative medicine (IM) aims to offer a workable, reasonably priced solution to the world's healthcare problems (Miller, 2022). The United States academic health institutions, including Duke, Harvard, Arizona, UCLA, Johns Hopkins, and Mayo Clinic, are part of the IM consortium, which has vigorously defended it as an essential component of the new healthcare system, serving the interests of both patients and society (Patwardhan, 2010). Integrative medicine is based on the fundamental tenet that everything that may be beneficial to human health should be investigated and, if proven helpful through evidence-based methods, given consideration for mainstream acceptability (Complementary, Alternative, or Integrative Health: What's in a Name? | NCCIH, n.d.). The concept of therapeutic utility is embodied in this approach.

1.2. Global Trends in Traditional and Complementary Medicine

As per the World Health Organization (WHO) Global Report on Traditional and Complementary Medicine (T&CM) 2019, nearly 88% (170 of 194 countries) of all WHO Member States acknowledge the use of T&CM among all WHO regions (Jgo.Org JGO-Journal of Global Oncology India-United States Dialogue on Traditional Medicine: Toward Collaborative Research and Generation of an Evidence Base, 2017). Nations worldwide, including India, Norway, and China, are embracing integrative medicine initiatives to enhance healthcare accessibility and address the diverse needs of populations. Additionally, a 2014 Government of India Health Survey found that both in rural and urban areas, the AYUSH system of medicine, primarily Ayurveda, was used mainly for managing gastrointestinal and musculoskeletal conditions. Ayurvedic care is primarily sought for genitourinary, skin, musculoskeletal, and injury conditions, especially by older

patients. Ayurveda also emerges as the first option whenever long-term intervention is desired. In addition to offering promotive, rehabilitative, and preventive healthcare, Ayurveda and AYUSH have great potential in managing a wide range of disorders, including mental health, geriatric health, and noncommunicable diseases. To foster expansion and tackle impediments to future growth, the Ayurvedic industry requires an integrative approach along with advancements in research and development, which benefits both the scientific community and the patients. Education, clinical practice, research, health and wellness, public health, technologies and digital innovations, pharmacovigilance, and adopting an all-encompassing integrative approach that benefits the entire society, country, and the world are crucial areas for promoting innovations in Ayurveda.

1.3. Current Scenario in India and Global Context

In rural India, approximately 65% of the population uses TM, primarily Ayurveda, to meet their primary healthcare requirements. India is one of the world's 12 mega-biodiverse countries with at least 7000 medicinal plants (White *et al.*, 2018). More than 90% of the population relies on CAM for primary care, particularly Ayurveda and Yoga (Jirge & Goudar, 2016). The Government of India has implemented new regulations with the formation of the National Commission for Indian Systems of Medicine (NCISM) and the National Commission for Homeopathy (NCH) in 2020 (Traditional, Complementary and Integrative Medicine, n.d.), along with strict adherence to the Drugs and Cosmetics Act. The rising trend of AYUSH market share paved the way for the establishment of the WHO Global Centre for Traditional Medicine at Jamnagar, Gujarat, India, which aims to utilize contemporary science and technology to maximize the potential of traditional medicine from around the globe to enhance both human and environmental health. Table 1 summarizes the key models and approaches to integration in healthcare systems.

2. Models and Approaches to Integration

2.1. Typology of Integration

Typically, the concept of integration can be understood across multiple dimensions (Armitage *et al.*, 2009):

- Type of integration: Organizational, cultural, professional, or technological integration;
- Level of integration: Macro (policy/system level), meso (organizational level), and micro (clinical level);
- Process of integration: How integrated care delivery is organized and managed;

- Breadth of integration: Applied to whole population groups or specific client groups;
- Degree or intensity: Across a continuum spanning from informal linkages to managed care coordination and fully integrated teams or organizations.

Table 1: Models and Approaches to Healthcare Integration

Integration model	Description
Organizational Integration	Structural alignment of healthcare institutions and administrative systems
Cultural Integration	Harmonisation of values, beliefs, and practices across different medical traditions
Professional Integration	Collaborative practice among practitioners from diverse medical backgrounds
Technological Integration	Unified digital health platforms, shared electronic health records, and diagnostic tools
Clinical Integration	Coordinated patient care pathways combining multiple therapeutic modalities

