



Review Article

## DIGITAL HEALTH MEETS AYURVEDA: A REVIEW OF LEVERAGING TELEMEDICINE, MOBILE APPS AND ARTIFICIAL INTELLIGENCE FOR EFFECTIVE OBESITY MANAGEMENT

Aswathy K P<sup>1\*</sup>, Megha K<sup>2</sup>

\*1PG Scholar, Department of Rachana Shareer, <sup>2</sup>PG Scholar, Department of Kayachikitsa, Chaudhary Brahm Prakash Ayurved Charak Sansthan, New Delhi, India.

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### ABSTRACT

Obesity is a multifactorial condition that significantly elevates the risk of chronic diseases and impairs overall well-being. In the Ayurvedic framework, it is termed *Medoroga*, arising from pathological accumulation of *Medo Dhatu* due to *Dosha* imbalances, especially *Kapha*. Ayurveda offers a holistic approach to prevention and management through individualized regimens involving *Ahara*, *Vihara*, and *Aushadha*. In parallel, the digital transformation of healthcare offers a timely opportunity to enhance traditional approaches with modern technologies. The increasing prevalence of obesity in India, reports that over 23% of adults are overweight or obese, necessitates scalable and sustainable interventions. Conventional models often face limitations due to logistical constraints and limited accessibility, particularly in underserved areas. However, India's rapid digitalization, and improved internet penetration, creates a favorable ecosystem for digital health integration. Tools such as telemedicine, mobile health apps, and AI-based analytics can offer remote consultations, personalized tracking, and behavioral support. When aligned with Ayurvedic principles, these technologies can promote individualized care, improve adherence, and enhance long-term outcomes. This convergence of Ayurveda and digital health presents transformative potential for obesity management. Future research should focus on clinical validation, infrastructural readiness, and ethical considerations to ensure responsible and effective implementation.

### INTRODUCTION

Obesity is a complex metabolic disorder characterized by excessive fat accumulation, typically defined as a body weight exceeding the normal range by 10–20%. In healthy young adults, the percentage of body fat generally remains below 25% in men and 30–32% in women, though slight individual variations are observed. The primary cause of obesity is a chronic imbalance between caloric intake and energy expenditure, wherein surplus energy is stored in adipose tissue as fat.<sup>[1]</sup> From an Ayurvedic perspective, this condition can be associated with *Medoroga* (obesity disorder), resulting from impaired *Agni* (digestive or metabolic factors) (digestive fire) and

imbalance in *Doshas* (regulatory functional factors of the body), particularly *Kapha*.

Overweight and obesity have emerged as major contributors to the global burden of disease, significantly increasing the risk of metabolic disorders, cardiovascular conditions, and premature mortality.<sup>[2]</sup> Current estimates suggest that by 2030, more than half of the global population may fall within the overweight or obese category, underscoring the urgent need for effective and accessible interventions.<sup>[3]</sup> Once regarded primarily as a lifestyle concern, obesity is now formally recognized by the World Health Organization (WHO) as a chronic disease. In the Ayurvedic framework, this condition is identified as *Medoroga* [obesity disorder (TM2)], characterized by the abnormal proliferation (*Vikrita Vridhhi*) of *Medo Dhatu* (adipose tissue) (fatty tissue).<sup>[4]</sup> Despite rising awareness, sustainable weight management remains a challenge for many individuals, and the adoption of established therapeutic options, such as medications, structured behavioral programs, and surgical interventions, remains suboptimal.

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Several systemic barriers impede access to holistic care, including socioeconomic constraints, limited healthcare infrastructure, and specialist shortages. Notably, the COVID-19 pandemic has catalyzed the integration of telemedicine into routine practice, offering a promising pathway to enhance the delivery of obesity management services, particularly in underserved regions.<sup>[5]</sup>

Obesity represents a multifactorial health challenge arising from the dynamic interaction of genetic predispositions, individual behaviors, cultural practices, social norms, and environmental influences. While inherent biological mechanisms contribute to energy regulation and fat storage, the influence of contemporary living- characterized by excessive caloric intake, minimal physical exertion, and an abundance of processed foods- has intensified susceptibility to weight gain across populations. This modern "obesogenic" environment often diminishes the body's ability to maintain metabolic balance, making lifestyle-related interventions increasingly difficult to sustain.<sup>[6]</sup> In response, technology-based health interventions have gained momentum, particularly among adolescents aged 12 to 18 years, who are vulnerable to early-onset obesity. Digital tools such as mobile applications, interactive web platforms, and wearable devices have been effectively integrated into structured programs aimed at encouraging healthy routines. These platforms support self-monitoring, goal-setting, and informed decision-making regarding nutrition and activity levels. Importantly, these initiatives are facilitated by trained coordinators and backed by interdisciplinary teams, including paediatricians, dietitians, and mental health professionals, to ensure holistic and evidence-informed weight management strategies.<sup>[7]</sup> This review aimed to trace the evolution of digital interventions in Ayurveda, identify key trends, and assess their perceived impact on healthcare delivery and patient outcomes.

