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Artificial Intelligence in Ayurveda Education, Diagnosis and Research: Opportunities, Ethical Risks and an NCISM-Aligned Roadmap

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Abstract

Background: Artificial intelligence is rapidly influencing medical education, clinical decision-making, research, pharmaceutical development, and public health. Ayurveda generates complex multidimensional information through Prakriti assessment, Dosha-Dushya analysis, Rogi-Roga Pariksha, dietary evaluation, and individualized treatment planning. These features make Ayurveda potentially suitable for carefully designed artificial intelligence applications. Recent competency-based curricula of the National Commission for Indian System of Medicine explicitly introduce artificial intelligence, digital health, diagnostic software, research databases, and development of technology-assisted diagnostic tools.

Objective: To examine the potential applications, limitations, ethical concerns, and educational requirements of artificial intelligence in Ayurveda and propose an NCISM-aligned framework for responsible implementation.

Methods: A narrative review was conducted using classical Ayurvedic literature, NCISM curriculum documents, official reports of the Ministry of Ayush and World Health Organization, and contemporary publications concerning artificial intelligence in traditional medicine, Ayurgenomics, machine learning, clinical prediction, and research governance.

Results: Artificial intelligence may support Ayurveda education through adaptive learning, multilingual knowledge retrieval, simulation, assessment, and research training. Potential clinical applications include structured documentation, Prakriti classification, diagnostic support, risk stratification, image analysis, treatment monitoring, and remote follow-up. Machine-learning studies have demonstrated the feasibility of classifying Prakriti phenotypes, while recent research has explored artificial intelligence-assisted evaluation of Panchakarma procedures. Artificial intelligence may also assist literature synthesis, formulation research, pharmacovigilance, medicinal-plant identification, and analysis of complex clinical datasets. Major limitations include inadequate standardized datasets, inconsistent terminology, algorithmic bias, hallucinated classical references, poor external validation, privacy risks, opacity, and uncertain accountability.

Conclusion: Artificial intelligence should function as a supervised clinical, educational, and research support system rather than an autonomous substitute for the Ayurvedic physician. Responsible adoption requires standardized terminology, validated datasets, interdisciplinary collaboration, human oversight, data governance, transparent reporting, and curriculum-based digital literacy. An NCISM-aligned roadmap can enable Ayurveda institutions to use artificial intelligence while preserving classical reasoning, patient safety, and professional accountability.

Keywords: Artificial Intelligence, Ayurveda, NCISM Curriculum, Digital Health, Clinical Decision Support, Ayurgenomics, Medical Education, Research Methodology

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