2.2. Perspective of Bio-Medical Medicine

Medicine is the practice of diagnosis, treatment, and prevention of disease. Western medicine, formerly known as allopathy, but more appropriately referred to as modern or bio-medical medicine, has taken the lead in providing mainstream healthcare services worldwide (Traditional, Complementary and Integrative Medicine, n.d.). To diagnose and treat the illness or injury, modern medicine uses biomedical research, health science, and medical technology. Usually, this involves surgery or medication (Xu & Chen, 2011). Modern medicine aims to treat tangible biochemical reactions and attributes illness to microbial exposure. It seeks to promote healing by intervening with effective measures to eradicate the disease (Locke, 2024). Though it is undeniable that contemporary medicine has been successful in lowering the incidence of infectious diseases, we cannot consider holistic health without the assistance of traditional medicine (Kumar, 2015). Emerging new diseases and health issues still outnumber the therapeutic efforts. Upcoming challenges in the form of non-communicable diseases, metabolic disorders like diabetes, hypertension, AIDS, malignancies, and infertility are still a constant cause of worry for biomedical medicine. According to the WHO, health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity. Thus, health can be understood as the result of several variables acting at different levels. The current trend suggests a restricted use of modern medicine to identify the issue and treat it. Patients'

mistrust of doctors is being exacerbated by several factors, including incorrect diagnoses, enhanced patient awareness of research and treatment options, and an increasing tendency to use more expensive, newer medications while ignoring side effects. In such conditions, a large number of patients favor conventional and alternative therapies such as Ayurveda.

2.3. *Perspective of Health in Ayurveda*

Ayurveda, the established system of healing, originated in India thousands of years ago. It is not only a science of medicine, rather a complete natural perspective of life. It treats diseases and promotes good health and longevity. According to Ayurveda, a healthy individual is one whose doshas (mind-body constitution), the digestive fire (agni), as well as the body's tissues (sapta dhatus) and waste products (trimala), are in dynamic equilibrium. The notion also mentions mental and spiritual health because it says that a person's soul (atman), sensory organs (indriyas), and mind (manas) must all be in a happy state (prasanna). According to Ayurveda principles, a person is deemed healthy when all of those factors are in harmony, which, to some extent, follows the WHO definition of health. The fact is, there exists a gap between the two systems of healthcare. Modern medicine seems to have no replacement, but traditional healthcare providers still form the basis of the rural healthcare in India. Modern medicine is striving to tackle challenges using new drugs, therapies, and technologies. However, rather than promoting good health and preventing disease, the focus of modern medicine is more on diagnosis, treatment, and complication prevention (Shenwai & Tare, 2017).

2.4. *Ayurvedic Perspective of Integration and Integrative Ayurveda*

An integrative approach is the idea of integrating or combining aspects of several different schools of thought to promote wellness. Western medicine became mainstream by being open to learn from basic sciences, applying technology, and adopting evidence-based practices. The origins of Ayurveda and the establishment of its fundamentals can be traced back to the Darshanas (Philosophical Schools of Thought), specifically the Nyaya, Vaishehsika, Samkhya, and portions of the Mimamsa and Vedanta darshana. The all-encompassing, holistic principles of Ayurveda were formulated by integrating approaches to treatment. For instance, in the context of Charaka Samhita (Atreya Sampradaya), patient referral to Shalya Tantra (Surgical Specialty) for further management is indicated if pittaja gulma is not being managed by the conservative modalities and there are lakshanas of vidaha and paka. This is a good

explanation of how two Ayurvedic medical specialties—Kayachikitsa and Shalya Tantra—were integrated, opening the door for the Integrated Ayurveda approach (E-Samhita - National Institute of Indian Medical Heritage, n.d.). Ashtanga Hridayam, a treatise of the highest order, incorporates the best of Ashtanga Ayurveda into a single treatise, adopting an integrated approach. Ayurveda, with its unwavering core principles, while also being open to incorporating new knowledge, has the potential to address the issues that have arisen from the need for universal healthcare, emphasizing disease prevention and health promotion. Integrative Ayurveda represents a specialized approach necessary as an adjunct to integrated medicine. There is a significant difference between Ayurveda and allopathy, the two main medical systems. Primarily, an Integrative Ayurveda approach could aid in narrowing this growing divide between the two systems (Raut, 2011). According to a study, “the Ayurvedic pivot is likely to be inspired by an appreciation and sophistication of Ayurvedic theory and clinical practice rather than the fact that Ayurveda is Indian alone” (Shankar, 2010). The definition and scope of Integrative Ayurveda can be represented as: Integrative Ayurveda as an active and flexible interface between Ayurveda and developing modern medical sciences, particularly bio-medical sciences, to continuously support the integration of new information into mainstream Ayurveda while abiding by its core fundamentals. With the extra benefit of being able to find new avenues for future development, such a heuristic approach would encourage Ayurveda's worldwide acceptance.

2.5. *Epistemological Variance between Systems*

When considered in comparison, there appear to be some differences between Ayurveda and modern medicine, which greatly affect the integration process. For instance, the terms “Arthritis” and “Sandhivata” have different etymologies. Arthritis refers to inflammation in the joints, while Sandhivata refers to Vata disorder in the joints. In this case, Vata epistemologically conveys the specific knowledge from where it can be deduced that the Sandhivata is a condition in which pain is the dominant clinical presentation and joint failure may be the eventual, feared outcome. Comparing the taxonomy, etiology, pathogenesis, pathobiology, and general management of Sandhivata and Arthritis from their respective epistemological perspectives, it is interesting to observe the differences on all levels. The strategy of modern medicine is primarily focused on anti-inflammatory and immunosuppressive agents, which are essentially symptomatic and palliative, whereas Ayurveda opts for the Yuktivyapashraya, i.e., Vata Shamanam (controlling and pacifying Vata), and the incorporation of

Sattwajaya Chikitsa (Ayurveda Psychotherapy). Hence, it is very evident that there are epistemological variances in the standard terminologies of the two systems that need to be addressed to move further on the path of an integrative approach.