## MATERIALS AND METHODS

A structured, multi-dimensional methodology was adopted to explore the role and integration of digital technologies within the Ayurvedic healthcare framework. The study was conducted in three sequential phases:

1. Review of Classical and Contemporary Sources: A comprehensive review of relevant literature was undertaken, encompassing classical Ayurvedic texts, domain-specific textbooks, reliable digital platforms and peer-reviewed journal articles published within 10 -15 years were selected.

2. Application-Based Analysis: Selected case examples that have proficiency in using smartphone facilities and electronic wearable devices were examined to understand the practical implementation of digital tools in Ayurvedic settings. These included the use of AI for *Prakriti* (normalcy) analysis, mobile health applications for monitoring *Ahara* (food) and *Vihara* (lifestyle), and wearable technologies for tracking physiological parameters. The analysis focused on evaluating how these tools contribute to the modernization, accessibility, and personalization of Ayurvedic care.
3. Stakeholder Feedback and Observational Insights: To gain firsthand perspectives, informal verbal inputs were collected from Ayurveda practitioners, researchers, and patients through structured personal interactions and online questionnaires. The aim was to assess awareness, acceptance, and user experience with digital health solutions in Ayurvedic practice. Responses were qualitatively analysed to identify emerging patterns, challenges, and areas for further development.

Studies were excluded from consideration if they focused solely on traditional Ayurvedic practices without integrating any digital elements, involved paediatric or animal populations, failed to report outcomes related to obesity, or were not published in English.

## RESULTS

The findings of this study illustrate the emerging role and practical benefits of digital health technologies, particularly telemedicine and mobile applications, in the context of obesity management, with a focus on their integration into Ayurvedic practice.

As of 2008, it was estimated that approximately 1.46 billion individuals worldwide had a body mass index (BMI) exceeding 25kg/m<sup>2</sup>, classifying them as overweight. In the Indian context, obesity is a growing concern, with national estimates suggesting that nearly 10% of the population may fall within the obese category. Findings from localized community-based studies across various regions of India report prevalence rates ranging from 17% to 38%. These studies further indicate that individuals with a BMI greater than 28kg/m<sup>2</sup> exhibit a markedly increased risk for non-communicable diseases such as ischemic heart disease (IHD), stroke, and diabetes mellitus (DM).<sup>[8]</sup>

Body weight by itself offers a limited assessment of obesity, whereas BMI, which considers both height and weight, provides a more consistent and standardized metric for evaluating excess body fat.

$BMI = (\text{weight in kg}) / (\text{height in m})^2$

The adoption of digital health technologies is reshaping the landscape of obesity care by offering more accessible, personalized, and proactive approaches to prevention and treatment. These tools enhance the ability of healthcare providers to monitor patient progress, adjust interventions in real time, and deliver consistent support across diverse settings.<sup>[9]</sup> Broadly, digital innovations in this domain span several categories, including genomics-based tools, intelligent health systems, digital therapeutics, and robotic assistance. They encompass a wide array of applications, ranging from affordable genetic testing and teleconsultation platforms to mobile-based tracking systems, wearable biosensors for continuous health monitoring, voice-interactive interfaces, and AI-driven image analysis- all contributing to a more integrated and responsive healthcare ecosystem.<sup>[10]</sup>

Emerging digital innovations are poised to redefine the future of obesity management by offering user-centric tools that promote long-term behavioral change and improved clinical outcomes. Mobile applications, teleconsultation services, and AI-enabled platforms designed for tracking nutrition and physical activity provide individuals with practical means to monitor lifestyle habits and make informed health decisions.<sup>[11]</sup> The integration of artificial intelligence into clinical workflows holds a significant promise, particularly in deciphering the multifactorial nature of obesity. By processing vast and complex datasets, AI can generate actionable insights that support individualized treatment strategies. Moreover, by leveraging data from electronic health records (EHRs), these systems can identify patterns and predict patient responses to various therapeutic interventions, thereby enhancing the precision and effectiveness of obesity care.<sup>[12]</sup>

