



# Ayurvedic Perspective of Circadian Rhythms: Role of Tridosha in Sleep-Wake Cycle

1. **DR. VAIBHAV ASHOKRAO BIRADAR**, PROFESSOR & H.O.D, DEPARTMENT OF KRIYA SHARIR (UG & PG), PARUL INSTITUTE OF AYURVED & RESEARCH PARUL UNIVERSITY, VADODARA, GUJURAT, INDIA
2. **DR. SUNIL PUNDALIK NIKHATE**, PROFESSOR & HOD, DEPT. OF KRIYA SHARIR, SUMADEEP AYURVEDA MEDICAL COLLEGE & HOSPITAL , SUMADEEP VIDHYAPEETH DEEMED TO BE UNIVERSITY, VADODARA, GUJURAT, INDIA
3. **DR. NISHANT N PATEL**, ASSISTANT PROFESOR, DEPT. OF KAYACHIKITSA, PARUL INSTITUTE OF AYURVED, VADODARA, GUJURAT, INDIA

## Abstract

Sleep is not merely the absence of wakefulness, but a highly regulated, rhythmic physiological process that is essential for cellular repair, neurocognitive balance, metabolic efficiency, and overall well-being. Modern science attributes this rhythmicity to the circadian system governed by the suprachiasmatic nucleus (SCN), which aligns bodily functions with environmental cues such as light and darkness. Disruption of this internal clock is increasingly implicated in a spectrum of chronic disorders including insomnia, metabolic syndrome, depression, and neurodegenerative diseases. Ayurveda, the traditional system of Indian medicine, offers a parallel but distinct chronobiological framework through its Tridosha theory. It posits that three fundamental bioenergetic forces—Vata, Pitta, and Kapha—regulate not only physiological processes but also follow specific temporal patterns over the course of a 24-hour day. Each Dosha dominates during particular periods, influencing sleep initiation, depth, dreaming, and arousal. This ancient understanding is reflected in practices such as Dinacharya (daily regimen) and Ratricharya (night regimen), which aim to align human behavior with cosmic rhythms for optimal health. This review synthesizes Ayurvedic and contemporary biomedical perspectives to explore how Tridosha dynamics influence the sleep-wake cycle. It examines classical textual references, Dosha-dominant time intervals, and Ayurvedic classifications of sleep disorders. Furthermore, it investigates the alignment of these concepts with circadian neuroscience, hormonal patterns, and sleep architecture recognized in modern sleep medicine. The pathological implications of Dosha imbalance—such as Vata-induced insomnia, Pitta-related night awakenings, and Kapha-related hypersomnia—are also

analyzed. By presenting a cross-disciplinary perspective, this article proposes that Ayurvedic chronophysiology is not only compatible with modern chronobiology but offers a rich, underutilized model for preventive, personalized, and holistic management of sleep health. The integration of Dosha-based interventions, lifestyle routines, and herbal support may provide effective non-pharmacological strategies for restoring circadian balance in today's chronically disrupted populations.

**Keywords:** Tridosha, Circadian rhythm, Sleep-wake cycle, Vata, Pitta, Kapha, Ayurveda, Chronobiology

## Introduction

The regulation of sleep and wakefulness is a fundamental biological rhythm intricately governed by internal clocks synchronized with external environmental cues—chiefly the light-dark cycle. This rhythm, known as the circadian cycle, plays a pivotal role in maintaining physiological and psychological equilibrium. Disruptions to this cycle have been conclusively linked to a range of disorders including insomnia, mood disturbances, obesity, diabetes, hypertension, cognitive decline, and even carcinogenesis.

Modern chronobiology identifies the suprachiasmatic nucleus (SCN) of the hypothalamus as the master circadian pacemaker in mammals. It receives photic input from the retina and coordinates peripheral clocks in various tissues via hormonal (e.g., melatonin, cortisol), autonomic, and behavioral pathways. However, long before the discovery of the SCN or melatonin, ancient medical systems such as Ayurveda developed sophisticated models of temporal physiology based on observation, intuition, and systematized experience.