3. Review Methodology

The data for this review have been collected from the classical texts of Ayurveda, namely, *Charaka Sambhita*, *Ashtanga Hridayam* and *Ashtanga Sangraha*, and *Nighantus*. The contemporary review has been drawn from the textbooks of biomedical medicine and scientific databases, including PubMed, Google Scholar, Scopus, and Clarivate (Web of Science). Search Strategy: Keywords used included “Ayurveda AND Integration,” “Integrative Medicine AND Complementary Medicine,” and “TCM AND Ayurveda.” Searches were conducted across multiple databases without strict date restrictions to capture the evolution of integrative medicine concepts. Inclusion Criteria: Peer-reviewed journal articles addressing integrative medicine, Ayurveda-based healthcare models, traditional and complementary medicine policies, collaborative healthcare frameworks, and evidence-based traditional medicine practices. Additional sources included WHO reports, Government of India health surveys, and standard medical textbooks. Exclusion Criteria: Non-peer-reviewed opinion pieces without substantial evidence base, articles focusing exclusively on single-herb pharmacology without clinical context, and studies not available in the English language. Data Extraction and Analysis: Information was systematically extracted regarding definitions, integration models, clinical applications, policy frameworks, and future directions. Traditional Chinese Medicine (TCM) and modern-day medical practices were analyzed for possible outcomes for expanding the frontiers and scope of integrative medicine in the present era.

4. Narrative Review Results

Ayurveda emphasises personalised treatments, herbal remedies, and lifestyle modifications, aligning with the principles of integrative medicine. Through synergistic combinations with conventional therapies, Ayurveda enriches patient care, fostering comprehensive wellness and therapeutic innovation.

4.1. Personalized Medicine

Personalized medicine has long been recognized and practiced in the medical community, both by Hippocrates and Charaka. Personalized medicine has been the aim of scientific endeavors since the sequencing of the human genome. A

patient’s reaction to medication is influenced by several factors, including environment, lifestyle, age, and heredity. With effective integration of ‘omics’, Prakriti-based medicine, based on the Tridosha Theory, can play an important role in today’s evolving scenario of global health, as Ayurveda offers its modalities by ahara (diet), vihara (lifestyle), and aushadhi (medication), which are the three founding pillars of Prakriti-based medicine, making it a holistic science, paving the way for further research in the field of Ayurgenomics. The “Golden Triangle of Integrative Ayurveda” (Figure 1), a methodical integration combined with an interdisciplinary approach, has the potential to offer remedies for evolving health issues, such as adverse drug events or reactions, drug withdrawals, and economic discrepancies, benefiting a wide range of patients.

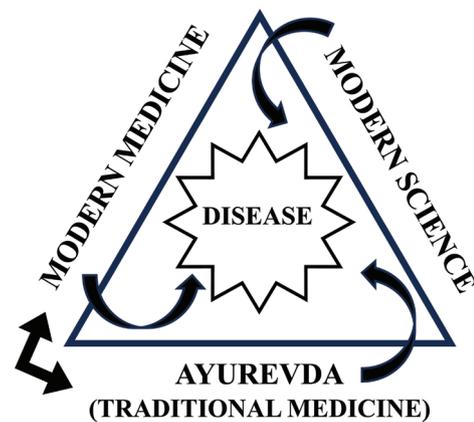


Figure 1: Golden Triangle of Integrative Ayurveda

It not only provides individualized treatment but also customized diet and lifestyle plans, utilizing medication and non-drug modalities tailored to a person’s specific needs. Figure 2 illustrates Ayurveda’s role in the broader concept of integrative health, demonstrating the multidimensional approach encompassing physical, mental, and spiritual well-being.

