

## **Āhāra Vidhi Vidhāna & Chrono - Nutrition: An Integrative Approach to Health through Time-Aligned Dietary Practices**

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### **ABSTRACT**

Āyurveda, the old age traditional system of medicine, encloses a detailed dietary protocol known as Āhāra Vidhi Vidhāna, emphasising the quantity, quality, timing, and mental state of an individual during food intake. Meanwhile, in present era Chrono-nutrition deals with the study of interaction between meal timing (affecting health & metabolism) and its alignment with the body's circadian rhythm, has emerged as a pivotal concept in modern nutritional science. This integrated approach bridges relation among Āyurveda principle i.e Āhāra Vidhi Vidhāna with chrono-nutrition, highlighting the commonalities and probability for synergistic health benefits. This alignment of consuming food with biological clocks may offer profound metabolic, digestive, and psychological benefits, making this integrative approach a promising area for future clinical research.

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**Keywords:** Āhāra Vidhi Vidhāna, Chrono-nutrition, Circadian rhythm, Meal timing.

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### **1. INTRODUCTION**

Āyurveda an ancient system & time aligned medical science speaks about trayopastamba [1] - 3 pillars of life [i.e Āhāra, Nidra & Brahmacharya]. Among them, Āhāra is not merely a source of energy - it is a synchroniser of biological rhythms. While modern science now acknowledges the significance of consuming food (when, what & how we eat) through the lens of chrono-nutrition, which Āyurveda has emphasised this for millennia through Āhāra Vidhi Vidhāna, Dinacharya [2] & Rutucharya [3] in the lens of agni & Kōṣṭha. This paper aims to examine & reveal the connections between these two frameworks and discuss their implications for metabolic health and preventive care.

## 2. CHRONO-NUTRITION: CONCEPT AND SCIENCE

### 2.1 Definition and Overview

Chrono-nutrition refers to the relationship between meal timing, circadian rhythms, and health outcomes. Chrono-nutrition, a science that combines components of nutritional research with elements of chronobiology, has gained increasing interest as the scientific community has emphasised the impacting effect of biological rhythms on nutritional response [4]. It is rooted in chronobiology, which studies the body's internal clocks—mainly regulated by the supra-chiasmatic nucleus (SCN) and peripheral clocks in metabolic tissues.

In general, Chrono-nutrition can be defined based on three major dimensions, as used in scientific literature [5]:

- Timing (actual time of the day)
- Regularity (Consistency of eating routine through-out the day / from day - to - day) &
- Frequency of food intake (No. of meals per day)

### 2.2 Role of Circadian Rhythm in Nutrition

The circadian system comprises networks of molecular clocks throughout body tissues. While circadian rhythms are autonomous, self-sustaining and temperature compensated, the circadian system has remarkable plasticity, and feeding can modify circadian rhythms from the molecular to behavioural level. Indeed, peripheral tissue clocks, such as the liver clock, are particularly sensitive to the composition and timing of food consumed. Disorganisation of the circadian system, and loss of timing relationships between circadian rhythms in particular, is thought to contribute to the development of certain chronic diseases. Hence, appropriate nutrition, where energy intake is aligned with energy expenditure and clear feeding/fasting cycles are synchronised with clock-regulated metabolic changes, helps maintain robust behavioural and physiological circadian rhythms and health [6].

### 2.3 Evidence-Based Benefits of Chrono-Nutrition

Studies show that:

- Eating two larger meals a day (breakfast and lunch) is more effective than six smaller meals in a reduced-energy regimen for patients with type 2 diabetes: a randomised crossover study [7]
- Early Time-Restricted Feeding Improves Insulin Sensitivity, Blood Pressure, and Oxidative Stress Even Without Weight Loss in Men with Prediabetes [8]
- Late eating is associated with cardiometabolic risk traits, obesogenic behaviors, and impaired weight loss [9]

## 3. ĀHĀRA VIDHI VIDHĀNA - TIME ALIGNED DIETARY HABITS

### 3.1 Overview from Classical Texts

Details of Āhāra vidhi Vidhāna was mentioned in Caraka samhita in Vimana sthāna 1st chapter (Rasavimāna adyāya) [10] and similar reference regarding dvādaśāsanapracārān in Sushruta samhita, in Uttara tantra swastavrutta adhyāya [11].

