

PERSONALIZED DINACHARYA: PRAKRITI AND RITU SPECIFIC PREVENTIVE HEALTHCARE MODEL

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ABSTRACT

Background: Dinacharya, the daily regimen described in Ayurveda, is a fundamental component of Swasthavritta that promotes health, prevents disease, and supports longevity. While classical Ayurvedic texts recommend a common set of daily practices for maintaining health, their implementation is not intended to be uniform for every individual. Rather, these practices should be adapted according to an individual's Prakriti (constitutional phenotype) and the prevailing Ritu (season). Despite this personalized approach being inherent in Ayurvedic philosophy, a structured framework integrating both constitutional and seasonal modifications into Dinacharya has not been systematically presented. **Objective:** To develop a comprehensive Prakriti and Ritu specific model of Personalized Dinacharya that translates classical Ayurvedic principles into an individualized preventive healthcare framework. **Methods:** A review of the classical Ayurvedic literature, including Charaka Samhita, Sushruta Samhita, and Ashtanga Hridaya, was undertaken. Eleven key components of Dinacharya—Brahma Muhurta Uttishta, Gandusha, Kavala, Abhyanga, Vyayama, Snana, Vastra Dharana, Gandha-Malya Dharana, Ahara Sevana, Jala Sevana, and Nidra—were critically analyzed. Each practice was customized according to Vata, Pitta, and Kapha Prakriti and further refined with season-specific modifications for summer (Grishma), Rainy (Varsha), and winter (Hemanta/Shishira). **Discussion:** The proposed model demonstrates that although the core sequence of Dinacharya remains universal, its practical application should be individualized. Variations were identified in the timing, intensity, frequency, duration, and choice of interventions, including oils, diet, hydration, exercise, clothing, sleep, and other lifestyle measures. Vata individuals benefited from warm, nourishing, and stabilizing practices; Pitta individuals from cooling and moderating measures; and Kapha individuals from stimulating and lightening regimens. Seasonal adaptations further refined these recommendations, enabling better maintenance of Dosha balance and physiological homeostasis throughout the year. **Conclusion:** Personalized Dinacharya provides a practical and dynamic model for individualized preventive healthcare in Ayurveda by integrating constitutional characteristics with seasonal influences. This framework extends the traditional concept of Dinacharya into a clinically relevant lifestyle model that aligns with contemporary principles of personalized and precision lifestyle medicine. It has the potential to support individualized patient counselling, strengthen preventive healthcare strategies, and provide a foundation for future clinical validation and translational research.

KEYWORDS: Dinacharya; Prakriti; Ritucharya; Swasthavritta; Personalized Preventive Healthcare

INTRODUCTION

The global healthcare landscape is witnessing an unprecedented rise in lifestyle-related disorders, including obesity, type 2 diabetes mellitus, cardiovascular diseases, metabolic syndrome, chronic inflammatory conditions, sleep disorders, and mental health disturbances. These disorders are largely attributed to unhealthy lifestyle practices, irregular dietary habits, sedentary behavior, disrupted circadian rhythms, psychological stress, and environmental changes. Despite remarkable advances in modern medicine, the increasing burden of chronic non-communicable diseases has shifted healthcare priorities from disease treatment toward prevention, health promotion, and personalized healthcare interventions. Consequently, precision medicine and lifestyle medicine have emerged as important paradigms that recognize the influence of individual biological variability, environmental exposures, and behavioral factors on health outcomes.¹⁻⁵ Long before the evolution of these contemporary concepts, Ayurveda proposed an individualized approach to health preservation based on the principle that every individual possesses a unique constitutional makeup (Prakriti) that governs physiological functions, disease susceptibility, metabolic characteristics, psychological behavior, and therapeutic responses.

Rather than advocating a uniform lifestyle for all individuals, Ayurveda emphasizes tailoring daily activities, dietary habits, and behavioral practices according to one's constitutional characteristics while simultaneously adapting them to changing environmental conditions. This holistic philosophy represents one of the earliest documented concepts of personalized preventive healthcare.⁶⁻⁹

Among the numerous preventive strategies described in Ayurveda, Dinacharya (daily regimen) occupies a central position within Swasthavritta, the branch dedicated to the maintenance of health and disease prevention. The term Dinacharya literally denotes "daily conduct" and encompasses a systematic sequence of activities beginning with awakening during Brahma Muhurta and extending through oral hygiene, therapeutic cleansing procedures, oil massage, physical exercise, bathing, appropriate clothing, dietary regulation, hydration, and adequate sleep. Classical Ayurvedic texts describe these practices not merely as routine habits but as physiological interventions intended to maintain the equilibrium of Dosha, preserve Agni, nourish Dhatus, facilitate proper elimination of Mala, maintain the integrity of Srotas, and protect Ojas, thereby sustaining physical, mental, and spiritual well-being.^{6,7,10}

Recent advances in chronobiology provide a scientific perspective that complements the Ayurvedic understanding of Dinacharya. Human physiology follows endogenous circadian rhythms regulated primarily by the suprachiasmatic nucleus of the hypothalamus, coordinating sleep-wake cycles, hormonal secretion, autonomic nervous system activity, metabolism, immune responses, gastrointestinal function, and cognitive performance. Disturbances in these biological rhythms have been implicated in obesity, insulin resistance, cardiovascular disease, mood disorders, gastrointestinal dysfunction, and accelerated ageing.⁽¹¹⁻¹⁵⁾ Interestingly, many components of Dinacharya—including early awakening, timely food intake, physical activity, and regular sleep—closely parallel modern recommendations for circadian health, suggesting that Ayurveda recognized the importance of biological timing centuries before the discovery of molecular clock mechanisms. However, the significance of Dinacharya extends beyond circadian regulation. Classical Ayurvedic literature consistently indicates that the application of daily regimens should be individualized. The recommendations are modified according to Prakriti, Vaya (age), Bala (physical strength), Desha (geographical habitat), Kala (time and season), Satmya (adaptability), and the prevailing health status of the individual. Among these determinants, Prakriti and Ritu represent two of the most influential factors governing physiological adaptation. Yet, in contemporary clinical practice and educational resources, Dinacharya is frequently presented as a standardized regimen, with limited emphasis on its constitution-specific and season-specific applications. This simplification overlooks one of Ayurveda's most distinctive strengths—its commitment to individualized healthcare.