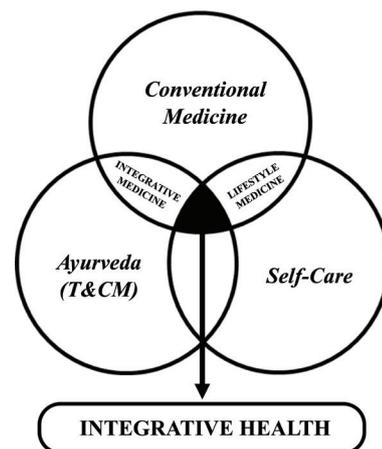


Figure 2: Ayurveda in the Concept of Integrative Health

4.2. Evidence-Based Medicine

Many patients today turn to both conventional and alternative medicine in their quest for healing (Mortada, 2024). Evidence-based CAM (EBCAM) therapies have shown remarkable success in treating diseases. WHO recommends integrating CM practitioners into the healthcare system when needed to enhance patient safety and effectiveness in using complementary therapies (Monalisa *et al.*, 2022). Combining traditional medicine with complementary and alternative medicine (CAM) in biomedicine seeks to establish a more effective and economical healthcare delivery system. Conventional medicine uses techniques that have been shown through methodically planned trials and research to be both safe and effective (Gray & Orrock, 2014). The hallmark of integrative medicine is that it is patient-centered and addresses the full individual—body, mind, and spirit. It emphasizes the therapeutic alliance and makes use of all required therapies, both conventional and alternative.

4.3. Cultural and Societal Considerations

The incorporation of Ayurveda into contemporary healthcare is significantly influenced by cultural and social

factors. The socio-cultural integration of Ayurveda is crucial to comprehend community beliefs, traditional healing practices, and social dynamics to promote acceptance and optimize health outcomes (Petri *et al.*, 2015).

4.4. Translational Approach

The goal of translational research is to translate scientific findings into real-world solutions for patients and the community. According to the continuum, the community's overall health improves due to the transfer of findings from clinical studies or clinical trials to practice settings and communities. The role of the integrative approach was shown to the world when researchers observed a correlation between HLA type and Prakriti type, with a complete absence of the HLA DRB102 allele for the Vata type and of HLA DRB113 for the Kapha type under the Ayurgenomics project, which uses large data analysis and machine learning, greatly facilitating this whole process of the integrative medicine approach (Wallace, 2020). Figure 3 depicts the relationship between Ayurgenomics and modern medicine, highlighting the translational pathways connecting traditional concepts with contemporary genomic science.

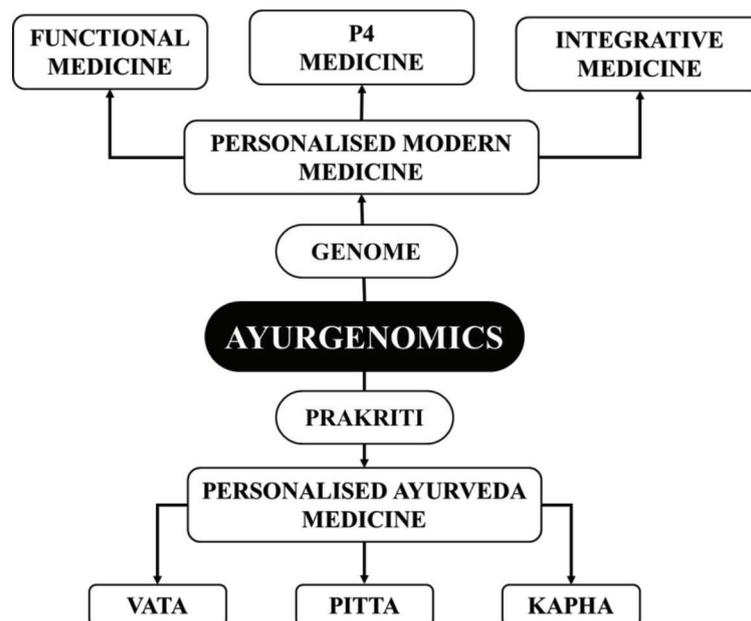


Figure 3: Ayurgenomics and its Relationship to Modern Medicine

4.5. Role of Integrative Medicine in Chronic Diseases

In the vast domain of chronic, non-communicable diseases, a complex web of environmental, physiological, lifestyle, and genetic factors is at play (Nolte & McKee, 2009). Biomedicine is only able to provide long-term management,

whereas expertly practiced Ayurveda has undoubtedly proven to produce dependable, effective results (Hankey, 2010), reversing the degenerative process and preventing it with lifestyle modifications. Diseases like diabetes (Thottapillil *et al.*, 2021), cancer, and infertility in India are steadily

on the rise. Ayurvedic treatment using a combination of Shamana (mitigation) and Shodhana (purification) therapies has successfully led to healthy pregnancies and also has the potential to improve the results of IVF and other assisted reproductive techniques (Asmabi & Jithesh, 2022). In general, Ayurvedic treatment focuses on enhancing the digestive fire (Agni) to boost metabolism and getting rid of toxins (like ama, garavisha, dooshivisha, amavisha, etc.). Rasayana (rejuvenation therapy) restores health, provides stability, and improves quality of life.