### 3.2 Core Principles of Āhāra Vidhi Vidhāna:

According to Caraka Samhita, the following rules are vital:

**tatrēdamāhāravividhividhānamarōgāṇāmāturāṇām cāpi kēṣāñcit kālē prakṛtyaiva hitatamaṁ bhuñjānānaṁ bhavati- uṣṇaṁ, snigdhaṁ, mātrāvat, jīrṇē vīryāvīruddham, iṣṭē dēśē, iṣṭasarvōpakaraṇaṁ, nātidrutaṁ, nātilambitaṁ, ajalpan, ahasan, tanmanā bhuñjīta, ātmānamabhisamīkṣya samyak||24| C.Vi.1**

- uṣṇaṁ aśnīyāt – Eating warm food.
- snigdhaṁ aśnīyāt – Eating unctuous or oily food.
- mātrāvat aśnīyāt – Eating the appropriate quantity.
- jīrṇē aśnīyāt – Eating only after the previous meal is digested.
- vīryāvīruddham aśnīyāt – Eating food without incompatibility.
- iṣṭē dēśē / iṣṭasarvōpakaraṇaṁ – Eating in a proper place with appropriate utensils.
- nātidrutaṁ / nātilambitaṁ – Neither too fast nor too slow.
- ajalpan / ahasan - Do not speak / Laugh while eating food.
- tanmanā bhuñjīta - Mindful eating with concentration.
- ātmānamabhisamīkṣya samyak – having food after due consideration of one's self.

### 4. INSIGHTS OF CHRONO-NUTRITION WITH ĀHĀRA VIDHI VIDHĀNA

Table 1: Insights of Chrono-Nutrition with Āhāra Vidhi Vidhāna

āhāra vidhi vidhāna	Chrono-Nutritional Principle	Shared Insight
uṣṇaṁ aśnīyāt	Thermic effect of food timing	Warm food enhances process of digestion, & digestion is stronger in day time ( Pitta kāla)
snigdhaṁ aśnīyāt	Supports sustained energy through out the day & supports melatonin & cortisol rhythm	Balanced fats reduce glycemic variability, important in circadian glucose regulation.
mātrāvat aśnīyāt	Caloric timing / Avoid excess late night calorie intake	Eating moderate meals earlier in the day supports metabolic efficiency & reduces postprandial glucose spikes.
jīrṇē aśnīyāt	Meal spacing / Intermittent fasting	Aligns with digestive circadian rhythm & supports gut rest & repair ( autophagy, insulin sensitivity).
vīryāvīruddham aśnīyāt (balanced meals)	Aligns with Pitta kāla when digestion is strong	Optimises nutrient absorption, supports insulin sensitivity & metabolic health.

<b>iṣṭē dēśē / iṣṭasarvōpakaraṇam</b>	Daytime eating in peaceful environment	Eating during daylight hours improves mindfulness & glucose metabolism ( as melatonin at night reduces insulin response)
<b>nātidrutam / nātilambitam</b>	Mindfull eating / meal timing consistency	Supports circadian alignment of digestion, improves satiety hormones ( leptin / ghrelin regulation)
<b>ajalpan / ahasan</b>	Reduces cognitive & sensory distractions during meals.	Multitasking while eating disrupts the hypo-thalamic satiety centre, causing overeating, poor digestion, & desynchronise of appetite-regulating hormones.
<b>tanmanā bhuñjīta</b>	Aligns with circadian meal regularity & Cognitive - emotional timing	Eating with attention improves digestive-enzyme release, gut-brain signalling & hormonal rhythm.
<b>ātmānamabhisamīkṣya samyak</b>	Eating based on biological hunger, not time	Synchronises internal biological cues with food intake: respects circadian rhythm.

#### 4.1 Gut Microbiota and Clock Genes

Both Āyurveda and chrono-nutrition stress on timely consumption & timely digestion, which indirectly supports circadian rhythms of the gut microbiome. Disrupting these can lead to health issues over a period of time & even leading to life style disorders [12].

#### 4.2 Agni and Circadian Clock

The concept of Agni as the digestive fire resembles the circadian regulation of enzymatic activity and hormone secretion involved in digestion. This concept of Agni correlating with Chrono-nutrition holds more appropriate with understanding food intake based on different seasons as changes in agni is very evident. Seasonal eating is not traditional but its biological. Combining rutucarya with Chrono-nutrition helps to enhance digestion, balances dosas & aligns body with body's circadian rhythm.

**Table 2: Season wise doṣa dominant & ideal recommended diet**

<b>Rutu ( Season)</b>	<b>Dominant doṣa as per Āyurveda</b>	<b>Condition of Agni (digestive fire)</b>	<b>Ideal diet according to Āhāra Vidhi Vidhāna</b>	<b>Insight acc. To Chrono-nutrition</b>
Shishira ( Late winter)	Kapha	Strong	Heavy, Nourishing	Heavier lunch; light dinner
Vasanta (Spring)	Kapha	Mild	Light, Dry, Spicy	Heavier lunch; light dinner