Prakriti, determined at conception by the relative predominance of Vata, Pitta, and Kapha Doshas, represents a stable constitutional phenotype that remains relatively constant throughout life. It influences anatomical features, physiological functions, metabolic efficiency, psychological traits, disease predisposition, exercise tolerance, digestive capacity, sleep patterns, and environmental adaptability. Individuals with Vata predominance generally exhibit greater physiological variability and susceptibility to dryness and instability; Pitta individuals possess relatively high metabolic activity and heat production; whereas Kapha individuals characteristically demonstrate structural stability, slower metabolism, and greater anabolic capacity. These constitutional differences logically necessitate individualized recommendations regarding diet, exercise, therapeutic procedures, hydration, sleep, and daily routines.^(6-10,16-18) Complementing constitutional individuality is the Ayurvedic concept of Ritucharya, which recognizes that seasonal variations exert profound influences on physiological functions and Dosha dynamics. Changes in ambient temperature, humidity, photoperiod, atmospheric pressure, and food availability continuously modify digestive capacity, immune competence, metabolic activity, and physical performance. Ayurveda therefore recommends seasonal modifications in lifestyle, diet, physical activity, clothing, therapeutic procedures, and behavioral practices to maintain homeostasis. These seasonal adaptations are increasingly supported by contemporary evidence demonstrating the influence of seasonal changes on endocrine regulation, immune function, cardiovascular physiology, sleep architecture, microbial diversity, and nutritional requirements.¹⁹⁻²⁴

The interaction between Prakriti and Ritu creates a dynamic framework for individualized preventive healthcare. While Prakriti provides the constitutional baseline for lifestyle recommendations, seasonal changes necessitate temporary modifications to preserve physiological equilibrium. Consequently, effective implementation of Dinacharya requires continuous adaptation rather than rigid adherence to a fixed routine. This dynamic personalization distinguishes Ayurveda from generalized lifestyle recommendations and closely aligns with the contemporary principles of precision medicine, which advocate individualized interventions based on genetic,

phenotypic, environmental, and behavioral variability.^{25–28} Among the numerous components of Dinacharya, practices such as Brahma Muhurta Uttishta, Gandusha, Kavala, Abhyanga, Vyayama, Snana, Vastra Dharana, Gandha–Malya Dharana, Ahara Sevana, Jala Sevana, and Nidra are routinely recommended for maintaining health. Although these practices are universally prescribed, their timing, duration, intensity, frequency, and choice of therapeutic materials—including oils, herbs, dietary components, water intake, fragrances, and clothing—should logically differ according to constitutional phenotype and seasonal requirements. However, a systematic framework integrating these dual dimensions of personalization has not been adequately described in the available Ayurvedic literature.

Developing such a framework has important implications for clinical practice, public health, education, and research. Constitution- and season-specific Dinacharya recommendations can facilitate individualized patient counselling, improve adherence to preventive interventions, enhance lifestyle modification programs, and promote evidence-informed integration of Ayurveda within contemporary healthcare systems. Furthermore, organizing Dinacharya into a structured personalization model provides a foundation for future clinical validation, translational research, and digital health applications, including personalized decision-support systems and artificial intelligence-assisted lifestyle recommendations. The present review therefore proposes a Personalized Dinacharya model by systematically integrating the eleven principal components of Dinacharya with Prakriti-specific and Ritu-specific modifications. The model preserves the universal sequence of classical Dinacharya while individualizing its implementation according to constitutional characteristics and seasonal variations. By bridging classical Ayurvedic wisdom with contemporary concepts of circadian biology, chronomedicine, preventive healthcare, and precision lifestyle medicine, this framework seeks to advance a practical, evidence-informed approach to individualized health promotion in Ayurveda.

DISCUSSION

Ayurveda defines health (*Swasthya*) not merely as the absence of disease but as a dynamic state of equilibrium involving Dosha, Agni, Dhatu, Mala, and Prasanna Atma-Indriya-Manas. This equilibrium is continuously influenced by intrinsic constitutional characteristics (*Prakriti*) and extrinsic environmental factors (*Kala* and *Ritu*). Consequently, preventive healthcare in Ayurveda is inherently individualized, emphasizing adaptation rather than standardization. This philosophical approach remarkably parallels the contemporary concepts of precision medicine and precision lifestyle medicine, which advocate individualized preventive strategies based on biological variability, environmental influences, and behavioural characteristics.^{29–34}

Although Dinacharya is universally recommended in classical texts, its practical implementation is never intended to be identical for every individual. Classical Ayurvedic scholars repeatedly emphasize that health recommendations should consider Prakriti, Desha, Kala, Vaya, Bala, Satmya, and Ahara Shakti before prescribing lifestyle interventions.^{35–37} Therefore, Dinacharya should be interpreted as a dynamic physiological framework, where the sequence of daily activities remains constant while their execution—including timing, duration, intensity, frequency, and choice of therapeutic substances—is individualized. The present model proposes two complementary layers of personalization. The first is constitutional personalization, determined by the stable predominance of Vata, Pitta, or Kapha Dosha. The second is seasonal personalization, wherein environmental changes necessitate temporary modifications without altering the individual's constitutional identity. Together, these two dimensions constitute a practical framework for individualized preventive healthcare.

Modern physiology offers a comparable explanation through the concepts of homeostasis and allostasis. Homeostasis maintains internal physiological stability, whereas allostasis enables adaptive responses to predictable environmental challenges such as seasonal variation, temperature changes, photoperiod, humidity, physical activity, and nutritional availability.^{38,39} Ayurveda recognized these adaptive requirements thousands of years ago through the principles of Dinacharya and Ritucharya, demonstrating an advanced understanding of biological adaptation.

Prakriti: The Foundation of Personalized Dinacharya

Prakriti represents an individual's constitutional phenotype established during embryogenesis through the relative predominance of the three Doshas. Classical texts describe Prakriti as influencing body structure, metabolic activity, digestive capacity, thermoregulation, psychological behaviour, disease susceptibility, and lifespan.^{35–37} Interestingly, contemporary biomedical research increasingly supports this constitutional concept. Genome-wide expression studies, HLA polymorphism analyses, metabolomic investigations, and systems biology approaches have demonstrated measurable biological differences among individuals categorized according to Ayurvedic

Prakriti. These include variations in inflammatory pathways, immune regulation, oxidative stress, metabolism, and gene expression profiles.⁴⁰⁻⁴³ Such findings strengthen the scientific basis of constitution-specific preventive healthcare. Individuals with Vata Prakriti generally exhibit greater physiological variability, rapid autonomic responses, relatively lower body mass, irregular appetite, disturbed sleep, and increased susceptibility to dehydration and fatigue. Therefore, their daily regimen should prioritize warmth, nourishment, oil therapies, regularity, and adequate rest.

Conversely, Pitta Prakriti is characterized by higher metabolic activity, greater thermogenesis, efficient digestion, heightened inflammatory responsiveness, and increased heat intolerance. Consequently, cooling measures, adequate hydration, moderation in physical activity, and avoidance of excessive heat become essential preventive strategies.

Individuals with Kapha Prakriti demonstrate structural stability, slower metabolic rate, efficient energy conservation, greater anabolic tendency, and increased susceptibility to obesity and metabolic disorders. Their preventive regimen therefore emphasizes stimulation, vigorous physical activity, lighter diet, reduced sleep duration, and therapies that enhance metabolic efficiency. These constitutional differences justify personalized implementation of every component of Dinacharya rather than adopting a universal regimen.