The WHO's endorsement of digital health is catalyzing a global healthcare revolution, prioritizing accessibility, efficiency, and patient-centricity. In the Indian context, the evolution of digital platforms- such as Telemedicine services, the CoWIN portal, Aarogya Setu, mobile health (m-Health) initiatives, e-Sanjeevani, Health Information Technology systems, and the Drugs and Vaccine Distribution Management System (DVDMS)- illustrates a significant paradigm shift in public health infrastructure. These tools have enhanced the management of electronic health records, enabled remote consultations, and streamlined immunization logistics, thereby extending high-quality healthcare services to underserved populations. Furthermore, the convergence of personalized medicine with advanced digital ecosystems fosters informed, data-driven decision-making for both clinicians and patients. Together,

these technological advancements not only increase the efficiency and inclusivity of healthcare delivery but also align with broader national and global goals for disease prevention, health equity, and sustainable development.<sup>[13]</sup>

### Telemedicine and Mobile Apps

The study findings highlight the progressive role of telemedicine in enhancing reachability and continuity of care, especially within the Ayurvedic framework. With increasing reliance on digital health services, the integration of telemedicine into routine clinical practice has redefined how consultations, diagnostics, and patient interactions are conducted.

According to the informatics team, telemedicine is conceptualized as a structured interface between healthcare providers and patients using digital communication tools to deliver clinical services across physical distances. It merges three core elements- clinical expertise, telecommunications, and secure access to health records- to support patient care remotely. This approach aligns with the global definition provided by the World Health Organization (WHO), which emphasizes the importance of using information and communication technologies to facilitate diagnosis, treatment, and preventive care when in-person interaction is not feasible.<sup>[14]</sup>

The onset of the COVID-19 pandemic significantly accelerated the adoption of virtual consultations, particularly when direct clinical contact posed safety concerns. In recognition of its relevance, the Central Council of Indian Medicine formulated comprehensive telemedicine guidelines for practitioners of Ayurveda, Siddha, and Unani systems. These protocols were designed to support safe and efficient remote consultations, emphasizing the need for adherence to regulatory frameworks and ethical practice.<sup>[15]</sup> Within the AYUSH sector, three principal modes of telecommunication- audio, video, and text- are employed to facilitate consultations. Practitioners utilize a variety of digital platforms, including mobile phones, web-based applications, and social messaging tools such as WhatsApp, Telegram, and Facebook Messenger. Additional channels like email, Skype, and mobile apps also contribute to a flexible communication network, ensuring accessibility even in resource-limited settings.<sup>[16]</sup>

Furthermore, the Ministry of AYUSH has introduced multiple digital initiatives across categories such as health information systems, research repositories, educational platforms, and public outreach resources, totalling approximately 19 distinct programs.<sup>[17]</sup> Tools like the Ayush Sanjeevani portal and the AyushQure app- initiated by the Department of AYUSH, Government of Madhya Pradesh- serve as

digital bridges between patients and Ayurvedic healthcare. In addition, platforms such as Nirogstreet, Jiva Ayurveda, Practo, and SUSHAIN offer virtual consultations customized to symptomatic presentations, facilitating prompt intervention and follow-up care.<sup>[18]</sup>

In the specific context of obesity management, virtual consultations have proven highly effective. These platforms allow patients to receive customized dietary and lifestyle guidance, track progress, and communicate with practitioners in real-time. This continuous interaction enables timely adjustments to the care plan and supports long-term adherence. Importantly, the private, home-based setting reduces psychological barriers often linked to obesity-related stigma, thereby creating a more supportive healing environment.

Despite the evident advantages, certain limitations persist. As noted by Berry et al., digital self-monitoring tools show promising outcomes in supporting weight loss; however, the absence of hands-on clinical evaluation remains a drawback in remote care models.<sup>[19]</sup> One of telemedicine's strongest attributes is its capacity to limit disease transmission, particularly during outbreaks, by replacing face-to-face interactions with digital alternatives.<sup>[20]</sup> Moreover, the time-saving and convenience benefits have made it a preferred choice for both patients and practitioners in a digitally connected world. Nonetheless, critical components of physical examination- such as palpation and auscultation- are not replicable through current virtual interfaces, potentially restricting diagnostic accuracy in some cases.<sup>[21]</sup>

Emerging innovations in remote diagnostics and wearable health monitors may help bridge these gaps in the near future. As digital health tools continue to evolve, they are likely to strengthen the delivery of Ayurvedic care through hybrid models that combine the accessibility of technology with the depth of traditional clinical wisdom.

