IJRAR.ORG E-ISSN: 2348-1269, P-ISSN: 2349-5138

INTERNATIONAL JOURNAL OF RESEARCH AND ANALYTICAL REVIEWS (IJRAR) | IJRAR.ORG

An International Open Access, Peer-reviewed, Refereed Journal

SCOPE OF SMART HEALTHCARE IN AYURVEDA FOR WOMEN

[1] **Dr Prabi KP**, [2] **Dr Manu K Mohan**, [3] **Prof.Dr Shamsa Fiaz**

[1] Ph.D Scholar, [2]Associate Professor, [3]Professor and HOD

[1]Department of shalakya tantra, National Institute of Ayurveda, Jaipur
[2] Department of Panchakarma,SCPM Ayurveda medical college,UP
[3] Department of shalakya tantra, National Institute of Ayurveda, Jaipur

Abstract: Women's health requires personalized, preventive, and continuous care across the life course from adolescence and reproductive years to menopause and ageing. Rapid advances in digital health technologies such as artificial intelligence (AI), wearables, Internet of Things (IoT), nanotechnology, and telemedicine are transforming healthcare delivery. Smart healthcare refers to the use of digital technologies to enable continuous monitoring, data-driven decision-making, and personalized interventions. The access to digital resources equips women to make informed decisions concerning their health, finances, and wellbeing, which enhances their agency and autonomy. Ayurveda, the traditional system of medicine of India, emphasizes *Prakriti* (individual constitution), balance of *Doshas*, *Agni* (~digestive and metabolic strength), *Dhatu* (~tissue health), and *Satva* (~mental well-being). Integrating these principles with modern smart technologies can create a comprehensive, women-centric healthcare model. Ayurveda emphasis on prevention, lifestyle regulation, and holistic well-being, aligns naturally with smart healthcare models. Despite promising applications, challenges remain regarding standardization of Ayurvedic parameters for digital use, data privacy, and the need for robust clinical validation. Integrating digital technologies with Ayurveda in women's healthcare requires interdisciplinary collaboration, evidence-based evaluation, and ethical governance. Overall, digital technology innovations offer significant potential to strengthen Ayurveda-based women's healthcare by enhancing personalization, accessibility, and continuity of care, while preserving the core holistic principles of the traditional system. This paper explores an integrated framework for smart women's healthcare by synergizing Ayurvedic principles with modern technological innovations. Conceptual models, application areas, and future research directions are discussed, highlighting the potential of Ayurveda-informed digital platforms to deliver precision, accessibility, and continuity of care for women.

IndexTerms **-** Smart healthcare, Women's health, Ayurveda, Artificial intelligence, Wearables, Integrative medicine

I. INTRODUCTION

Women's health is influenced by complex biological, psychological, social, and environmental factors. Conventional healthcare systems often provide episodic and symptom-oriented care, which may be insufficient for chronic, lifestyle-related, and reproductive health conditions commonly affecting women, such as menstrual disorders, polycystic ovary syndrome (PCOS), infertility, menopause-related problems, and mental health issues. Smart healthcare refers to the use of digital technologies to enable continuous monitoring, data-driven decision-making, and personalized interventions. Ayurveda, the traditional system of

medicine of India, emphasizes individual constitution (Prakriti), balance of Doshas, digestive and metabolic strength (Agni), tissue health (Dhatu), and mental well-being (Satva). Integrating these principles with modern smart technologies can create a comprehensive, women-centric healthcare model. Smart healthcare involves continuous data acquisition through wearables and sensors, digital platforms for monitoring and communication, AI-based analytics for prediction and personalization, remote care via telemedicine. For women, smart healthcare aims to address reproductive and menstrual health, maternal and antenatal care, mental and emotional well-being, ageing and menopausal health. Ayurveda adds a preventive and lifestyle-oriented dimension to these objectives.

