

SCOPE OF AYUSH SYSTEMS IN STRENGTHENING PUBLIC HEALTH: EVIDENCE, OPPORTUNITIES, AND FUTURE DIRECTIONS

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ABSTRACT

Background: India's AYUSH systems—Ayurveda, Yoga & Naturopathy, Unani, Siddha, and Homoeopathy—represent a heritage of preventive and holistic healthcare. In the context of rising non-communicable diseases and growing interest in integrative medicine, these systems offer affordable, culturally resonant solutions.

Objectives: To critically analyse the evidence supporting AYUSH integration in public health, identify key opportunities and challenges, and propose future directions in line with UGC publication standards.

Methods: A narrative review of policy documents, government reports, peer-reviewed literature, and WHO publications was conducted. Integration models, utilisation trends, and institutional expansions were synthesised. **Results:** AYUSH systems have played a substantial role in preventive health, pandemic response, rural healthcare delivery, and wellness tourism. Initiatives such as the Ayush

Grid, Traditional Knowledge Digital Library (TKDL), WHO Global Centre for Traditional Medicine (GCTM), and ICMR–AYUSH research collaborations have improved digital reach, evidence-building, and global recognition. However, quality assurance, large-scale clinical trials, and professional acceptance remain critical challenges. **Conclusion:** AYUSH has significant potential to strengthen public health in India and globally if supported by rigorous research, robust regulation, and ethical integration. Strategic investments in digital health, institutional capacity, and international partnerships are essential for maximising its role.

KEYWORDS: AYUSH, public health, preventive healthcare, Ayurveda, Yoga, integrative medicine, health promotion, traditional medicine.

1. INTRODUCTION

India's healthcare landscape is unique in its coexistence of modern biomedicine and traditional systems of medicine. The Ministry of AYUSH administers Ayurveda, Yoga & Naturopathy, Unani, Siddha, and Homoeopathy, collectively offering low-cost, preventive, and culturally embedded healthcare solutions.^[1] With the global health discourse shifting towards wellness, prevention, and sustainable care models, AYUSH systems present a timely opportunity for integration into public health frameworks. Their focus on lifestyle modification, diet, seasonal regimens, and herbal interventions complements biomedical approaches, particularly in managing chronic diseases and enhancing community health resilience.^[2]

2. EVIDENCE SUPPORTING AYUSH INTEGRATION

2.1 Pandemic Response and Preventive Health

During COVID-19, AYUSH hospitals and wellness centres functioned as quarantine facilities, with campaigns such as *Ayush for Immunity* and the *Ayush Sanjivani App* engaging millions. Self-reported benefits included improved immunity and reduced anxiety.^[3]

2.2 Utilisation and Awareness Trends

The National Sample Survey (2014) recorded AYUSH usage in 6.9% of outpatient visits, with highest prevalence in Kerala, Chhattisgarh, and West Bengal. Awareness exceeds 95%, and over 50% of respondents have used AYUSH at least once.^[4,5]

2.3 Mainstreaming under NRHM/NHM

AYUSH practitioners are posted in Primary and Community Health Centres under the National Health Mission, participating in maternal health, tuberculosis, and malaria control programmes.^[6]

2.4 Research and Academic Collaborations

The 2023 ICMR–AYUSH MoU established AIIMS-Advanced Centres for Integrative Health Research (AI-ACIHR), focusing on gastroenterology, women's health, and metabolic disorders.^[7]

2.5 Digital and IP Infrastructure

The Traditional Knowledge Digital Library (TKDL), Ayush Grid, and NAMAST platforms preserve traditional knowledge, protect intellectual property, and facilitate global access.^[8]

2.6 Global Recognition

The WHO GCTM in Jamnagar, supported by India, positions the country as a global leader in traditional medicine research and policy.^[9]