4.6. Collaborative Healthcare Models

Ayurveda, known for its holistic healing and rejuvenation, draws people from all over the world who are looking for wellness retreats and natural remedies. The AYUSH Visa enables foreign nationals who wish to use AYUSH or other traditional Indian medical systems to receive medical treatment in India. Numerous cooperative projects have demonstrated the effectiveness of the Integrative Ayurvedic Approach. For instance, Safdarjung Hospital's Department of Integrative Medicine of AIIA, Centre for Integrative Medicine and Research (CIMR), and the National Institute of Traditional Medicine of the Indian Council for Medical Research (ICMR-NITM) were founded to offer patients comprehensive care, including promotive, preventive, curative, and rehabilitative therapies. An Integrated AYUSH Cancer Care facility, a specialty tertiary health care institute at the National Cancer Institute at Jhajjar, Haryana, is also functioning efficiently (Press Information Bureau Government of India | Ministry of Information and Broadcasting, n.d.).

Apollo AyurVAID Hospitals is a pioneering network of integrative Ayurvedic care, committed to offering evidence-based integrated medicine that combines traditional and allopathic models, enhancing patient outcomes and quality of life (Apollo Hospitals Acquires 60% Stake in AyurVAID, Targets Medical Value Market, Integrated Medicine - BusinessToday, n.d.). The curative potential of Ayurvedic medicine garnered international interest when Dr. Narayanan Namboodiri and his staff at Sreedhareeyam Ayurveda Eye Hospital, Kerala, a Centre of Excellence under the Ministry of AYUSH for Eye Care, successfully helped in restoring the vision of the daughter of former PM, Rosemary Odinga. Integrative protocols for disease management, from Ayurveda therapeutics to physiotherapy, dietetics and clinical nutrition, naturopathy, and spiritual healing, are incorporated to fulfil the demand of Integrative Ayurveda at Vaidyaratnam Oushadhasala, Ollur, Thrissur, Kerala, and Arya Vaidya Pharmacy, Coimbatore, Tamil Nadu, for musculoskeletal disorders and in manasa roga and manovijnana (mental disorders and psychiatry) at Kottakkal.

4.7. Instances from the Past: The COVID-19 Era

A 2019 study stated that COVID-19 has no cure, and patients who have underlying comorbidities are more likely to experience complications. The Indian Government's Ministry of AYUSH had approved the use of traditional medical practices to treat mild to moderate COVID-19 cases (Shirkande & Shirkande, 2022). Later, headlines stated the importance of realizing the true potential of Ayurveda against COVID-19, and India demonstrated the potential of AYUSH systems in addressing the global health crisis (Golechha, 2020). Subsequently, it was observed that individuals who shifted to Ayurvedic remedies did so with the hope of improving their general health. An enormous number of patients have visited Ayurveda practitioners/centers in recent years for COVID-19 treatment, post-COVID recovery, preventive measures, or to boost immunity. This demonstrated how more people are beginning to trust Ayurveda because it is necessary to treat illnesses at their source. The Ministry of AYUSH's successful response to the COVID-19 pandemic was a result of several key factors: effective integrated research, proactive collaboration between public and private sectors, improved understanding among various organizations, and significant public acceptance of its AYUSH measures (T. M. Nesari, 2023). Even though the COVID-19 pandemic brought to light the importance of Ayurvedic medicine in promoting health and battling illness, Ayurveda's integrative approach was not fully embraced. On one hand, the utilization of paracetamol and remdesivir-like drugs was very common; conversely, reliance on measures issued by the Ministry of AYUSH, like AYUSH Kwatha, Anu Taila Nasya, by the people led to standard treatment guidelines for mild, moderate, and severe COVID-19 cases.

4.8. Interdisciplinary Perspectives

Ayurveda, an ancient system of medicine, offers profound insights into holistic healing modalities. Integrating Ayurvedic principles within modern medical frameworks, such as integrative cancer therapy (Arnold, 2023), dentistry, critical care, orthopedics, and dietetics & nutrition, enhances patient care. Ayurveda's emphasis on personalized approaches, herbal remedies, and lifestyle modifications complements conventional treatments, addressing not just symptoms but underlying imbalances. In the Centre for Integrative Orthopedics, for instance, Ayurvedic therapies like Panchakarma may aid in managing musculoskeletal disorders. Similarly, integrating Ayurveda within the Casualty OPD Section can optimize emergency care by promoting preventive measures and enhancing resilience. Also, the concept of the Ayurveda Intensive Care Unit (AICU) could serve the upcoming needs. Such

interdisciplinary collaborations offer a comprehensive model for patient-centered healthcare (Rao, 2015).