Ayurvedic Foundations Relevant to Smart Women's Healthcare

Prakriti-Based Personalization

Ayurveda classifies individuals into *Vata, Pitta*, and *Kapha Prakriti*, influencing susceptibility to diseases, stress response, metabolism, and hormonal balance. *Prakriti*(phenotype) can be linked with genotype. It is already researched by various researcher that there is a genetic link to Prakriti such as HLADRB1, CYP2C19, PGM1, Blood group and cardiac disorders etc. These parameters can help in confirmation of *Prakriti* which is decided by *Prakriti* characteristics-based questionnaires as described in Ayurveda. Digital *Prakriti* assessment tools supported by AI can enable scalable personalization. People can prevent diseases and maintain their health by taking preventive steps after they have a knowledge of their *Prakriti.* Eating and living according to one's constitution lowers the likelihood of illness by preserving the body's harmony and balance.[1] *Prakriti* influences reproductive milestones (menarche, menopause) and menstrual health outcomes, making it a useful baseline for personalized women's care. Early or premature menopause is observed largely in *Vata Prakriti* females of Nagpur district, Eastern Maharashtra, tribal zone of Central Inda. *Vata Dosha* characteristics such as *Ruksha*, *Laghu*, *Sheeta*, and *Khara* in *Vata Prakriti* females lead to early or premature menopause. To avoid early or premature menopause in tribal females, ghee (*Ghrita*) and milk can be included in dietary habits, lifestyle modification, and awareness counselling may prove beneficial.[2] Integrating *Prakriti* assessment with digital health tools (AI, mobile apps) can support tailored preventive and lifestyle interventions.[3]

Personalized Ayurvedic Menstrual Health

Ayurveda describes menstrual health through *Artava, Artavavaha Srotas,* and *Dosha* balance.[4] Disorders such as *Rajodushti* and *Yonivyapad* correlate with modern gynecological conditions.[5] Digitization can be achieved through validated digital questionnaires integrated with machine-learning algorithms that analyze physical, physiological, and psychological parameters.[6] These tools can generate standardized Prakriti profiles and correlate them with menstrual patterns such as cycle length, flow characteristics, pain intensity, and associated symptoms, enabling constitution-based menstrual health planning[7,8]. Mobile health applications can be redesigned to incorporate Ayurvedic descriptors of menstruation, including *Raja's* quantity, colour, odour, associated pain (*Vedana*), and systemic symptoms indicative of *Dosha* imbalance[9].

The menstrual cycle represents dynamic *Dosha* fluctuations, with *Vata* predominance during menstruation, *Pitta* during ovulation, and *Kapha* during the follicular phase[10]. Artificial intelligence models can map these physiological phases with digital biomarkers and suggest personalized lifestyle, diet, yoga, and herbal regimens in alignment with classical Ayurvedic principles. Continuous self-reporting combined with wearable-derived physiological data such as heart rate variability, sleep quality, and stress levels allows early detection of menstrual irregularities from an Ayurvedic perspective[11].

Digital Fertility, Preconception, Antenatal and Postnatal care

Smart fertility tools integrated with Ayurvedic concepts such as Ritu Kala and Garbhadhana Poorva Chikitsa support preconception health optimization[12]. Personalized recommendations for diet, lifestyle, and Rasayana therapy can be delivered digitally, particularly beneficial for conditions such as PCOS and unexplained infertility[13]. Digital delivery of trimester-wise Garbhini Paricharya supports maternal nutrition, physical activity, and mental well-being[14]. Remote monitoring of physiological parameters aids in early risk detection[15]. Postnatal platforms facilitate Sutika Paricharya and monitoring of lactation and mental health**.**

Preventive Care and Lifestyle (Ahara–Vihara)

Dinacharya and *Ritucharya* (~ Daily and seasonal regimens) are central to women's health maintenance and can be digitized through smart reminders and adaptive health coaching. Ayurveda's core preventive principles such as *Dinacharya* (daily routine), Ritucharya (seasonal regimen), *Ahara–Vihara* (diet & lifestyle), *Sadvritta* (ethical living) can be digitally operationalized using mobile apps, AI health coaching, and wearable–mHealth integration to encourage sustainable, personalized preventive care in women's health.[16] AI-enabled reminders for diet, sleep, and stress management aligned to phases of the menstrual cycle interpreted through *Dosha* fluctuations. Seasonal diet plans and daily routine alerts to maintain hormonal balance and improve outcomes in conditions like PCOS and dysmenorrhea.[17]

Nanotechnology-Enabled Ayurvedic Drug Delivery

Nano-formulations of Ayurvedic drugs (e.g., nano-ghrita, phyto-nanoparticles) can enhance bioavailability and targeted delivery for gynecological and endocrine disorders.[18,19]