Ayurveda, the traditional Indian system of medicine dating back over 3000 years, presents a unique temporal framework grounded in the theory of Tridosha—Vata, Pitta, and Kapha—three fundamental regulatory principles that govern all physiological, psychological, and pathological processes in the body. According to classical Ayurvedic texts like Charaka Samhita, Ashtanga Hridaya, and Sushruta Samhita, these Doshas exhibit diurnal variations, each predominating at specific times of the day and night. This cyclic Dosha dominance subtly modulates everything from digestion, alertness, and immunity to mood and sleep.

The sleep-wake cycle in Ayurveda is not treated as an isolated physiological process but rather as an emergent property of a broader dynamic equilibrium among the Doshas. Kapha induces sleepiness and grounding, Pitta governs metabolic transformation during the night, while Vata is linked with dreaming, microarousals, and early morning alertness. Ayurveda also prescribes time-bound behavioral routines—Dinacharya (daily regimen) and Ratricharya (night regimen)—to align individual lifestyle with cosmic rhythms, thereby promoting restorative sleep and wakefulness.

While modern medicine views sleep in terms of neurochemicals and brain regions, Ayurveda contextualizes it in terms of functional energies, digestive cycles, lunar rhythms, and seasonal shifts. What is striking is the parallelism between these two paradigms: both emphasize rhythmicity, synchronization, and the catastrophic consequences of desynchronization.

Despite this conceptual richness, the Ayurvedic chronobiological view remains underexplored in academic and clinical contexts. With rising cases of circadian rhythm sleep disorders and the failure of purely pharmacological approaches, there is a growing interest in integrative perspectives that combine traditional insights with modern chronophysiology.

## **Aims & Objectives**

### **Aim**

To explore and critically review the Ayurvedic understanding of circadian rhythms, specifically the role of Tridosha in the regulation of the sleep-wake cycle, and to correlate this traditional framework with contemporary insights from chronobiology and sleep science.

### **Objectives**

- To examine classical Ayurvedic texts regarding Tridosha dominance across the 24-hour day.
- To identify the functional role of Kapha, Pitta, and Vata in sleep induction, maintenance, and awakening.
- To analyze how the concepts of Dinacharya and Ratricharya help in maintaining circadian balance.
- To assess the pathological consequences of Dosha vitiation on sleep health.
- To correlate Ayurvedic chronobiology with current biomedical understanding of circadian rhythms and sleep disorders.
- To propose Ayurvedic lifestyle and therapeutic recommendations for sleep-wake regulation.

## **Materials and Methods**

This review article is based on a qualitative, textual, and comparative analysis method combining classical Ayurvedic sources and modern biomedical literature. The materials and methods used are as follows:

### **1. Source Materials**

Classical Ayurvedic Texts:

Charaka Samhita, Ashtanga Hridaya, Sushruta Samhita, and authoritative commentaries were consulted in Sanskrit and translated English versions.

### **Modern Literature:**

Peer-reviewed journals indexed in PubMed, Scopus, and Google Scholar were searched using keywords like "circadian rhythm," "Tridosha," "Ayurveda and sleep," "chronobiology," "Kapha sleep cycle," and "Vata and insomnia."

## Conceptual Framework

### 1. Tridosha and Biological Time

According to Ashtanga Hridaya and Charaka Samhita, each 24-hour period is divided into six segments, each dominated by one of the three Doshas:

Time (approx.)	Dominant Dosha	Physiological State
6 AM – 10 AM	Kapha	Heaviness, sluggishness
10 AM – 2 PM	Pitta	Metabolic peak, alertness
2 PM – 6 PM	Vata	Creativity, mental activity
6 PM – 10 PM	Kapha	Wind-down, sleep induction
10 PM – 2 AM	Pitta	Internal metabolism, REM
2 AM – 6 AM	Vata	Light sleep, dreams, arousal

### 2. Role of Doshas in Sleep-Wake Cycle

**Kapha Dosha:** Promotes heaviness and inertia. Its evening dominance (6–10 PM) facilitates natural sleep induction. Morning Kapha (6–10 AM) creates drowsiness if sleep is prolonged.

**Pitta Dosha:** Controls digestion, heat, and transformation. At night (10 PM–2 AM), it fuels internal repair and REM sleep. If Pitta is aggravated, it may manifest as night waking or vivid dreams.