Seasonal Adaptation: The Dynamic Dimension of Personalized Dinacharya

While Prakriti remains relatively constant throughout life, seasonal variations continuously influence physiological functions. Ayurveda explains these changes through the cyclic accumulation (*Chaya*), aggravation (*Prakopa*), and pacification (*Prashama*) of Doshas during different seasons.^{36,37}

Modern chronobiological research similarly demonstrates that seasonal alterations in ambient temperature, humidity, daylight duration, and environmental exposures significantly affect endocrine secretion, circadian rhythm, immune function, cardiovascular physiology, gastrointestinal activity, sleep architecture, physical performance, and nutritional requirements.⁴⁴⁻⁴⁷

During Grishma (summer), excessive environmental heat reduces physical strength, increases perspiration, predisposes to dehydration, and aggravates Pitta while gradually weakening Vata through tissue depletion. Accordingly, cooling dietary measures, adequate hydration, moderate physical activity, and protection from heat become important. During Varsha (rainy season), digestive capacity diminishes owing to impaired Agni, while humidity and climatic instability aggravate Vata and predispose to gastrointestinal disturbances. Warm food, medicated oils, boiled water, indoor exercise, and protection from dampness therefore become appropriate seasonal modifications. In Hemanta and Shishira (winter), digestive strength is naturally enhanced, physical endurance improves, and nourishing foods are better tolerated. Nevertheless, cold exposure aggravates Vata and promotes Kapha accumulation, necessitating warming therapies, vigorous exercise, adequate clothing, and regular oil massage. Thus, seasonal adaptation should not replace Prakriti-specific recommendations but rather refine them, allowing continuous physiological adaptation throughout the year.

Brahma Muhurta Uttishta

Among all components of Dinacharya, Brahma Muhurta Uttishta serves as the foundation of physiological synchronization. Classical Ayurvedic texts recommend awakening approximately one Muhurta before sunrise, considering this period ideal for promoting clarity of mind, efficient bowel evacuation, sensory alertness, longevity, and spiritual well-being.³⁵⁻³⁷

Modern chronobiology provides a compelling physiological explanation for this recommendation. The early morning hours are characterized by activation of the cortisol awakening response, gradual decline in melatonin secretion, increased sympathetic nervous activity, enhanced gastrointestinal motility, and improved cognitive alertness. Aligning awakening with these endogenous circadian events optimizes neuroendocrine coordination, glucose metabolism, cardiovascular regulation, and mental performance.⁴⁸⁻⁵¹

However, constitutional individuality influences the practical application of this recommendation. Vata individuals are more susceptible to sleep deprivation owing to autonomic instability and should therefore avoid sacrificing adequate sleep merely to awaken earlier. In contrast, Kapha individuals derive maximum benefit from strict early rising because prolonged morning sleep aggravates sluggish metabolism and increases Kapha

dominance. Pitta individuals generally tolerate Brahma Muhurta awakening well and particularly benefit during summer by utilizing the cooler morning hours before environmental heat increases.

Seasonal adaptation further modifies this practice. During winter, protection from cold immediately after awakening becomes important, whereas in summer Vata individuals may require slightly extended rest if dehydration or fatigue develops. Thus, Brahma Muhurta Uttishta represents not merely a behavioural recommendation but an individualized chronobiological intervention.

Gandusha and Kavala

Gandusha and Kavala are classical oral therapeutic procedures designed to maintain oral hygiene, strengthen the oral cavity, improve taste perception, enhance speech, and prevent diseases affecting the teeth, gums, tongue, throat, and upper respiratory tract.^{36,37} From a physiological perspective, these procedures stimulate salivary secretion, improve lubrication of the oral mucosa, enhance local circulation, facilitate mechanical cleansing, reduce microbial colonization, and maintain mucosal integrity. Oil-based Gandusha additionally strengthens the epithelial barrier, decreases inflammatory responses, and may improve oral microbial homeostasis.⁵²⁻⁵⁴ The choice of therapeutic medium should vary according to Prakriti. Warm sesame oil effectively counteracts oral dryness in Vata individuals. Coconut oil, medicated ghee, or cooling herbal decoctions are more suitable for Pitta constitutions because of their anti-inflammatory and cooling properties. Kapha individuals benefit from warm saline solutions or pungent herbal decoctions that stimulate salivation, reduce mucus accumulation, and enhance local circulation. Seasonal modifications further refine these recommendations. Warm oils become particularly beneficial during rainy and winter seasons, whereas cooling oils are preferable during summer, especially for Pitta constitutions. Such modifications illustrate how a single therapeutic procedure can be individualized while preserving its therapeutic objective.

Abhyanga

Among all Dinacharya procedures, Abhyanga exemplifies constitutional personalization because the choice of oil, duration, frequency, massage technique, and seasonal application vary considerably according to Prakriti and Ritu. Ayurvedic classics describe Abhyanga as nourishing the Dhatus, pacifying Vata, improving skin texture, enhancing physical strength, delaying ageing, promoting sound sleep, and increasing longevity.^{36,37} These classical observations are increasingly supported by modern physiological evidence demonstrating that therapeutic massage improves peripheral circulation, stimulates cutaneous mechanoreceptors, enhances parasympathetic activity, lowers circulating cortisol concentrations, facilitates lymphatic drainage, improves muscle recovery, and reduces psychological stress.⁵⁵⁻⁵⁸

Daily warm sesame oil massage is particularly beneficial for Vata individuals because it compensates for constitutional dryness, supports neuromuscular stability, and minimizes joint stiffness. Pitta constitutions benefit more from cooling oils such as coconut or sandalwood preparations, particularly during summer, where they help dissipate excess body heat. Kapha individuals require comparatively smaller quantities of warming oils combined with vigorous massage techniques that stimulate circulation and metabolic activity. Seasonal adaptations further enhance these benefits. During rainy and winter seasons, generous application of warm medicated oils protects against cold-induced Vata aggravation, whereas lighter applications become more appropriate during summer. Thus, the therapeutic efficacy of Abhyanga depends not only on performing massage but also on appropriately individualizing the intervention according to constitutional and environmental factors.

Collectively, Brahma Muhurta Uttishta, Gandusha, Kavala, and Abhyanga demonstrate that the effectiveness of Dinacharya lies not in rigid adherence to routine but in its thoughtful personalization. By integrating Prakriti with seasonal adaptation, these daily practices function as targeted physiological interventions that promote homeostasis, enhance resilience, optimize circadian synchronization, and contribute to long-term health maintenance.

Vyayama: Personalized Exercise as a Constitutional and Seasonal Intervention

Among all components of Dinacharya, Vyayama (physical exercise) represents one of the most individualized lifestyle interventions in Ayurveda. Rather than recommending a uniform exercise prescription, Ayurvedic classics advocate that the type, duration, intensity, and frequency of exercise should be determined according to Prakriti, Bala (physical strength), Vaya (age), Ahara Shakti (digestive capacity), and Ritu (season). This individualized approach closely resembles the principles of modern exercise prescription, where training

programmes are tailored according to age, body composition, cardiovascular fitness, metabolic characteristics, and individual physiological responses.^{35-37,59-62}

Charaka and Vagbhata describe exercise as a means of producing Laghava (lightness), Karma Samarthya (improved functional efficiency), Agni Deepana (enhanced digestive and metabolic activity), Meda Kshaya (reduction of excessive adiposity), and Sharirika Bala (improved physical strength) while cautioning that excessive exercise (*Ati Vyayama*) results in fatigue, tissue depletion, Vata aggravation, dyspnoea, excessive thirst, and diminished immunity.^{35,36} These observations remarkably correspond with modern concepts of exercise physiology, wherein moderate exercise enhances cardiovascular efficiency, insulin sensitivity, mitochondrial biogenesis, immune competence, and musculoskeletal health, whereas excessive training may culminate in overtraining syndrome, characterized by neuroendocrine dysfunction, chronic inflammation, impaired recovery, and increased susceptibility to infections.⁵⁹⁻⁶⁴

Constitutional differences significantly influence exercise tolerance. Individuals with Vata Prakriti, owing to their relatively lower muscle mass, variable energy levels, and greater autonomic lability, benefit from moderate-intensity activities such as yoga, walking, swimming, cycling, and resistance training with adequate recovery periods. Excessive endurance exercise may aggravate Vata, leading to fatigue, musculoskeletal pain, insomnia, and impaired recovery.