Proposed Technology-Based Smart Healthcare Models Integrating Ayurveda

AI-Enabled Prakriti and Risk Assessment

The Digital Prakriti–Vikriti–Avastha Assessment Model is grounded in fundamental Ayurvedic principles of Prakriti, Vikriti, Agni, Bala, and Avastha, with special emphasis on age and reproductive stage in women. These systems can predict risks for PCOS, metabolic syndrome, stress disorders, and menopausal symptoms through. By integrating life-stage–specific data from adolescence to menopause, the model enables early detection of functional imbalances before the manifestation of overt disease.

Wearable-Integrated Menstrual and Reproductive Health Monitoring

Wearables measuring heart rate variability, sleep patterns, activity levels, and temperature can be integrated with menstrual tracking applications. Ayurvedic interpretation of these parameters helps assess *Dosha* fluctuations across the menstrual cycle. In women's health, this model helps identify stress-induced menstrual irregularities, supports antenatal monitoring, and enables tracking of menopausal symptoms. Dosha

dominance analysis enables individualized dietary and lifestyle guidance along with non-pharmacological interventions such as yoga and behavioral modification. The target population includes women experiencing dysmenorrhea, irregular menstrual cycles, and polycystic ovarian syndrome. This product supports early functional correction and long-term menstrual regulation.

Digital Garbhasanskara and Sutika Paricharya Platforms

Smart antenatal and postnatal care applications can incorporate Ayurvedic month-wise pregnancy regimens (*Masanumasika Garbhini Paricharya*), yoga, meditation, and dietary guidance, promoting maternal and fetal health. The target population includes pregnant women across all trimesters and postpartum women during the puerperal phase. Postpartum recovery model delivers a structured Sutika Paricharya timeline, monitors recovery progress, provides lactation and nutrition guidance, and tracks mood and fatigue. This digital product ensures continuous and preventive maternal care beyond conventional clinical visits.

Smart Mental Health and Stress Management

Wearable-based stress indicators mapped to Ayurvedic concepts of Satva, Rajas, and Tamas can help in early identification of anxiety, depression, and premenstrual mood disorders. Stress–menstrual correlation analysis and personalized yoga and pranayama recommendations support preventive health management. The target population includes working women and women experiencing high stress levels.

Tele-Ayurveda and Continuity of Women's Care Model

This model is founded on Rogi–Roga Pariksha and the principle of Chikitsa Anuvartana. Teleconsultation platforms and electronic Ayurvedic health records ensure seamless communication, documentation, and follow-up care. The model is particularly beneficial for rural and underserved women and for long-term management of conditions such as infertility and menopausal disorders. Improved accessibility, adherence to treatment, and continuity of care constitute the key outcomes of this approach.

Smart Clinical Decision Support Tool for Practitioners

The Smart Clinical Decision Support Tool is developed for Ayurvedic practitioners managing women's health conditions. It integrates Samprapti-based clinical reasoning with AI-assisted treatment suggestions, Panchakarma planning, and Rasayana selection while linking recommendations to classical textual references. The target population includes Ayurvedic physicians and institutional healthcare providers. This product supports evidence-informed, standardized, yet individualized clinical decision-making.

Digital Research and Evidence Generation Platform

The Digital Research and Evidence Generation Platform is designed to strengthen scientific validation of Ayurvedic women's healthcare. It incorporates digital patient-reported outcome measures, Dosha–Agni–Dhatu-based scoring systems, and real-world evidence registries. The target population includes researchers, academic institutions, and healthcare organizations. This product facilitates clinical trials, outcome monitoring, and large-scale data analysis in women's health research.

Applications in Key Women's Health Domains

Polycystic Ovary Syndrome (PCOS)

An integrated smart PCOS platform can combine wearable data, menstrual tracking, AI-based risk profiling, and Ayurvedic lifestyle and herbal recommendations, enabling long-term management.

Pregnancy and Postnatal Care

Digital monitoring of physiological parameters with Ayurvedic dietary and behavioral guidance can reduce complications and improve maternal outcomes.

Menopause and Healthy Ageing

Smart systems can track sleep, bone health, mood, and vasomotor symptoms, correlating them with Vata predominance and Dhatu kshaya to guide Rasayana-based interventions.