4.9. Challenges for Ayurveda: Can It Endure Over Time?

An in-depth SWOT analysis to rule out the strengths and weaknesses, integration, top-notch research, and incorporating technological advancements, making it patient-friendly, is required (Chandola, 2012). With the integration of technology in the areas of diagnostic, prognostic, and curative procedures, modern medicine has advanced remarkably. Every day, newer technologies are developed to provide a more accurate and sophisticated understanding of diseases and human beings. Radiodiagnostics, molecular genetics, and invasive cardiology are some examples that show the power of the human brain to probe physiology and investigate pathology. Attempts are underway to modernize the traditional body of knowledge in many areas by emphasizing its pharmacological and therapeutic potential. Developing a new patent drug completely ignores the core principles of Ayurveda. The work being done in large pharmacies is based on recent studies on drug molecules conducted in pharmacology. Drug development is driven entirely by contemporary ideas and references. A comprehensive reevaluation of this is necessary. Modern science discovers, creates, describes, explains, and introduces a great deal of new diseases. Researchers can now investigate the genesis and development of illnesses right down to the DNA level. However, when it comes to Ayurveda, we must take into account the basic ideas to create the Samprapti (pathophysiology) and subsequently create the treatment plan, which may include Shamana (medical management) or Shodhana (purification techniques).

In that scenario, administering herbal medication alone, which is justified by current research, would not be adequate. For instance, electromyography and nerve conduction velocity studies can be useful to determine the diagnosis of a disease related to mamsa dhatu (muscular tissue), which may be mamsavritta vata or mamsagata vata, etc., in Ayurvedic terms, and muscular dystrophy in modern medicine. Likewise, such examinations could help to determine the effectiveness of Ayurvedic practices like pinda sweda (pottali sweda) and shastika shali pinda sweda (navarakizhi), which will provide the objective data. But merely prescribing drugs based on modern research without diagnosing the awastha (status) of dosha, level of dhatu, and ama status as per Ayurveda would be of less benefit. Also, practical complications in implementing apunarbhave therapy (preventing recurrence or relapse) through classical Rasayana chikitsa (Sharma & Shetty, 2025) and nidana parivarjana, or difficulties in adhering to the Sattwavajaya

(Ramachandran *et al.*, 2025) and the Daivavyapashraya, are still a great challenge. Modern technology must be integrated with Ayurveda while maintaining its fundamental principles. This is a difficult task that requires deep knowledge of Ayurveda and a mind that is fed by contemporary intellectualism. To mention, a senior rheumatologist aims to combine ancient Ayurvedic principles from the *Charaka Samhita* with modern technology to create a new approach. These kinds of initiatives are what we need right now. If this doesn't happen, Ayurveda will soon disappear behind the layers of contemporary herbalist research. Nonetheless, as long as these modifications are interpreted in light of fundamental Ayurvedic principles, Integrative Ayurveda is amenable to them. In summary, the Integrative Ayurveda Approach faces the following main challenges: to increase the scientific and evidence-based nature of important Ayurvedic concepts like Panchakarma and Prakriti; research investigations on the effectiveness and safety of Ayurvedic medications; Ayurvedic studies published in reputable peer-reviewed journals; and joint efforts between contemporary and Ayurvedic professionals in treating patients.

4.10. Significant Areas for Innovation and Integration in Ayurveda

The following sections outline critical domains requiring focused attention for advancing Integrative Ayurveda (Gopal *et al.*, 2023):

- **Education:** The Central Government is in the process of establishing numerous new All India or National Institutes, along with 780 AYUSH Institutions with an intake capacity of over 50,000, including 412 Ayurveda colleges (S. Kumar *et al.*, 2025). Even though the infrastructure is being strengthened, regulatory organizations like NCISM still need to address the standard and quality of education. While the NCISM Act 2020's guidelines for admission to UG through NEET-UG, the National Exit Exam, Teacher Eligibility Test, AIAPGET for post-graduation education, and revised curriculum for BAMS, MD/MS, and PhD programs have set the bar for quality assurance, more work needs to be done to incorporate the best practices of contemporary science into the field of Ayurveda without compromising the principles (Framework: Assessment & Rating of Ayurveda, Siddha and Unani Colleges, n.d.).
- **Research:** The AYUSH system coexists with the conventional medicine system. With about 80 institutes under the Ministry of AYUSH, it boasts a strong network of research institutions, including Research Councils and their affiliated Institutes of respective medical systems (Nesari *et al.*, 2025). More than 34,885

research articles can be found on the AYUSH Research Portal, primarily 6,328 clinical, 13,974 pre-clinical, and 8,680 drug research articles about Ayurveda and AYUSH systems (Thrigulla *et al.*, 2022). Even though there may not be a robust number of AYUSH clinical research articles published in peer-reviewed journals, CCRAS's efforts deserve recognition. Research at the RCT, network analysis, and systematic review levels is urgently needed to develop a database of evidence-based, patient-centered treatment protocols that will improve outcomes.