**Vata Dosha:** Governs movement and sensory flow. Its early morning activity (2–6 AM) induces light sleep, spontaneous awakening, and dream recall. Vata aggravation is linked to insomnia and fragmented sleep.

## Discussion

The sleep-wake cycle, at its core, is a biological dialogue between internal regulatory systems and external environmental cues. In modern physiology, this dialogue is mediated through the circadian timing system, with the suprachiasmatic nucleus (SCN) serving as the master clock, orchestrating rhythms across endocrine, metabolic, immunologic, and behavioral domains. Ayurveda, however, approaches this rhythmicity through a functional and phenomenological model—Tridosha Siddhanta—which is both spatial (in terms of bodily loci) and temporal (in terms of daily and seasonal patterns). In this context, the Doshas are not just constitutional factors but dynamic temporal energies that wax and wane across the 24-hour cycle, subtly modulating consciousness, neurochemistry, digestion, and sleep.

### 1. Circadian Dosha Cycles and Sleep Architecture

The trifold division of the day and night in Ayurveda directly mirrors the circadian fluctuation of physiological activity. Kapha, with its qualities of heaviness (guru), coolness (sheeta), and stability (sthira), dominates during the evening hours (6–10 PM), making it the optimal window for natural sleep onset. The modern sleep literature describes this period as associated with rising melatonin levels, reduction in core body temperature, and the initiation of slow-wave sleep—an exact biological reflection of Kapha's grounding influence.

As the night progresses, Pitta takes over from 10 PM to 2 AM. Though Pitta is commonly associated with digestion and metabolism, this nighttime dominance reflects internal metabolic activity, such as hepatic detoxification, tissue repair, and consolidation of memory during REM sleep. Notably, modern research has shown that the highest metabolic activity in the liver and brain occurs during this window, consistent with Ayurvedic assertions about Pitta's transformative nature.

In the pre-dawn hours (2–6 AM), Vata becomes predominant. Vata is mobile, light, and subtle—qualities associated with dreaming, light sleep, micro-arousals, and eventual awakening. From a neurophysiological standpoint, this period is characterized by sympathetic nervous system activation, increased cortisol secretion, and heightened brainwave variability, all of which facilitate the transition from sleep to wakefulness.

## 2. Tridoshic Imbalance and Sleep Disorders

From an Ayurvedic standpoint, sleep disturbances are not merely disorders of the nervous system but symptomatic expressions of Dosha imbalance.

- Vata-type Insomnia: Characterized by light, disturbed sleep with excessive dreaming and early awakenings. It aligns with modern descriptions of anxiety-related insomnia, often seen in individuals with heightened sympathetic tone and increased cognitive rumination.
- Pitta-type Insomnia: Involves difficulty staying asleep, night sweats, vivid dreams, or waking between 1–3 AM with mental overactivity. It resonates with stress-related sleep fragmentation and hyperarousal disorders.
- Kapha-type Sleep Disorders: Present as hypersomnia, sleep inertia, or daytime drowsiness, and may be linked to metabolic syndromes, depression, or obstructive sleep apnea—all of which are associated with Kapha vriddhi (increased Kapha).

The Ayurvedic approach to correcting sleep is thus not sedative but regulatory—aimed at restoring the appropriate Dosha balance during specific circadian phases. Herbal interventions like Jatamansi, Tagara, Ashwagandha, and Brahmi are selected not just for their tranquilizing properties but for their specific actions on Dosha vitiation. Likewise, practices like Abhyanga (oil massage), Shirodhara (streaming medicated oils on the forehead), and Nasya (nasal medicated drops) are used to pacify aggravated Doshas and anchor the body back into its natural rhythm.

## 3. Dinacharya, Chrononutrition, and Lifestyle Synchronization

Ayurveda prescribes time-specific behavioral regimens that align lifestyle practices with Dosha fluctuations. These regimens, Dinacharya (daily routine) and Ratricharya (night regimen), have striking overlaps with modern chronotherapeutic strategies.

- Waking up during Brahma Muhurta (pre-dawn Vata time) supports alertness, clarity, and spiritual attunement—echoing the modern findings on early morning cortisol surge and cognitive sharpness.