Challenges and Ethical Considerations

Challenges include standardization of Ayurvedic parameters for digital application, data privacy concerns, limited large-scale validation studies, and the need for interdisciplinary training among practitioners.

Future Directions

Future research should focus on developing validated digital Prakriti assessment tools, large-scale clinical trials for technology-enabled Ayurvedic interventions, and policy frameworks for integrative smart healthcare.

Conclusion

Smart healthcare for women represents a paradigm shift from reactive treatment to proactive, personalized, and holistic care. The integration of Ayurveda with modern digital technologies offers a unique opportunity to address women's health needs across the lifespan. By combining ancient wisdom with innovative technology, a sustainable and inclusive healthcare model can be developed for the future.

REFERENCES

1. Nayak, U., & Panda, P. K. (2024). Significance of Prakriti in Ayurveda: A Review. *Journal of Ayurveda and Holistic Medicine (JAHM)*, *12*(1). https://doi.org/10.70066/jahm.v12i1.1218
2. Tawalare K, Wakde S, Tawalare KA, et al. Estimation of prakriti (body constitution) in women of Eastern Maharashtra tribal belt of central India featuring early and premature menopause. *J Family Med Prim Care*. 2024;13(5):1665-1669. doi:10.4103/jfmpc.jfmpc_376_23
3. Venkatesh A, Johansson L, Sivanandan PV, et al. Prakriti (constitutional typology) in Ayurveda: a critical review of Prakriti assessment tools and their scientific validity. *Front Med (Lausanne)*. 2025;12:1656249. Published 2025 Nov 6. doi:10.3389/fmed.2025.1656249
4. Tripathi B. Ashtanga Hridayam of Vagbhata. Delhi: Chaukhamba Sanskrit Pratishthan; 2017.
5. Tiwari PV. Ayurvediya Prasuti Tantra Evam Stri Roga. Varanasi: Chaukhambha Orientalia; 2018.
6. Topol E. Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again. New York: Basic Books; 2019.
7. World Health Organization. Global Strategy on Digital Health 2020–2025. Geneva: WHO; 2021.
8. A. 2008;105(25):9141-6. Rotti H, Raval R, Anchan S, Bellampalli R, Bhale S, Bharadwaj R, et al. Determinants of Prakriti, the human constitution types of Indian traditional medicine and its correlation with contemporary science. J Ayurveda Integr Med. 2014;5(3):167-75.
9. Shastri AD. Sushruta Samhita. Varanasi: Chaukhamba Sanskrit Sansthan; 2016.
10. Lad V. Textbook of Ayurveda. Albuquerque: Ayurvedic Press; 2002.
11. Smarr BL, Aschbacher K, Fisher SM, Chowdhary A, Dilchert S, Puldon K, et al. Feasibility of continuous fever monitoring using wearable devices. Sci Rep. 2020;10:21640.
12. Sharma RK. Ashtanga Hridaya of Vagbhata. Varanasi: Chaukhambha Sanskrit Series Office; 2010.
13. Azziz R, Carmina E, Chen Z, Dunaif A, Laven JS, Legro RS, et al. Polycystic ovary syndrome. Nat Rev Dis Primers. 2016;2:16057.
14. Shastri K. Kashyapa Samhita. Varanasi: Chaukhambha Sanskrit Sansthan; 2015.
15. World Health Organization. WHO recommendations on digital interventions for health system strengthening. Geneva: WHO; 2019.
16. Bhavamishra. Bhavaprakasha. Varanasi: Chaukhambha Sanskrit Bhawan; 2012.
17. Mishra S, Singh N, Sharma R. Ayurvedic lifestyle interventions in polycystic ovarian syndrome: A review. J Ayurveda Integr Med. 2021;12(4):725-32.
18. Patra JK, Das G, Fraceto LF, Campos EVR, Rodriguez-Torres MDP, Acosta-Torres LS, et al. Nano based drug delivery systems: recent developments and future prospects. J Nanobiotechnology. 2018;16:71.
19. Mukherjee PK, Harwansh RK, Bahadur S, Banerjee S, Kar A, Chanda J, et al. Development of Ayurveda – Tradition to trend. J Ethnopharmacol. 2017;197:10-24.