### Artificial Intelligence

Artificial Intelligence (AI) is broadly understood as the replication of human cognitive functions through machines. More formally, the European Commission (EC) describes AI systems as those developed by humans to function in physical or digital environments by acquiring data, interpreting it, applying reasoning, and making informed decisions aimed at achieving specific objectives.<sup>[22]</sup>

In the context of healthcare, AI and its subset, machine learning (ML), are proving to be valuable tools for addressing complex conditions such as obesity. These technologies can process large and

multidimensional datasets, detect hidden patterns, and assist clinicians in making data-informed decisions. Particularly in obesity care, AI has shown promise in enhancing early risk identification, supporting diagnosis, and enabling individualized treatment planning.<sup>[22]</sup>

Machine learning algorithms have demonstrated superior predictive capabilities compared to traditional statistical models, particularly in identifying diverse factors that may influence obesity onset and progression. Notably, AI models have revealed associations with behavioural, environmental, and psychosocial variables- including discretionary spending, mobile screen time, eating behaviors, sleep patterns, and academic engagement- which are not typically captured through conventional assessments.<sup>[23]</sup>

Given the multifactorial nature of obesity as a metabolic condition, effective management necessitates the integration of both historical and current health information. This includes tracking anthropometric indicators such as BMI, analyzing risk profiles, and monitoring for potential complications such as neuropathy, retinopathy, and nephropathy. AI-based tools can streamline this process by synthesizing patient data and providing dynamic insights that support proactive intervention.<sup>[24]</sup>

At every stage of care- from assessment and diagnosis to intervention and follow-up- AI can be strategically applied to enhance the precision and personalization of obesity management. Its role is particularly relevant in hybrid healthcare models that aim to integrate traditional systems like Ayurveda with modern digital capabilities for comprehensive, patient-centered outcomes.

### DISCUSSION

In Ayurvedic clinical practice, diagnosis is fundamentally rooted in the *Trividha Pariksha*- a threefold examination method comprising *Daršana* (observation) (inspection), *Sparšana* (palpation), and *Prasna* (interrogation). These diagnostic pillars enable a comprehensive understanding of the patient's constitution, imbalance, and presenting condition. With the advent of digital health technologies, particularly AI, there exists a unique opportunity to augment these traditional methods with modern analytical precision. At each step of the obesity management pathway- from assessment to intervention- AI-driven tools can enhance the effectiveness and personalization of care.

1. Problem Identification: AI-powered mobile applications now offer preliminary screening functionalities for metabolic markers such as

hyperglycemia and BMI. BMI calculators use height and weight to measure body fat, providing a general indication of overweight or obesity. Notably, facial analysis algorithms- such as the model developed by Gayatri Gadre- can evaluate facial features, skin tone, and structural attributes, aligning well with principles of *Darśana Parīkṣa* (observation) for early recognition of metabolic imbalance.<sup>[25]</sup>

2. **Information Gathering:** In the phase corresponding to *Praśna Parīkṣa (Interrogation)*, digital assistants and chatbots can streamline history-taking by guiding patients through structured questionnaires. These platforms also allow users to manually input anthropometric data such as weight, height, hip, and waist circumference. These are considered as important indicators of obesity related health risks according to the Canadian Journal of Cardiology.<sup>[26]</sup> Smartphone-based body composition assessments can also be offered by apps to track changes in muscle mass, body fat percentage, and other metrics. Moreover, AI applications are capable of processing diagnostic reports, such as lipid panels, by cross-referencing values with normative ranges, supporting both practitioners and patients in forming a clearer clinical picture.<sup>[27,28]</sup>
3. **Formulating the Diagnosis:** AI algorithms can synthesize patient data to classify obesity based on established frameworks like the Edmonton Obesity Staging System (EOSS). This digital interpretation enables a refined assessment of disease severity, moving beyond mere BMI thresholds to a more nuanced, stage-based classification.<sup>[29]</sup> Such an approach resonates with Ayurvedic efforts to understand the progression (*Kriyakala* [Stages of disease manifestation and its management]) of a disorder.
4. **Treatment Planning:** At the intervention stage, AI-enabled systems can offer targeted lifestyle recommendations. These may include individualized yoga protocols, dietary guidance based on current health parameters, and ongoing tracking of physiological changes.<sup>[30]</sup> In advanced cases, where more intensive therapies are

warranted, digital tools may provide education on procedural options, supporting shared decision-making between patient and physician.<sup>[31]</sup>

5. **Prevention:** Many EHR platforms now feature clinical decision support functionalities, including automated alerts that inform healthcare professionals when a patient's BMI exceeds a specific limit, encouraging timely conversations about weight management approaches.