- **Clinical Practice:** Maintaining the core fundamental principles of Indian Medicine is necessary to standardize the practice (Pratibha *et al.*, 2023). Case documentation, methodology, and analysis ought to be shared with the Ayurvedic community. To generalize the results in society, the extent of integration of other systems, such as physiotherapy, yoga, pranayama, naturopathy, or even conventional biomedical medicine, needs to be adequately documented.
- **Health and Wellness:** Ayurveda has enormous potential in terms of preventive medicine, maintenance of health, and treatment of ailments (Sharma *et al.*, 2007). A broad spectrum of health-promoting practices, such as daily regimen (dinacharya) and seasonal regimens (ritucharya) that include dietary and lifestyle advice (ahara-vihara), rejuvenating herbs (rasayana), yoga (Patwardhan *et al.*, 2015), meditation, moral behaviour (achara rasayana), the importance of suppressible and non-suppressible urges (vega dharana and pravartana), and more, should be incorporated into treatment modalities for promoting and restoring health.
- **Public Health:** There are many obstacles in the way of properly integrating Ayurveda and AYUSH systems in public health (Saxena *et al.*, 2024). A major problem affecting the quality of services delivered through AYUSH systems is the lack of public health standards, even though the Ministry of AYUSH is working to streamline the Ayurvedic system as mainstream primary medicine.
- **Digital Innovations and Technologies:** Ayurveda is going to experience a digital revolution that will improve accessibility, individualized treatment plans, and diagnosis accuracy (Kumar & Arya, 2024). Algorithms powered by artificial intelligence will analyze patient data to find customized personalized treatments. Wearable technology can monitor vital signs and provide immediate feedback. Reach can be increased through virtual consultations, and data security and traceability can be ensured by blockchain. Ayurveda fits right in with the digital healthcare

environment. Therefore, taking into account that digital is the new normal, the Ayurvedic community must adapt to the latest technological advancements and digital innovations.

- **Pharmacovigilance:** The Ministry of AYUSH has been working to develop evidence-based guidelines for the clinical safety of ASU and H drugs, as well as to create and maintain a systemwide adverse drug reaction (ADR) database (Ajanal *et al.*, 2013). Therefore, additional work needs to be done to ensure compliance with drug trial standards regarding the efficacy and safety of Ayurvedic medicines.

5. Discussion

Since Ayurveda and yoga are effective, the world now acknowledges India as a fount of traditional knowledge spanning the spectrum when it comes to accessible, evidence-based healthcare facilities. India's G20 presidency offered an incredible chance to more closely and deliberately present this effectiveness to global leaders and medical professionals. In an effort to inform the international community about how India's traditional medical sciences like Ayurveda have been coping with the world's mounting environmental and human resource challenges, the Ministry of AYUSH actively participated in all pertinent discussions while keeping the Sustainable Development Goal-3 of "Good Health and Wellbeing" front and center. At its core, integrated care aims to reduce care fragmentation, especially when it impacts people's care experiences and treatment outcomes. Since the emergence of integrative medicine in the 1990s, all parts of P4 medicine, meaning Predictive, Preventive, Personalized, and Participatory, have gained significant importance in seeking solutions for managing health and disease in a way that is stratified for both populations and individuals. Ayurveda, a healthcare system based on genuine fundamentals, emphasizes health promotion and disease prevention through its holistic approach to healthcare management. If Ayurveda remains true to its foundation while opening up to new knowledge, it will undoubtedly offer a wide range of solutions to most of the issues that have arisen as a result of the need for healthcare around the world. It is necessary to acknowledge the individuality and distinctiveness of Ayurveda from that of biomedicine. Ayurveda is a functional, time-tested system of safe, individualized medicine. Creating connections between Ayurveda and contemporary medicine can offer fresh perspectives on personalized modern medicine, leading to potential points of convergence between the two medical systems and putting forth verifiable theories about subjects related to personalized medicine.

The evidence of clinical efficacy and safety of popular Ayurvedic formulations, through publication in journals, can pave the way to sensible application, strengthening the system's integration with other medical systems and potentially expanding its market both domestically and globally. Various diagnostic techniques such as clinical chemistry, endoscopy, radiology, electrophysiology (EMG, EEG, EMG), ultrasonography, gamma scintigraphy, computerized X-ray tomography, and NMR imaging aid clinicians in obtaining comprehensive information about the patient's altered anatomy, physiology, and biochemistry to link and integrate the symptoms and signs with changed pathology, anatomy, physiology, and biochemistry. Knowing the underlying interpretation with Ayurvedic understanding will enable Ayurvedic practitioners to make a prompt diagnosis and plan subsequent treatment. It is necessary to digress from the "utilitarian ethos" to a "unifying ethos," especially in today's era. It is insufficient to just develop pharmaceutical products based on Ayurveda. It is crucial to go beyond products to the underlying therapeutic principles and then to the core philosophical precepts of Ayurveda. More effectively, a movement like this will be facilitated by Integrative Ayurveda rather than Integrative Medicine. The emphasis on health promotion and disease prevention found in Ayurveda, along with its body, mind, and spirit inclusive holistic approach, is crucial for meeting the demands of a future world community that is happier, healthier, and more harmonious.