Individuals with Pitta Prakriti generally possess superior metabolic efficiency and competitive temperament, allowing them to tolerate relatively higher exercise intensities. Nevertheless, prolonged strenuous exercise, particularly under hot environmental conditions, predisposes them to dehydration, electrolyte imbalance, oxidative stress, and inflammatory disorders. Therefore, moderate-to-high intensity exercise performed during cooler hours with adequate hydration is preferable.

In contrast, Kapha Prakriti individuals exhibit greater structural stability, higher endurance, and slower metabolism. Vigorous aerobic exercise, interval training, resistance exercise, and prolonged physical activity effectively stimulate metabolism, improve insulin sensitivity, reduce adiposity, and counteract Kapha predominance. Consequently, Kapha individuals derive the greatest benefit from higher exercise volumes compared with Vata and Pitta constitutions.

Seasonal adaptation further refines exercise prescription. During Grishma, excessive heat reduces exercise tolerance owing to increased cardiovascular strain and dehydration risk, necessitating reduced exercise intensity across all constitutions, particularly in Pitta individuals. During Varsha, weakened digestive power and environmental humidity warrant moderate indoor exercise while avoiding excessive exertion. Conversely, Hemanta and Shishira represent physiologically favourable periods for vigorous exercise because enhanced digestive capacity and improved physical endurance facilitate greater training loads. Such recommendations closely align with seasonal variations in thermoregulation, cardiovascular function, and exercise performance described in contemporary sports physiology.⁶⁵⁻⁶⁸

Therefore, Vyayama in Ayurveda represents a constitution-specific and seasonally adaptable exercise prescription rather than a standardized recommendation, emphasizing physiological optimization while minimizing exercise-induced stress.

Snana: Physiological Regulation Through Personalized Bathing Practices

Snana (therapeutic bathing) occupies an important position within Dinacharya owing to its influence on thermoregulation, circulation, neuromuscular function, hygiene, and psychological well-being. Classical Ayurvedic literature attributes Snana with improving cleanliness, relieving fatigue, promoting enthusiasm, enhancing complexion, and restoring physical comfort while advising against extremely hot water over the head because of its potential adverse effects on hair, vision, and sensory organs.³⁵⁻³⁷

Modern physiology similarly recognizes bathing as an intervention capable of influencing autonomic nervous activity, vascular tone, endocrine responses, skin barrier function, and psychological relaxation. Warm bathing induces peripheral vasodilatation, improves muscular relaxation, reduces sympathetic activity, and facilitates recovery after physical exertion. Cold or cool bathing enhances alertness, transiently stimulates sympathetic activation, and may reduce exercise-induced inflammation.⁶⁹⁻⁷²

The physiological effects of Snana differ according to constitutional characteristics. Vata individuals, who commonly experience dryness, cold intolerance, and muscular stiffness, benefit from warm water bathing that promotes vasodilatation, improves peripheral circulation, and enhances neuromuscular relaxation. Pitta individuals, owing to increased heat production and inflammatory predisposition, benefit from lukewarm or cool bathing, particularly during summer, which assists thermoregulation and reduces heat stress. Kapha individuals generally tolerate warmer baths well, as warmth stimulates circulation, promotes metabolic activity, and alleviates heaviness.

Seasonal adaptation further enhances these recommendations. During winter and the rainy season, warm bathing protects against cold-induced vasoconstriction and Vata aggravation, whereas cooler bathing becomes preferable during summer, especially for Pitta constitutions. These observations demonstrate that bathing should be considered an individualized physiological intervention rather than merely a hygienic practice.

Vastra Dharana: Clothing as an Environmental Physiological Modifier

Although often considered a simple daily activity, Vastra Dharana (selection and wearing of clothing) plays an important physiological role in maintaining thermal homeostasis, protecting the skin, and facilitating environmental adaptation. Ayurveda recommends selecting garments according to Ritu, geographical conditions, occupation, and individual constitution, recognizing that inappropriate clothing may disturb Doshic equilibrium.

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From a physiological perspective, clothing functions as an external regulator of heat exchange by influencing conduction, convection, evaporation, and radiation. Appropriate garments help maintain body temperature, reduce thermal stress, prevent dehydration, and protect against ultraviolet radiation and environmental pathogens. Contemporary research demonstrates that clothing material, thickness, colour, moisture permeability, and insulation significantly influence thermoregulation, exercise performance, cardiovascular strain, and overall comfort.

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Individuals with Vata Prakriti benefit from warm, soft, insulating fabrics that minimize heat loss and reduce exposure to cold and dry environments. Pitta constitutions derive greater benefit from lightweight, breathable, light-coloured cotton or linen garments that facilitate evaporative cooling and reduce heat retention. Kapha individuals, although generally tolerant of cold environments, should avoid excessively heavy clothing that promotes sweating and inactivity, preferring garments that encourage movement and thermal comfort.

Seasonal adaptation remains equally important. During winter, insulating garments preserve body temperature and prevent Vata aggravation, whereas loose, breathable fabrics become preferable during summer to facilitate efficient heat dissipation. During the rainy season, rapid-drying garments help prevent prolonged moisture exposure and associated microbial proliferation.

Thus, Vastra Dharana extends beyond aesthetics and represents an important environmental modifier capable of influencing physiological homeostasis through appropriate thermal regulation.

Gandha Dharana and Malya Dharana: Sensory Modulation and Psychophysiological Well-being

Ayurveda includes Gandha Dharana (application of aromatic substances) and Malya Dharana (wearing of flowers or garlands) as integral components of Dinacharya, reflecting the holistic understanding that sensory experiences contribute significantly to physical and psychological health. Classical literature describes these practices as promoting mental freshness, emotional stability, pleasant appearance, and overall well-being while contributing to social and environmental harmony.

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Modern neuroscience increasingly supports the physiological significance of olfactory stimulation. Aromatic compounds activate olfactory receptors that project directly to the limbic system, including the amygdala, hippocampus, and hypothalamus, thereby influencing emotional regulation, memory, autonomic function, endocrine responses, and stress perception. Aromatherapy studies have demonstrated that selected essential oils can reduce anxiety, improve sleep quality, lower sympathetic activity, and enhance subjective well-being, although the magnitude of these effects varies among individuals.⁷⁷⁻⁸⁰ The selection of aromatic substances should likewise be individualized. Vata constitutions benefit from warm, grounding fragrances such as sandalwood, sesame-based herbal preparations, or lavender that promote relaxation and reduce anxiety. Pitta individuals respond favourably to cooling aromas including sandalwood, rose, jasmine, and vetiver, which alleviate heat-associated irritability and promote emotional calmness. Kapha constitutions derive greater benefit from

stimulating fragrances such as eucalyptus, cinnamon, tulsi, or citrus oils that enhance alertness and counteract lethargy.