Numerous leading digital tools are available to assist with health and weight management. MyFitnessPal allows individuals to monitor their dietary habits, exercise routines, and weight changes. Fitbit offers detailed tracking of health and fitness metrics, including activity levels and sleep patterns, especially when used with compatible devices. Noom provides customized weight loss programs that incorporate psychological strategies and achievable goals. LoseIt! functions as a calorie tracker and weight management app, while Fooducate supports users in monitoring their calorie intake, analyzing nutritional quality, and logging meals and drinks.

For those managing glucose, Continuous Glucose Monitoring (CGM) apps enable real-time tracking of glucose levels through sensor integration. Weight Watchers delivers structured support for weight loss, and CalFit for iOS creates individualized daily step targets. The Control app motivates users with a set daily step goal, typically 10,000 steps. CITY (Cell Phone Intervention for You) and Rosemary Online connect users with health coaches through chat and call-based platforms, while Slimming World Online offers similar support via its website. Vida Health provides ongoing coaching through live video, phone calls, and text messaging over several months. The b-SLIM app offers digital guidance on dietary choices and behavioral habits; all these are contributing to a comprehensive approach to health and weight management.<sup>[32]</sup>

A thorough overview of all the potential benefits and possible limitations of digital tools in obesity management is presented in Table 1.

**Table 1: Overview of digital tools in obesity management**

S.No	Digital tool	Potential Benefits in Ayurvedic Obesity Management	Possible Limitations in Ayurvedic Obesity Management
1	Teleconsultation services	<ul style="list-style-type: none"> <li>• Connects patients with Ayurvedic practitioners remotely, making expert guidance more accessible.</li> <li>• Facilitates regular virtual check-ins and follow-up appointments.</li> <li>• Minimizes travel and waiting times for patients.</li> </ul>	<ul style="list-style-type: none"> <li>• May limit the ability to perform traditional Ayurvedic physical assessments (<i>Sparshana</i> [palpation]).</li> <li>• Virtual interaction can reduce the depth of the patient-practitioner connection.</li> </ul>

2	Mobile wellness applications	<ul style="list-style-type: none"> <li>Enables users to log meals, activities, and Ayurvedic routines conveniently.</li> <li>Sends reminders for herbal supplements and daily practices.</li> <li>Allows for easy tracking of progress and habits.</li> </ul>	<ul style="list-style-type: none"> <li>Effectiveness depends on user engagement and comfort with technology.</li> <li>User-entered data may be inconsistent or incomplete.</li> </ul>
3	AI-Based Guidance Systems	<ul style="list-style-type: none"> <li>Delivers recommendations based on individual health data and Ayurvedic principles.</li> <li>Can identify trends to personalize interventions over time.</li> </ul>	<ul style="list-style-type: none"> <li>May oversimplify complex Ayurvedic assessments.</li> <li>Automated suggestions could lack the nuance of practitioner expertise.</li> </ul>
4	Digital Learning Platforms	<ul style="list-style-type: none"> <li>Offers accessible resources on Ayurvedic diet, exercise, and self-care.</li> <li>Empowers patients to make informed lifestyle choices with credible information.</li> </ul>	<ul style="list-style-type: none"> <li>Information may not be fully tailored to individual constitutions.</li> <li>Less opportunity for interactive, personalized education.</li> </ul>
5	Remote Monitoring Tools	<ul style="list-style-type: none"> <li>Provides ongoing updates on weight and vital signs to practitioners.</li> <li>Allows for timely adjustments to Ayurvedic regimens based on real-world data.</li> </ul>	<ul style="list-style-type: none"> <li>Requires reliable internet and compatible devices.</li> <li>Large volumes of data may be challenging to interpret without clinical context.</li> </ul>
6	Fitness and Health Trackers	<ul style="list-style-type: none"> <li>Monitors activity levels and sleep patterns in real time, supporting tailored Ayurvedic lifestyle advice.</li> <li>Encourages accountability through continuous feedback.</li> </ul>	<ul style="list-style-type: none"> <li>May not capture subtle Ayurvedic indicators (such as pulse or tongue diagnosis).</li> <li>Cost and device upkeep may be a barrier for some users.</li> </ul>