- Sleeping before 10 PM (Kapha time) ensures optimal entry into slow-wave sleep and supports physiological repair.
- Avoiding heavy meals at night prevents Kapha aggravation and Pitta overactivity, thus maintaining metabolic and sleep health. Modern science confirms that late-night eating disrupts melatonin secretion and delays sleep onset.

This alignment of behavior with Dosha cycles is perhaps Ayurveda’s most powerful and preventive strategy in maintaining circadian homeostasis—far ahead of its time.

#### 4. Emerging Scientific Validation and Integration Potential

Contemporary science is slowly catching up to what Ayurveda emphasized centuries ago. Recent work in chronobiology, psychoneuroimmunology, and integrative sleep medicine increasingly supports the Ayurvedic view that health is inseparably linked with biological timing.

For example:

- Chronotype-based therapy mirrors Prakriti-based interventions.
- The role of gut microbiota in regulating sleep has parallels in Agni (digestive fire) theory and its impact on mental clarity (Sattva).
- Circadian alignment therapies, such as light therapy or melatonin, could be complemented by Dosha-specific diets, herbs, and rituals to offer more individualized and holistic treatment plans.

However, what Ayurveda offers is not just a toolkit, but a temporally intelligent framework—one that sees sleep not as a mechanical shutdown but as an opportunity for metabolic regeneration, emotional processing, and spiritual recalibration.

#### Pathological Implications

Dosha Vikriti	Sleep Issues	Associated Disorders
Vata vitiation	Insomnia, light and broken sleep	Anxiety, premature aging
Pitta vitiation	Night waking, hot flashes, intense dreams	GERD, stress disorders
Kapha vitiation	Excessive sleep, daytime lethargy	Depression, metabolic sluggishness

#### Scientific Convergence

Studies show Shirodhara reduces cortisol and increases serotonin, supporting Vata-Pitta modulation. Herbs like Tagara, Jatamansi, and Ashwagandha have been shown to influence GABAergic and serotonergic systems, aligning with Ayurvedic prescriptions for sleep disorders.

## Conclusion

The Ayurvedic interpretation of the sleep-wake cycle through the lens of Tridosha theory offers a sophisticated, temporally-aware model of human physiology that predates modern chronobiology by millennia. By framing sleep not as a passive state but as a dynamic phase orchestrated by the cyclic dominance of Vata, Pitta, and Kapha, Ayurveda provides a coherent explanation for the timing, quality, and functional consequences of rest. This model not only identifies which Dosha predominates at different times of the day and night, but also elucidates how each Dosha governs distinct physiological and psychological states—from initiation of sleep, to metabolic repair, to arousal and cognitive readiness. Where contemporary science relies heavily on neurochemical markers, circadian gene expression, and centralized brain mechanisms (like the SCN and melatonin signaling), Ayurveda emphasizes functional balance, lifestyle alignment, and biotemporal awareness as primary levers of circadian health. Far from being an esoteric model, the Tridoshic framework finds deep resonance in modern discoveries: the timing of hormone release, phases of REM and non-REM sleep, thermoregulation, and even gut-brain signaling all reflect patterns that Ayurveda described in terms of Dosha activity. In clinical application, this approach extends beyond symptom relief to a more root-cause, regulatory strategy—addressing not just the presence of insomnia or hypersomnia but the Dosha-based disruption underlying them. It also highlights how poor alignment with daily rhythms—through late-night work, untimely eating, erratic schedules, or overstimulation—disturbs the body's innate rhythmic intelligence and leads to chronic disorders. In this regard, Ayurvedic principles of Dinacharya and Ratricharya stand as timeless tools for re-establishing physiological order and mental clarity. Crucially, integrating this model into modern healthcare offers a non-invasive, preventive, and individualized approach to sleep health. It moves the discourse beyond pharmacological management and into a domain where diet, behavior, sensory inputs, herbal interventions, and self-awareness can restore circadian integrity in a sustainable manner. In conclusion, the Ayurvedic view of circadian rhythm is not merely an alternative—it is a complementary and expansive paradigm. By uniting this ancient chronophysiology with modern sleep science, practitioners and researchers have an opportunity to redefine how we understand and treat sleep—from a reductionist to a rhythmic, systemic perspective. This shift is not only scientifically valid but urgently needed in an era of epidemic sleep disturbances and chronodisruption.