Grīshma (Summer)	Pitta	Weak	Cooling, Hydrating	Smaller & Frequent meals; good hydration; early evening meal
Varsha (monsoon)	Vāta	Weak	Warm, Easily digesting	Regular meal timings; avoid late night meals
Sharad (Autumn)	Pitta	Moderate	Sweet, Cooling	Cool, pitta pacifying breakfast & lunch; light dinner
Hemanta (Early Winter)	Vāta	Very strong	Oily, Heavy, Nourishing	Rich breakfast & heavy meals

## 5. FUTURE INITIATIVES BY ADOPTING PRINCIPLES OF CHRONO-NUTRITION & ĀHĀRA VIDHI VIDHĀNA

### 5.1 Potential Applications

- **Personalised daily Nutritional plan** - helps tailoring meal timing to individual circadian rhythm to optimise appropriate digestion & metabolism of food.
- **Sustainable & Seasonal eating** i.e implementing rutucarya based diet aligned with both environmental rhythms & body clocks.
- **Implementing principles of Āhāra vidhi Vidhāna** in eyes of chrono-nutrition for Hospital & clinical integration to improve recovery & drug metabolism among patients.

### 5.2 Research Gaps

- Lack of interdisciplinary clinical trials i.e., comparing Āyurveda based meal timing vs. Western chrono-nutritional models.
- Need for standardising meal-timing recommendations across body types (Prakriti).

### 5.3 Gross Proposed Model for Integrated Practice

**Table 3: Doṣa dominancy as per timings in a day & ideal recommended diet**

Time of Day	Ayurvedic Doṣa Dominance	Ideal Meal Plan According to Integration
6–10 AM	Kapha	Light breakfast, warm and energizing
10–2 PM	Pitta	Largest meal, full digestive capacity
2–6 PM	Vāta	Light snacks (optional)
6–8 PM	Kapha	Light dinner, warm, easy to digest

## 6. CONCLUSION

The convergence of Chrono-nutrition and Āhāravidhi-Vidhāna presents a compelling, multidimensional framework that integrates ancient dietary wisdom with modern biological science. Ayurveda, through its meticulous guidelines on the timing, manner, quantity, and sequence of food intake, has long emphasised that diet is not merely nutritional input but a rhythmic, dynamic process that must remain in harmony with the body's internal cycles. Chrono-nutrition, emerging from the study of circadian biology, now validates these classical principles by demonstrating that metabolic pathways, digestive enzyme secretion, hormonal regulation, gut microbiome activity, and cellular repair mechanisms exhibit strong time-bound oscillations. The alignment of these concepts underscores that optimal nutrition must go beyond food composition and include the critical dimension of time.

Āyurveda's assertion that agni (digestive fire) follows diurnal rhythms parallels chrono-nutritional findings that gastrointestinal motility, insulin sensitivity, and metabolic rate peak during daytime and decline towards night. Method to consume the largest meal during midday (when agni is at its strongest), avoid heavy or late-night eating, and maintain consistent meal timings aligns properly with the modern evidence that circadian misalignment—such as irregular eating, night-time snacking, or skipping meals—contributes to metabolic syndrome, obesity, insulin resistance, and inflammatory disorders. Thus, what Ayurveda recognised as derangement of agni and doṣa imbalance, modern science identifies as disruptions in metabolic and circadian homeostasis.

Moreover, the qualitative aspects of Āhāravidhi-Vidhāna—such as mindful eating, proper food combinations, consuming warm and freshly prepared meals, avoiding incompatible foods, and customising diet according to constitution (prakṛti), season (ṛtu), and digestive strength (agni bala)—interact synergistically with the chrono-nutritional emphasis on metabolic flexibility, glucose variability, gut microbial rhythms, and chrono-type-specific dietary patterns. Both disciplines highlight that health cannot be achieved by focusing solely on caloric or nutrient metrics; instead, nutrition must respect the natural oscillations that govern human physiology. This integrative perspective strengthens the understanding that diet is a biological event embedded within temporal, environmental, and individual contexts.

By synthesising these frameworks, it becomes evident that time-conscious eating is not a modern discovery but a rediscovery of Ayurvedic fundamentals. Chrono-nutrition provides mechanistic explanations—through clock genes, hormonal cycles, and metabolic rhythms—for what Ayurveda established empirically through centuries of observation and clinical experience. The combined insights of both systems provide a more comprehensive model for preventive medicine, lifestyle management, metabolic health, and personalised nutrition.

In conclusion, Chrononutrition and Āhāravidhi-Vidhāna are not separate or conflicting paradigms; rather, they are complementary lenses viewing the same universal truth. Thus, the convergence of these two knowledge systems reinforces a unified message: health is optimised when dietary practices respect biological clocks and digestive rhythms. This holistic, time-sensitive approach to nutrition provides a practical, evidence-based model for preventive healthcare and lifestyle medicine. Future research exploring deeper physiological correlations can further strengthen this interdisciplinary synergy and support its application in clinical and public health contexts.

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