3. OPPORTUNITIES FOR AMPLIFICATION

The integration of AYUSH systems into mainstream healthcare offers a range of strategic benefits that align with both national and global health objectives. One of the most significant contributions is towards Universal Health Coverage (UHC), as AYUSH promotes low-cost, prevention-oriented, and community-based interventions that reduce the burden on tertiary healthcare systems and align well with the global UHC goals.^[10] The sector is also experiencing rapid growth in educational expansion, with the establishment of new AYUSH universities—such as the upcoming Gorakhpur AYUSH University—and integrated medical colleges that are improving the availability of trained practitioners and fostering interdisciplinary learning.^[11] This is complemented by the AYUSH sector's role in economic growth, with industry projections suggesting it will exceed USD 23 billion in the coming years, driven by rising global demand for nutraceuticals, herbal products, Ayurveda-based cosmetics, and wellness tourism.^[12] The integration of AYUSH into digital health platforms such as the Ayushman Bharat Digital Mission enables teleconsultations, electronic health record connectivity, and mobile-based wellness services, thereby increasing accessibility even in remote areas.^[13] Furthermore, AYUSH offers immense potential for rural health development and wellness tourism, with therapies like Panchakarma, yoga retreats, and traditional healing centres not only contributing to preventive and rehabilitative health but also supporting rural economies, creating livelihood opportunities, and positioning India as a global destination for holistic medical tourism.^[14]

4. CHALLENGES AND ETHICAL CONCERNS

4.1 Quality and Safety

Despite AYUSH's increasing popularity, concerns over the quality and safety of certain herbal and mineral formulations remain significant. Reports of heavy metal contamination, particularly involving lead, mercury, and arsenic, as well as cases of hepatotoxicity, have been documented in both domestic and international literature.^[15] Such issues highlight the

urgent need for stringent adherence to Good Manufacturing Practices (GMP), along with chemobiological standardisation to ensure consistency in active ingredient profiles. Additionally, strengthening pharmacovigilance systems—both passive and active—can help in early detection of adverse drug reactions and improve patient safety. The Ministry of AYUSH has initiated several quality control programs, but their implementation remains uneven across states, calling for stronger enforcement and regular third-party audits.

4.2 Professional Resistance

Another major challenge is the resistance from certain sections of the modern medical fraternity, particularly organisations like the Indian Medical Association (IMA), which strongly oppose so-called “mixopathy” initiatives, such as allowing MBBS doctors to practice Ayurveda or vice versa.^[16] The IMA argues that such integration without adequate cross-disciplinary training may compromise patient safety, especially in acute care settings. While proponents view such integration as a way to address the shortage of doctors in rural areas, critics stress the risk of diagnostic errors, improper drug use, and undermining of professional standards unless structured bridge courses, rigorous training, and clear practice boundaries are established.

4.3 Limited Large-Scale Evidence

Although AYUSH systems demonstrate promising results in various chronic, lifestyle-related, and preventive health domains, much of the current research is limited to small-scale, observational, or single-centre studies.^[17] The lack of large, multi-centre randomised controlled trials (RCTs)—the gold standard for clinical evidence—limits AYUSH’s acceptance in global scientific forums. Furthermore, methodological issues such as inadequate blinding, insufficient sample sizes, and lack of standardised outcome measures make it difficult to compare findings across studies. Expanding collaborative research between AYUSH institutions, modern medical universities, and international research bodies could help build a stronger evidence base.

4.4 Ethical Integration

Mainstreaming AYUSH into public health systems also requires careful consideration of ethical and cultural dimensions.^[18] Integration must maintain a balance between scientific rigor and cultural sensitivity, ensuring that traditional knowledge is respected while also being critically evaluated. Over-claiming efficacy without adequate evidence could not only mislead patients but also damage credibility. Similarly, tokenistic inclusion of AYUSH

practices in health programs—without genuine operational support—can hinder rather than help integration efforts. Transparent communication, patient consent, and evidence-backed claims should form the ethical backbone of AYUSH integration policies.