6. Future Perspectives

Like riding a tiger, such an integrative exercise is incredibly difficult and complex. Both getting lost or carried away and losing one's identity are risks, as is the risk of becoming overburdened. It will become an elephant ride rather than a tiger ride if the entire fraternity rises to improve our understanding of Ayurveda and raise our vision for the ultimate benefit of humanity (Patwardhan, 2010). Ayurveda has a bright future if it embraces integration, innovation, and technological advancements. This includes developing new strategies in pharmacovigilance, digital innovations, clinical practice, education, research, and public health. The creation of innovative and sustainable tools is necessary to enhance comprehension of concepts such as prakriti, sapta dhatu, dosha, marma, and others, to advance Ayurveda for modern applications in the greater good of society, and to support and enhance the Ayurvedic research ecosystem. Vaidyas, the practitioners of Ayurveda, need to be encouraged to document their clinical findings and observations to enable great knowledge sources regarding the response of Ayurveda medicines and practices in different disease conditions

in the present times. The Ayurveda practitioners need to make use of the most recent, cutting-edge diagnostic equipment. By providing information and success stories to traditional practitioners, digital tools can significantly enhance their knowledge base. The National AYUSH Morbidity and Standardized Terminologies Electronic (NAMASTE) Portal and the CCRAS standardized Prakriti Assessment Scale can be used to assist in the development of evidence-based outcomes and standardized treatment protocols for the Ayurvedic field. To do the same, effective use of artificial intelligence and information technology is required. One more area where AYUSH offers India an advantage over its counterpart nations is in Medical Value Tourism (MVT). There is an urgent need for the creation of AYUSH Public Health Standards to facilitate the development of an Integrative Medicine approach in the nation.

In the field of Ayurveda, comprehensive quality assessment is crucial, encompassing not only clinical practitioners but also hospitals, laboratories, and educational institutions. Achieving accreditation from recognized bodies such as NABH, QCI, JCI, ISO, CAP, and NABL is imperative for hospitals and related laboratories to ensure and elevate the quality of healthcare delivery. Similarly, educational establishments must seek accreditation from NAAC to guarantee excellence in their academic offerings and operations. This multi-faceted approach to quality assurance not only enhances service delivery but also builds trust among stakeholders and contributes to the standardization of Ayurvedic practices. It is necessary to create integrative program protocols to offer the best overall care. National Madumeha Programme, National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases, and Stroke (NPCDCS), and other integrated programs are prime instances of comprehensive and economically viable integrative service models. The AYUSH system offers enormous potential for technological advancement and digital innovation. The best examples are the A-HMIS (portal), Namaste Portal, e-charak, e-ashadhi portal, TKDL, AYUSH Research Portal, Yoga Locator Application, and WHO m-Yoga app. Real-time monitoring, transparency, and improved implementation can be achieved by incorporating digital innovations and technologies into the Ministry of AYUSH's various schemes. Altogether, Ayurveda can be effective in a variety of contexts, which opens the door for "Integrative Ayurveda" to play a significant role in integrative medicine.

7. Conclusion

Every healthcare system has its own advantages and disadvantages. In certain situations, depending on the type

and progression of the illness, one system may function better than the other. Since Ayurveda has been used as a medical system in India for countless years, integrating it with modern knowledge and applying it to other medical systems can aid in achieving the goals of integrative medicine, or Integrative Ayurveda. It seems that although we now have a better understanding of integrated care, it is still being discussed and is evolving. At its core, the goal is to improve the quality and safety of care through continuous collaboration. It is important to create an ecosystem for innovation in different areas of Ayurveda, encompassing education, research, clinical practice, public health, and pharmacovigilance to establish a system called “Ayurveda-Based-Evidences” and “Integrated Ayurveda” to achieve the state of anamaya (disease-free), i.e., poorna-swasthya, the state of total health, as all beings long for ‘Ayushkamyam’ and ‘deerghan-jeeviteeyam’ (longevity).

Abbreviations

AYUSH: Ayurveda, Yoga, Unani, Siddha and Homeopathy; **TCM:** Traditional & Complementary Medicine; **TM:** Traditional Medicine; **IM:** Integrative Medicine; **CAM:** Complementary and Alternative Medicine; **EBCAM:** Evidence-Based Complementary & Alternative Medicine; **AIIA:** All India Institute of Ayurveda; **BAMS:** Bachelor of Ayurvedic Medicine & Surgery; **MD/MS:** Doctor of Medicine/Master of Surgery; **CCRAS:** Central Council for Research in Ayurveda Sciences.

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Declarations

The authors declare that this work is original and has not been submitted elsewhere for publication. All data, methodologies,

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Conflict of Interest

The authors declare no conflict of interest related to this study.

Data Availability Statement

The authors declare that the data supporting the conclusions of this study are included within the article.

AI Usage Statement

Artificial intelligence tools were used solely for rephrasing text to enhance scientific tone and to correct minor spelling errors. No AI tools were used for data generation, analysis, interpretation, or the development of scientific content; all substantive material was produced by the authors through thorough independent research.

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