Seasonal modifications further optimize these interventions. Cooling floral fragrances become especially valuable during summer, whereas warming aromatic preparations provide greater comfort during winter and the rainy season. Consequently, Gandha Dharana and Malya Dharana should not be regarded merely as cosmetic practices but as constitution-specific sensory interventions capable of influencing psychoneuroendocrine regulation. Collectively, Vyayama, Snana, Vastra Dharana, and Gandha-Malya Dharana illustrate that Ayurveda conceptualizes daily lifestyle practices as individualized physiological interventions rather than generalized health advice. Their personalization according to Prakriti and Ritu enables continuous adaptation of musculoskeletal function, thermoregulation, environmental interaction, autonomic balance, and psychophysiological resilience, thereby strengthening the preventive potential of Dinacharya.

Ahara Sevana: Personalized Nutrition as the Central Pillar of Dinacharya

Among all components of Dinacharya, Ahara (diet) occupies a central position because it directly influences Agni, Dosha equilibrium, Dhatu nourishment, Ojas formation, and overall physiological homeostasis. Ayurveda considers food not merely a source of nutrients but a therapeutic intervention capable of maintaining health or initiating disease depending on its quality, quantity, timing, and compatibility. The classical principle that "appropriate diet sustains life while inappropriate diet becomes the cause of disease" reflects an advanced understanding of preventive nutrition.³⁵⁻³⁷

Modern nutritional science increasingly supports this concept by recognizing diet as one of the strongest determinants of metabolic health, immune competence, gut microbiome composition, inflammatory status, and chronic disease prevention. Contemporary concepts of precision nutrition advocate tailoring dietary recommendations according to genetic predisposition, metabolic phenotype, microbiome characteristics, lifestyle, and environmental exposures. This individualized nutritional philosophy closely parallels the Ayurvedic concept of Prakriti-based Ahara, which recommends dietary modifications according to constitutional characteristics and digestive capacity rather than universal dietary prescriptions.⁸¹⁻⁸⁵

The proposed Personalized Dinacharya model emphasizes that dietary recommendations should simultaneously consider Prakriti and Ritu. Individuals with Vata Prakriti, owing to their relatively variable digestive function and susceptibility to tissue depletion, benefit from warm, freshly prepared, unctuous, nourishing, and easily digestible meals consumed at regular intervals. Foods possessing Madhura, Amla, and Lavana Rasa help stabilize Vata while maintaining digestive efficiency. Individuals with Pitta Prakriti, characterized by stronger digestive activity and increased metabolic heat production, require cooling, mildly unctuous foods rich in Tikta, Madhura, and Kashaya Rasa while minimizing excessively spicy, fermented, acidic, and fried foods that aggravate Pitta. Adequate hydration and seasonal fruits become particularly beneficial during summer.

Conversely, Kapha Prakriti individuals benefit from lighter meals possessing Katu, Tikta, and Kashaya Rasa with reduced intake of heavy, oily, sweet, and cold foods. Such dietary modification enhances Agni, improves lipid metabolism, facilitates body weight regulation, and minimizes metabolic dysfunction. Seasonal adaptation further refines these recommendations. During Grishma, lighter, cooling, water-rich foods compensate for increased perspiration and heat stress. During Varsha, diminished digestive capacity necessitates warm, freshly prepared, easily digestible meals to preserve Agni and prevent Ama formation. During Hemanta and Shishira, enhanced digestive strength permits relatively nourishing diets with adequate healthy fats and proteins, supporting increased metabolic requirements. These observations correspond closely with modern understanding of seasonal variation in appetite regulation, energy expenditure, gastrointestinal physiology, and metabolic adaptation.⁸⁶⁻⁸⁹ Thus, Ahara Sevana represents the cornerstone of personalized preventive medicine, integrating constitutional biology, digestive physiology, chrononutrition, and environmental adaptation within a unified dietary framework.

Jala Sevana: Individualized Hydration and Physiological Homeostasis

Adequate hydration is essential for maintaining circulatory volume, electrolyte balance, cellular metabolism, thermoregulation, gastrointestinal function, renal physiology, and cognitive performance. Ayurveda similarly recognizes Jala Sevana as an indispensable component of Dinacharya while emphasizing that both excessive and inadequate water intake may disturb physiological equilibrium.³⁵⁻³⁷

Unlike generalized hydration recommendations, Ayurveda advocates individualized water consumption based upon Prakriti, Agni, physical activity, climatic conditions, disease status, and season. This personalized approach closely resembles contemporary hydration strategies employed in sports medicine and clinical nutrition.⁹⁰⁻⁹³

Individuals with Vata Prakriti, who exhibit greater susceptibility to dehydration owing to dryness and variable digestive function, benefit from frequent intake of warm or lukewarm water in moderate quantities. Pitta constitutions, characterized by increased heat production and perspiration, require relatively greater fluid intake together with naturally cooling beverages during warmer seasons. In contrast, Kapha individuals, owing to comparatively slower metabolism and greater tendency for water retention, benefit from moderate consumption of warm water while avoiding excessive fluid intake immediately after meals.

Seasonal adaptation significantly influences hydration requirements. Fluid demands naturally increase during summer because of enhanced sweat losses, whereas warm water becomes physiologically advantageous during rainy and winter seasons by supporting digestion and minimizing Vata-Kapha aggravation. Such recommendations align with contemporary evidence demonstrating that hydration strategies should account for ambient temperature, humidity, exercise intensity, and individual sweat rates.⁹¹⁻⁹⁴

Consequently, Jala Sevana should be regarded not simply as water consumption but as a constitution-specific physiological intervention contributing to cardiovascular stability, digestive efficiency, thermoregulation, and metabolic homeostasis.

Nidra: Personalized Sleep and Circadian Restoration

Among the three Trayopastambha (Ahara, Nidra, and Brahmacharya), Nidra occupies a unique position because of its profound influence on neurological recovery, endocrine regulation, immune competence, cognitive performance, emotional stability, and tissue repair. Ayurveda considers appropriate sleep indispensable for strength, complexion, nourishment, fertility, longevity, and psychological well-being, whereas disturbed sleep predisposes to multiple systemic disorders.³⁵⁻³⁷

Contemporary neuroscience has established sleep as a fundamental biological process regulating glymphatic clearance, synaptic plasticity, hormonal secretion, memory consolidation, immune modulation, glucose metabolism, and cardiovascular health. Chronic sleep deprivation contributes to obesity, diabetes mellitus, hypertension, depression, impaired cognition, and increased all-cause mortality.⁹⁵⁻⁹⁹

Personalization of sleep according to Prakriti represents one of Ayurveda's most distinctive preventive recommendations. Vata individuals, owing to heightened autonomic responsiveness and susceptibility to insomnia, require relatively longer, regular, and uninterrupted sleep supported by calming evening routines and oil massage. Pitta constitutions generally experience satisfactory sleep but may develop nocturnal awakening secondary to increased metabolic activity or psychological stress; therefore, cooling measures and avoidance of excessive mental stimulation before bedtime are beneficial. Kapha individuals, characterized by naturally prolonged sleep and slower metabolism, should avoid excessive daytime sleeping and prolonged morning sleep because these practices further aggravate Kapha and diminish metabolic efficiency.