5. Comparative Analysis

Table 1: Comparative Role of AYUSH and Modern Medicine in Public Health.

Parameter	AYUSH Approach	Modern Medicine Approach
Focus	Preventive, holistic	Curative, disease-specific
Cost	Low, community-based	High infrastructure and technology
PHC Integration	Wellness centres, herbal treatments	Diagnostics, surgical interventions
Chronic Disease Care	Lifestyle changes, yoga, herbal therapy	Pharmacological and surgical management
Emergency Care	Limited	High-capacity emergency systems
Research Base	Growing, needs large RCTs	Strong, global trial networks
Global Recognition	Rising via WHO GCTM and TKDL	Established as gold standard

6. DISCUSSION

AYUSH systems are uniquely positioned to serve as a complementary pillar to modern medicine, particularly in the domains of preventive health and the long-term management of chronic diseases. Unlike acute care, where rapid biomedical interventions are often indispensable, chronic and lifestyle-related disorders require sustained lifestyle modifications, holistic therapies, and multi-dimensional approaches—areas where Ayurveda, Yoga, Unani, Siddha, and Homoeopathy have distinct strengths. The Chinese experience of integrating Traditional Chinese Medicine (TCM) with biomedicine offers a relevant model for India. In China, TCM is not seen as a replacement or diluted version of biomedicine but as an equal and parallel system, applied where it has demonstrated efficacy, supported by rigorous research, and incorporated into national health policy. This dual-track approach has preserved the authenticity of traditional knowledge while ensuring that it operates within evidence-based frameworks, thereby offering a pathway India could adapt to its own cultural and scientific landscape. A key priority for such integration is the strengthening of the scientific evidence base. Large-scale, multicentre clinical trials, guided by organisations such as the All India Institute for Ayurveda–Centre for Integrative Health Research (AI-ACIHR) and the WHO Global Centre for Traditional Medicine (GCTM), must be undertaken in priority health areas such as diabetes, hypertension, mental health, musculoskeletal disorders, and women's

health. Such research not only validates the clinical potential of AYUSH systems but also helps in refining treatment protocols to ensure replicability, scalability, and acceptance at the global level. This will require coordinated funding mechanisms, interdisciplinary research teams, and transparent dissemination of results in peer-reviewed platforms to build both domestic and international credibility. Ensuring safety and quality standards is equally critical for mainstream acceptance. Reports of heavy metal contamination and adulteration in some herbal formulations underline the urgent need for a nationwide pharmacovigilance framework, regular contamination testing, and strict enforcement of Good Manufacturing Practices (GMP). Establishing chemobiological standardisation, particularly for polyherbal formulations, will help eliminate variability and maintain therapeutic efficacy. Alongside this, patient safety can be further enhanced through continuing education programs for AYUSH practitioners, ensuring they are equipped with updated diagnostic and therapeutic knowledge, especially in cases that require referral to biomedical facilities. The integration of AYUSH into India's digital health ecosystem presents another transformative opportunity. Linking AYUSH services to the Ayushman Bharat Digital Mission (ABDM) would enable real-time teleconsultations, electronic health records, and nationwide data analytics on patient outcomes. Such integration would not only improve accessibility, especially in rural and underserved areas, but also create a valuable national database to study treatment efficacy, monitor adverse events, and guide health policy. Digital platforms can also be leveraged for patient education, lifestyle modification guidance, and personalised health monitoring, ensuring a patient-centred approach. AYUSH also holds significant potential for economic growth and rural development. Promoting AYUSH-based entrepreneurship in areas such as medicinal plant cultivation, herbal product manufacturing, wellness tourism, and nutraceutical innovation can create local employment, strengthen rural economies, and support biodiversity conservation. With structured training, quality certification, and market linkages, India could position itself as a global leader in sustainable natural health products. Finally, global positioning through strategic use of institutions like the WHO GCTM can turn AYUSH into a diplomatic and trade asset. Collaborative research projects, international academic exchanges, and standard-setting initiatives can help India establish leadership in integrative health sciences. By actively participating in the development of global benchmarks for traditional medicine research and practice, India can ensure that AYUSH systems are recognised and respected on the world stage, while safeguarding their cultural integrity and ensuring patient safety.