The CCIM has also published information on the strengths and limitations of video, audio, text-based, and asynchronous modes of communication in the telemedicine practice guidelines for ASU practitioners.<sup>[33]</sup> This convergence of Ayurvedic diagnostic wisdom with emerging AI technologies not only strengthens diagnostic accuracy but also promotes holistic, patient-centered care. As these tools evolve, they hold the potential to make personalized obesity management more accessible, especially in resource-constrained or geographically remote settings.

**Table 2: Comparative overview of digital innovations and conventional approaches for obesity management**

Feature	Digital Innovations	Conventional Programs
Accessibility	Enables remote participation; reduces spatial barriers	Requires attendance at clinical sites; limited by travel and appointment schedules
Personalization	AI and analytics deliver tailored feedback, updated in real time	Modifications occur during scheduled in-person sessions only
Long-Term Effectiveness	Outcomes show greater sustained weight loss and higher participant retention	Results rely on ongoing reinforcement, which is less feasible in practice
Patient Engagement	Uses self-monitoring, reminders, interactive elements, and peer support	Relies on periodic visit-based interactions; engagement can lapse between sessions
Health Impact	Promotes faster improvement in metabolic and psychosocial outcomes	Improvement may follow a slower trajectory, typically paralleling digital programs when supported
Cost and Convenience	Minimizes costs linked to travel; flexible timing and instant access	Greater personal/time investment for travel and appointments

## CONCLUSION

The increasing prevalence of metabolic disorders, particularly among individuals with sedentary occupations and time-constrained lifestyles, highlights the urgent need for accessible, efficient, and personalized healthcare solutions. In this context, digital health technologies offer a practical alternative to traditional care models, minimizing the need for physical travel, extended waiting periods, and time-intensive consultations.

This study emphasizes the transformative potential of integrating digital platforms with Ayurvedic principles for obesity management. The convergence of Digital Ayurveda, telemedicine, and artificial intelligence (AI) represents a sea change, enabling personalized interventions that address both the physiological and lifestyle dimensions of obesity. By combining time-tested Ayurvedic insights with the precision and scalability of modern digital tools, these integrated systems support preventive care, early intervention, and sustainable behaviour change.

Digital Ayurveda platforms not only preserve the foundational philosophies of traditional medicine but also enhance user engagement through real-time monitoring, individualized recommendations, and accessible remote consultations. This blend of tradition and technology fosters a patient-centric model of care that aligns with contemporary healthcare needs.

As digital literacy and smartphone access grow, especially among younger populations, there is a clear opportunity to cultivate healthier habits early in life. By harnessing technology to promote awareness, encourage mindful living, and offer continuous support, the next generation can be empowered to resist the rise of obesity and associated comorbidities.

In moving forward, the integration of Ayurveda with digital innovation holds immense promise to redefine obesity care. With continued research, strategic implementation, and policy support, these hybrid approaches can contribute meaningfully to national and global health priorities by making holistic, affordable, and equitable care a tangible reality.

### Clinical Significance

The integration of digital health technologies into Ayurvedic practice offers a novel and dynamic framework for managing obesity. By uniting traditional diagnostic wisdom with modern tools such as remote monitoring and individualized health tracking, this approach enhances the precision and consistency. Digital platforms enable real-time interaction between patients and practitioners, supporting timely adjustments to treatment plans based on evolving health patterns. Furthermore, the incorporation of data-driven insights allows for more informed clinical

decisions and better alignment with each patient's unique constitution (*Prakriti* [normalcy]). This synergy between Ayurveda and digital innovation fosters greater patient engagement, strengthens adherence to therapeutic regimens, and ultimately contributes to more effective and sustainable outcomes in obesity management.

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**\*Address for correspondence**

**Dr. Aswathy K P**

PG Scholar,

Department of Rachana Shareer,  
Chaudhary Brahm Prakash Ayurved  
Charak Sansthan, New Delhi, Khera  
Dabar.

Email: [draswathikp154@gmail.com](mailto:draswathikp154@gmail.com)

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