## References:

1. Charaka. Charaka Samhita, Sutrasthana. Varanasi: Chaukhamba Sanskrit Sansthan; 2009.
2. Vagbhata. Ashtanga Hridaya, Sutrasthana. Ed. Harishastri Paradkar. Varanasi: Chaukhamba Surbharati; 2002.
3. Sushruta. Sushruta Samhita, Sutrasthana. Ed. Kaviraj Kunjalal Bhishagratna. Varanasi: Chowkhamba Sanskrit Series Office; 2010.
4. Sharma RK, Dash B. Charaka Samhita: Text with English Translation & Critical Exposition Based on Chakrapani Datta's Ayurveda Dipika. Vol. 1. Varanasi: Chowkhamba Sanskrit Series; 2005.
5. Moore RY. Suprachiasmatic nucleus in sleep-wake regulation. *Sleep*. 2007;30(9):1051–1058.
6. Arendt J. Melatonin and the mammalian pineal gland. *Chronobiol Int*. 2006;23(1–2):21–37.

7. Panda S. Circadian physiology of metabolism. *Science*. 2016;354(6315):1008–1015.
8. Walker MP. The role of sleep in cognition and emotion. *Ann N Y Acad Sci*. 2009;1156:168–197.
9. Saper CB, Fuller PM, Pedersen NP, Lu J, Scammell TE. Sleep state switching. *Neuron*. 2010;68(6):1023–1042.
10. Patwardhan B, Warude D, Pushpangadan P, Bhatt N. Ayurveda and traditional Chinese medicine: a comparative overview. *Evid Based Complement Alternat Med*. 2005;2(4):465–473.
11. Singh RH. Exploring issues in the development of Ayurvedic research methodology. *J Ayurveda Integr Med*. 2010;1(2):91–95.
12. Srivastava A. Chronobiology and Ayurveda: An emerging interface. *Anc Sci Life*. 1999;18(3–4):203–207.
13. Bhutani S, Vishnoi M. Ayurvedic principles and circadian rhythm: A review. *Int J Ayur Pharm Chem*. 2020;12(3):155–162.
14. Sharma H, Clark C. *Ayurvedic Healing: A Comprehensive Guide*. 2nd ed. Twin Lakes: Lotus Press; 2002.
15. Reddy VD, Ramesh M, Rao KN, Prasad MR. Pharmacological effects of *Nardostachys jatamansi*. *Indian J Exp Biol*. 2010;48(5):549–556.
16. Mishra LC, Singh BB, Dagenais S. Scientific basis for the therapeutic use of *Withania somnifera* (Ashwagandha): A review. *Altern Med Rev*. 2000;5(4):334–346.
17. Gupta A, Khera S, Venkatesh S, Sharma R. A clinical study on the effect of Shirodhara in anxiety disorder. *AYU*. 2012;33(2):202–206.
18. Sheth RD, Mishra N, Sharma A. Sleep disorders in Ayurveda: A review. *Int J Res Ayurveda Pharm*. 2018;9(2):25–30.
19. Gopinath G, Sreelakshmi G. Dinacharya and its relevance in maintaining circadian health. *J Ayurveda Integr Med Sci*. 2017;2(4):12–17.
20. Gadgil M, Nair K, Utkarsh G, Rao PPR. People's biodiversity registers: A chronobiological documentation tool. *Curr Sci*. 2002;83(10):1237–1246.
21. Czeisler CA, Gooley JJ. Sleep and circadian rhythms in humans. *Cold Spring Harb Symp Quant Biol*. 2007;72:579–597.
22. Turek FW, Gillette MU. Melatonin, sleep, and circadian rhythms: Rationale for chronobiotic therapy. *Clin Neuropharmacol*. 2004;27(3):143–148.
23. Sharma PV. *Dravyaguna Vijnana, Vol. II*. Varanasi: Chaukhambha Bharati Academy; 2012.