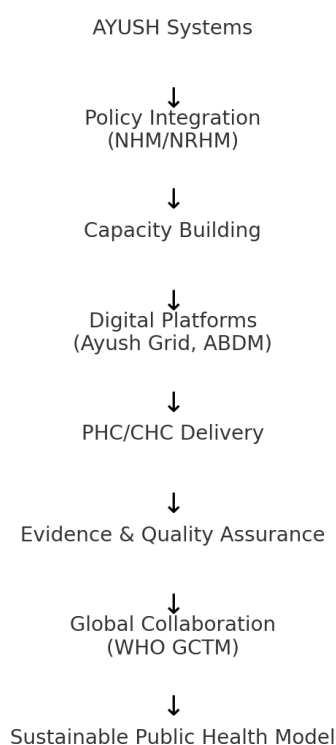
7. KEY OPPORTUNITIES IN PUBLIC HEALTH

Table 2: Opportunities for AYUSH in Public Health.

Opportunity Area	Potential Impact
Digital Health Integration	Expands reach via telemedicine
Rural Health Coverage	Cost-effective service delivery
Medical & Wellness Tourism	Revenue generation, cultural promotion
Research Collaborations	Strengthens credibility, clinical guidelines
Industry Growth	Boosts exports and rural economies

8. AYUSH INTEGRATION PATHWAY

Flowchart (Conceptual)



9. FUTURE DIRECTIONS

To strengthen the role of AYUSH in public health, it is essential to conduct multicentre randomized controlled trials (RCTs) in priority areas such as non-communicable diseases (NCDs), geriatrics, and women's health. This will generate high-quality evidence to support wider clinical adoption. Simultaneously, stringent quality and safety standards must be enforced through Good Manufacturing Practices (GMP) compliance and robust pharmacovigilance systems to ensure patient safety and product reliability. Expanding digital integration—particularly for national-scale teleconsultation—will bridge accessibility gaps, especially in underserved regions. Furthermore, promoting AYUSH-based rural

entrepreneurship through initiatives like herbal cultivation can generate livelihood opportunities while strengthening local healthcare ecosystems. Finally, enhancing international policy collaborations, particularly via platforms such as the WHO Global Centre for Traditional Medicine (GCTM), will enable knowledge exchange, capacity building, and global recognition of AYUSH systems.

10. CONCLUSION

AYUSH systems have the capacity to transition from being primarily traditional health practices to becoming a globally recognised, evidence-driven pillar of healthcare. By integrating scientific research with time-tested knowledge, these systems can offer holistic, preventive, and cost-effective solutions to a wide range of health challenges. Strengthening regulatory frameworks through Good Manufacturing Practices (GMP) and pharmacovigilance will ensure safety, efficacy, and quality of AYUSH-based interventions. Digital innovation, such as nationwide teleconsultation platforms, can expand accessibility, particularly in rural and underserved regions. Furthermore, investment in specialised research—especially in non-communicable diseases, geriatrics, mental health, and women's health—can position AYUSH as a valuable complement to biomedical approaches. Global collaborations, such as partnerships through WHO's Global Centre for Traditional Medicine, can enhance credibility and promote international acceptance. Encouraging AYUSH-linked rural entrepreneurship through herbal cultivation and value-added products can also strengthen both community health and local economies. In the coming years, coordinated efforts in research, policy alignment, infrastructure development, and public awareness will be vital. With the right strategies, AYUSH can not only complement modern healthcare but also lead in fostering a preventive, wellness-oriented, and sustainable public health model worldwide.

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