Seasonal adaptation further modifies sleep requirements. During summer, relatively shorter nocturnal sleep associated with increased daytime heat may occasionally justify limited daytime rest, whereas winter permits longer restorative sleep without disturbing physiological balance. These observations parallel modern chronobiological evidence demonstrating seasonal variation in melatonin secretion, sleep architecture, circadian rhythm, and photoperiod-dependent behavioural adaptation.¹⁰⁰⁻¹⁰² Thus, personalized sleep recommendations represent an essential component of constitution-specific circadian medicine, integrating classical Ayurvedic wisdom with contemporary sleep physiology.

Clinical Implications of Personalized Dinacharya

The present Personalized Dinacharya model has important implications for preventive medicine, clinical Ayurveda, public health, and integrative healthcare. Rather than applying standardized lifestyle advice, clinicians may individualize recommendations according to constitutional phenotype and seasonal variation, thereby improving adherence, physiological compatibility, and preventive efficacy.

Such an approach may prove particularly valuable in the prevention and long-term management of lifestyle disorders including obesity, type 2 diabetes mellitus, hypertension, cardiovascular disease, metabolic syndrome, gastrointestinal disorders, anxiety, sleep disturbances, and stress-related illnesses. Constitution-specific lifestyle counselling may also complement pharmacological interventions by improving metabolic resilience and reducing disease recurrence. ^{103–106}

Beyond clinical practice, Personalized Dinacharya provides opportunities for integration into digital health, artificial intelligence, wearable health monitoring, and mobile health applications. Incorporating Prakriti assessment together with environmental variables may facilitate individualized lifestyle recommendations capable of dynamically adapting to seasonal and physiological changes. Such technological integration represents an important direction for precision preventive healthcare.

Strengths and Future Perspectives

One of the principal strengths of the proposed model lies in its integration of classical Ayurvedic knowledge with modern concepts of chronobiology, precision medicine, lifestyle medicine, exercise physiology, nutritional science, and systems biology. Unlike conventional descriptions of Dinacharya, the present framework emphasizes both constitutional and seasonal personalization, thereby enhancing its translational relevance for contemporary healthcare.

Future investigations should validate these recommendations through prospective cohort studies, randomized controlled trials, physiological biomarker analysis, metabolomics, microbiome profiling, digital phenotyping, and artificial intelligence-assisted personalized healthcare platforms. Such interdisciplinary research may further strengthen the scientific foundation of Ayurvedic preventive medicine and facilitate its integration into evidence-based global healthcare systems. ^{107–110}

The findings of the present work indicate that Dinacharya should not be interpreted as a rigid universal daily schedule but rather as a dynamic physiological model requiring continuous personalization according to constitutional phenotype and seasonal adaptation. The selected eleven components collectively regulate circadian synchronization, autonomic balance, digestive function, metabolic efficiency, immune resilience, musculoskeletal performance, psychological well-being, and environmental adaptation. This individualized framework demonstrates remarkable conceptual convergence with emerging disciplines of precision medicine, precision nutrition, chronomedicine, and systems biology, suggesting that Ayurveda anticipated many principles of modern personalized healthcare centuries before their contemporary scientific recognition. Consequently, Personalized Dinacharya may serve as a practical, economical, culturally acceptable, and scientifically relevant preventive healthcare model capable of addressing the growing global burden of lifestyle-related diseases while preserving the holistic philosophy of Ayurveda.

CONCLUSION

The present study demonstrates that Dinacharya should be interpreted not as a universal daily routine but as a personalized preventive healthcare model that requires continuous adaptation according to an individual's Prakriti (constitutional phenotype) and Ritu (seasonal variation). Although the sequence of daily practices remains constant, their implementation—including timing, intensity, duration, quantity, and therapeutic substances—must be individualized to maintain Doshic equilibrium, preserve Agni, nourish Dhatus, and sustain Ojas.

The proposed framework integrating eleven key components of Dinacharya—Brahma Muhurta Uttishta, Gandusha, Kavala, Abhyanga, Vyayama, Snana, Vastra Dharana, Gandha-Malya Dharana, Ahara Sevana, Jala Sevana, and Nidra—illustrates how classical Ayurvedic principles can be translated into a practical, constitution-specific lifestyle model. These interventions collectively regulate circadian rhythm, digestive efficiency, metabolic homeostasis, thermoregulation, neuromuscular function, immune competence, psychological well-being, and environmental adaptation, thereby promoting physiological resilience and reducing susceptibility to lifestyle-related disorders. Importantly, the conceptual foundations of this personalized approach demonstrate remarkable concordance with contemporary scientific disciplines, including precision medicine, precision nutrition, chronobiology, lifestyle medicine, systems biology, and predictive preventive healthcare. The constitutional individuality described through Prakriti and the adaptive seasonal modifications advocated in Ritucharya closely parallel current concepts of biological variability, chronophysiology, and individualized health optimization. This convergence highlights Ayurveda as an early and comprehensive model of personalized medicine with significant relevance to modern preventive healthcare.

The proposed Personalized Dinacharya model offers substantial opportunities for integration into clinical practice, public health initiatives, digital health platforms, wearable technologies, and artificial intelligence-based decision support systems. Such integration may facilitate individualized lifestyle recommendations that are culturally acceptable, economical, sustainable, and scientifically informed. Nevertheless, the present work is primarily conceptual and narrative in nature. Future research should focus on validating this framework through well-designed observational studies, randomized controlled trials, multicentric clinical investigations, biomarker-based physiological assessments, metabolomic and microbiome analyses, and digital phenotyping. Developing validated Prakriti-based lifestyle algorithms and AI-assisted personalized Dinacharya applications may further strengthen its translational value and global applicability.

In conclusion, Personalized Dinacharya represents a scientifically relevant and clinically applicable preventive healthcare framework that integrates the timeless principles of Ayurveda with advances in contemporary biomedical science. By harmonizing constitutional individuality with seasonal adaptation, it provides a practical roadmap for precision lifestyle medicine, fostering health promotion, disease prevention, and sustainable well-being in the twenty-first century.

LIST OF REFERENCES

1. World Health Organization. *Noncommunicable diseases*. Geneva: WHO; 2025.
2. Hodeib M, et al. *Lifestyle medicine and chronic disease prevention*. N Engl J Med. 2022.
3. Hood L, Friend SH. *Predictive, preventive, personalized and participatory medicine*. Nat Rev Clin Oncol. 2011;8:184–187.
4. Ordovas JM, Ferguson LR, Tai ES, Mathers JC. *Personalised nutrition and health*. BMJ. 2018;361:k2173.
5. Egger GJ, Binns AF, Rossner SR. *Lifestyle Medicine*. 3rd ed. Academic Press; 2017.
6. Agnivesha. *Charaka Samhita. Sutra Sthana, Chapters 5 & 7*.
7. Vagbhata. *Ashtanga Hridaya. Sutra Sthana, Chapter 2*.
8. Sushruta. *Sushruta Samhita. Chikitsa Sthana*.
9. Sharma PV. *Charaka Samhita. English translation*. Varanasi: Chaukhambha Orientalia.
10. Murthy KRS. *Ashtanga Hridayam. English Translation*. Varanasi: Chaukhambha Krishnadas Academy.
11. Panda S. *The Circadian Code*. Rodale; 2018.
12. Bass J, Takahashi JS. *Circadian integration of metabolism and energetics*. Science. 2010;330:1349–1354.
13. Roenneberg T, Merrow M. *The circadian clock and human health*. Curr Biol. 2016;26:R432–R443.
14. Cederroth CR, et al. *Medicine in the fourth dimension*. Nat Rev Endocrinol. 2019;15:731–743.
15. Potter GDM, et al. *Circadian rhythm and metabolic health*. Proc Nutr Soc. 2016;75:487–500.
16. Govindaraj P, et al. *Genome-wide analysis correlating Ayurvedic Prakriti*. PLoS One. 2015.
17. Prasher B, et al. *Whole genome expression and Prakriti*. J Transl Med. 2008;6:48.
18. Rotti H, et al. *Systems biology of Ayurvedic constitution*. J Ayurveda Integr Med. 2014.
19. Singh RH. *The Holistic Principles of Ayurvedic Medicine*. Chaukhambha.
20. Patwardhan B, Gehlot S, Singh G, Rathore HCS. *Global challenges of Ayurveda*. J Ayurveda Integr Med. 2015.
21. Buhr ED, Takahashi JS. *Molecular components of circadian clocks*. Handb Exp Pharmacol. 2013.
22. Wehr TA. *Seasonal rhythms in humans*. J Biol Rhythms. 2001.
23. Smolensky MH, Hermida RC, Reinberg A. *Chronobiology and chronotherapy*. Chronobiol Int. 2016.
24. Froy O. *Circadian rhythms and nutrition*. Front Endocrinol. 2013.
25. Ashley EA. *The precision medicine initiative*. JAMA. 2015;313:2119–2120.
26. National Research Council. *Toward Precision Medicine*. Washington DC: National Academies Press; 2011.
27. Patwardhan B. *Bridging Ayurveda and systems biology*. J Ayurveda Integr Med. 2014.
28. Langhorst J, et al. *Integrative medicine in preventive healthcare*. Lancet. 2022.
29. World Health Organization. *Noncommunicable diseases*. Geneva: World Health Organization; 2025.
30. Egger G, Binns A, Rossner S. *Lifestyle Medicine*. 3rd ed. London: Academic Press; 2017.
31. Ashley EA. *The precision medicine initiative: a new national effort*. JAMA. 2015;313(21):2119–20.
32. National Research Council. *Toward Precision Medicine: Building a Knowledge Network for Biomedical Research and a New Taxonomy of Disease*. Washington (DC): National Academies Press; 2011.
33. Hood L, Friend SH. *Predictive, personalized, preventive, participatory (P4) cancer medicine*. Nat Rev Clin Oncol. 2011;8(3):184–7.
34. Ordovas JM, Ferguson LR, Tai ES, Mathers JC. *Personalised nutrition and health*. BMJ. 2018;361:k2173.
35. Agnivesha. *Charaka Samhita. Sutra Sthana, Chapters 5 and 7*. Sharma PV, translator. Varanasi: Chaukhambha Orientalia.
36. Vagbhata. *Ashtanga Hridaya. Sutra Sthana, Chapter 2 (Dinacharya Adhyaya)*. Murthy KRS, translator. Varanasi: Chaukhambha Krishnadas Academy.
37. Sushruta. *Sushruta Samhita. Chikitsa Sthana*. Ambikadutta Shastri, editor. Varanasi: Chaukhambha Sanskrit Sansthan.
38. Sterling P. *Allostasis: A model of predictive regulation*. Physiol Behav. 2012;106(1):5–15.
39. McEwen BS, Wingfield JC. *The concept of allostasis in biology and biomedicine*. Horm Behav. 2003;43(1):2–15.

40. Prasher B, et al. Whole genome expression and biochemical correlates of extreme constitutional types defined in Ayurveda. *J Transl Med.* 2008;6:48.
41. Govindaraj P, et al. Genome-wide analysis correlates Ayurveda Prakriti. *PLoS One.* 2015;10:e0121750.
42. Rotti H, 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.
43. Patwardhan B, Bodeker G. Ayurvedic genomics: establishing a genetic basis for mind-body typologies. *J Altern Complement Med.* 2008;14(5):571-6.
44. Wehr TA. Seasonal rhythms in humans. *J Biol Rhythms.* 2001;16(4):348-64.
45. Smolensky MH, Hermida RC, Reinberg A. Chronobiology and chronotherapy. *Chronobiol Int.* 2016;33(8):1101-19.
46. Buhr ED, Takahashi JS. Molecular components of the mammalian circadian clock. In: *Handbook of Experimental Pharmacology.* 2013;217:3-27.
47. Panda S. *The Circadian Code.* New York: Rodale; 2018.
48. Bass J, Takahashi JS. Circadian integration of metabolism and energetics. *Science.* 2010;330(6009):1349-54.
49. Roenneberg T, Merrow M. The circadian clock and human health. *Curr Biol.* 2016;26(10):R432-43.
50. Potter GDM, Cade JE, Grant PJ, Hardie LJ. Nutrition and the circadian system. *Proc Nutr Soc.* 2016;75(4):487-500.
51. Cederroth CR, et al. Medicine in the fourth dimension. *Nat Rev Endocrinol.* 2019;15(12):731-46.
52. Asokan S, Emmadi P, Chamundeswari R. Effect of oil pulling on plaque-induced gingivitis. *Indian J Dent Res.* 2008;19(1):47-51.
53. Peedikayil FC. Oil pulling therapy. *J Tradit Complement Med.* 2015;5(3):121-7.
54. Nagilla J, et al. Comparative evaluation of oil pulling and chlorhexidine mouthwash. *J Clin Diagn Res.* 2017;11(4):ZC08-12.
55. Field T. Massage therapy research review. *Complement Ther Clin Pract.* 2016;24:19-31.
56. Weerapong P, Hume PA, Kolt GS. The mechanisms of massage and effects on performance. *Sports Med.* 2005;35(3):235-56.
57. Rapaport MH, Schettler P, Bresee C. A preliminary study of the effects of repeated massage on immune function. *J Altern Complement Med.* 2012;18(8):789-97.
58. Moraska A, Pollini RA, Boulanger K, Brooks MZ, Teitlebaum L. Physiological adjustments to massage therapy. *Pain Med.* 2015;16(11):220-8.
59. American College of Sports Medicine. *ACSM's Guidelines for Exercise Testing and Prescription.* 11th ed. Philadelphia: Wolters Kluwer; 2021.
60. Garber CE, Blissmer B, Deschenes MR, Franklin BA, Lamonte MJ, Lee IM, et al. Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: guidance for prescribing exercise. *Med Sci Sports Exerc.* 2011;43(7):1334-59.
61. Booth FW, Roberts CK, Laye MJ. Lack of exercise is a major cause of chronic diseases. *Compr Physiol.* 2012;2(2):1143-211.
62. Warburton DER, Nicol CW, Bredin SSD. Health benefits of physical activity: the evidence. *CMAJ.* 2006;174(6):801-9.
63. Kreher JB, Schwartz JB. Overtraining syndrome: a practical guide. *Sports Health.* 2012;4(2):128-38.
64. Nieman DC, Wentz LM. The compelling link between physical activity and the body's defense system. *J Sport Health Sci.* 2019;8(3):201-17.
65. Casa DJ, Armstrong LE, Hillman SK, Montain SJ, Reiff RV, Rich BS, et al. National Athletic Trainers' Association position statement: fluid replacement for athletes. *J Athl Train.* 2000;35(2):212-24.
66. Sawka MN, Burke LM, Eichner ER, Maughan RJ, Montain SJ, Stachenfeld NS. American College of Sports Medicine position stand: Exercise and fluid replacement. *Med Sci Sports Exerc.* 2007;39(2):377-90.
67. Chevront SN, Kenefick RW. Dehydration: physiology, assessment, and performance effects. *Compr Physiol.* 2014;4(1):257-85.
68. Kenney WL, Wilmore JH, Costill DL. *Physiology of Sport and Exercise.* 7th ed. Champaign (IL): Human Kinetics; 2020.
69. Becker BE. Aquatic therapy: scientific foundations and clinical rehabilitation applications. *PM R.* 2009;1(9):859-72.
70. Tipton MJ. The physiological responses to cold water immersion. *Extreme Physiol Med.* 2014;3:26.
71. Mooventhan A, Nivethitha L. Scientific evidence-based effects of hydrotherapy on various systems of the body. *N Am J Med Sci.* 2014;6(5):199-209.
72. Hohenauer E, Costello JT, Stoop R, Küng UM, Clarys P, Deliens T. The effect of post-exercise hydrotherapy on recovery. *Sports Med.* 2015;45(2):257-81.
73. Parsons KC. *Human Thermal Environments.* 3rd ed. Boca Raton: CRC Press; 2014.
74. Havenith G. Heat balance when wearing protective clothing. *Ann Occup Hyg.* 1999;43(5):289-96.
75. Kenny GP, Jay O. Thermometry, calorimetry and mean body temperature during heat stress. *Compr Physiol.* 2013;3(4):1689-719.
76. Cheung SS. *Advanced Environmental Exercise Physiology.* Champaign (IL): Human Kinetics; 2010.
77. Herz RS. Aromatherapy facts and fictions: a scientific analysis of olfactory effects on mood, physiology and behavior. *Int J Neurosci.* 2009;119(2):263-90.
78. Lehrner J, Eckersberger C, Walla P, Pötsch G, Deecke L. Ambient odor of orange and lavender reduces anxiety and improves mood in a dental office. *Physiol Behav.* 2000;71(1-2):83-6.
79. Perry N, Perry E. Aromatherapy in the management of psychiatric disorders. *CNS Drugs.* 2006;20(4):257-80.

80. Moss M, Hewitt S, Moss L, Wesnes K. Modulation of cognitive performance and mood by aromas of peppermint and ylang-ylang. *Int J Neurosci*. 2008;118(1):59-77.
81. Ordovas JM, Ferguson LR, Tai ES, Mathers JC. Personalised nutrition and health. *BMJ*. 2018;361:k2173.
82. Zeevi D, Korem T, Zmora N, Israeli D, Rothschild D, Weinberger A, et al. Personalized nutrition by prediction of glycemic responses. *Cell*. 2015;163(5):1079-94.
83. Valdes AM, Walter J, Segal E, Spector TD. Role of the gut microbiota in nutrition and health. *BMJ*. 2018;361:k2179.
84. Berry SE, Valdes AM, Drew DA, Asnicar F, Mazidi M, Wolf J, et al. Human postprandial responses to food and potential for precision nutrition. *Nat Med*. 2020;26(6):964-73.
85. Kaput J, Rodriguez RL. Nutritional genomics: the next frontier in nutrition. *Physiol Genomics*. 2004;16(2):166-77.
86. Panda S. *The Circadian Code*. New York: Rodale Books; 2018.
87. Garaulet M, Gómez-Abellán P. Timing of food intake and obesity: a novel association. *Br J Nutr*. 2014;112(S2):S75-S80.
88. Johnston JD. Physiological responses to food timing. *Proc Nutr Soc*. 2014;73(2):307-15.
89. Potter GDM, Skene DJ, Arendt J, Cade JE, Grant PJ, Hardie LJ. Circadian rhythm and sleep disruption: causes, metabolic consequences and countermeasures. *Proc Nutr Soc*. 2016;75(4):487-500.
90. Popkin BM, D'Anci KE, Rosenberg IH. Water, hydration, and health. *Nutr Rev*. 2010;68(8):439-58.
91. Armstrong LE. Hydration assessment techniques. *Nutr Rev*. 2005;63(6 Pt 2):S40-54.
92. Sawka MN, Cheuvront SN, Carter R III. Human water needs. *Nutr Rev*. 2005;63(6 Pt 2):S30-9.
93. Maughan RJ, Shirreffs SM. Hydration and physical performance. *Nestle Nutr Inst Workshop Ser*. 2012;69:17-28.
94. Institute of Medicine. *Dietary Reference Intakes for Water, Potassium, Sodium, Chloride, and Sulfate*. Washington (DC): National Academies Press; 2005.
95. Walker MP. *Why We Sleep: Unlocking the Power of Sleep and Dreams*. New York: Scribner; 2017.
96. Xie L, Kang H, Xu Q, Chen MJ, Liao Y, Thiagarajan M, et al. Sleep drives metabolite clearance from the adult brain. *Science*. 2013;342(6156):373-7.
97. Cirelli C, Tononi G. The functions of sleep. *Cold Spring Harb Perspect Biol*. 2015;7(12):a027920.
98. Medic G, Wille M, Hemels MEH. Short- and long-term health consequences of sleep disruption. *Nat Sci Sleep*. 2017;9:151-61.
99. Irwin MR. Why sleep is important for health: a psychoneuroimmunology perspective. *Annu Rev Psychol*. 2015;66:143-72.
100. Roenneberg T, Merrow M. The circadian clock and human health. *Curr Biol*. 2016;26(10):R432-43.
101. Czeisler CA, Gooley JJ. Sleep and circadian rhythms in humans. *Cold Spring Harb Symp Quant Biol*. 2007;72:579-97.
102. Foster RG, Kreitzman L. *Circadian Rhythms: A Very Short Introduction*. Oxford: Oxford University Press; 2017.
103. Egger G, Binns A, Rossner S. *Lifestyle Medicine*. 3rd ed. London: Academic Press; 2017.
104. Katz DL, Frates EP, Bonnet JP, Gupta SK, Vartiainen E, Carmona RH. Lifestyle as medicine: the case for a true health initiative. *Am J Health Promot*. 2018;32(6):1452-6.
105. Rippe JM. *Lifestyle Medicine*. 3rd ed. Boca Raton: CRC Press; 2019.
106. World Health Organization. *Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013-2030*. Geneva: World Health Organization; 2023.
107. Hood L, Flores M. A personal view on systems medicine and the emergence of proactive P4 medicine. *New Biotechnol*. 2012;29(6):613-24.
108. Ashley EA. Towards precision medicine. *Nat Rev Genet*. 2016;17(9):507-22.
109. National Research Council. *Toward Precision Medicine: Building a Knowledge Network for Biomedical Research and a New Taxonomy of Disease*. Washington (DC): National Academies Press; 2011.
110. Topol EJ. *Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again*. New York: Basic Books; 2019.