

Dinacharya and Ritucharya as Preventive Lifestyle Frameworks for Non-Communicable Diseases: A Narrative Review

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Abstract:

Non-communicable diseases (NCDs), including cardiovascular diseases, diabetes mellitus, obesity, cancers and chronic respiratory disorders, constitute a major global public-health challenge. Their development is strongly influenced by modifiable factors such as unhealthy dietary practices, physical inactivity, disturbed sleep, psychological stress, tobacco use, harmful alcohol consumption and environmental exposures. Ayurveda gives primary importance to preservation of health through systematic daily and seasonal practices described under *Dinacharya* and *Ritucharya*. *Dinacharya* recommends regularity in waking and sleeping, personal and oral hygiene, physical exercise, massage, bathing, timely food intake, appropriate occupational activity and behavioural discipline. *Ritucharya* recommends gradual modification of diet, physical activity, clothing, sleep and other lifestyle practices according to seasonal changes in environmental temperature, humidity, daylight and physiological strength. The present narrative review explores the possible role of *Dinacharya* and *Ritucharya* in preventing NCDs by integrating classical Ayurvedic principles with contemporary evidence concerning circadian rhythm, sleep regularity, physical activity, meal timing, stress regulation and seasonal variation in metabolic and cardiovascular parameters. Experimental and epidemiological studies demonstrate that circadian misalignment, irregular sleep, physical inactivity, inappropriate meal timing and failure to adapt behaviour to climatic conditions are associated with insulin resistance, hypertension, obesity, inflammation and cardiovascular events. Many components of *Dinacharya* and *Ritucharya* therefore show conceptual and functional convergence with evidence-based lifestyle medicine. Nevertheless, direct long-term clinical trials evaluating the complete classical regimens for preventing NCD incidence are limited. *Dinacharya* and *Ritucharya* should consequently be considered structured, culturally acceptable and potentially cost-effective frameworks for primordial and primary prevention rather than replacements for medical screening or treatment. Individualized implementation according to age, constitution, occupation, disease status, geographical region and environmental conditions may support healthier behaviour, biological rhythm and metabolic resilience.

Keywords: Dinacharya, Ritucharya, non-communicable diseases, lifestyle disorders, circadian rhythm, preventive medicine.

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Introduction:

Non-communicable diseases are chronic conditions produced through complex interactions among genetic, physiological, behavioural, environmental and social factors. According to the World Health Organization, NCDs caused at least 43 million deaths in 2021, representing approximately 75% of deaths unrelated to pandemics. Cardiovascular diseases, cancers, chronic respiratory diseases and diabetes account for most premature NCD mortality. Tobacco use, unhealthy diet, insufficient physical activity, harmful alcohol consumption and air pollution remain major preventable risk factors. India is experiencing a substantial increase in metabolic NCDs. The ICMR–INDIAB national study reported a weighted prevalence of 11.4% for diabetes and 15.3% for prediabetes. It also identified high levels of hypertension, generalized obesity, abdominal obesity and dyslipidaemia, indicating a major future burden of cardiovascular and metabolic complications. Although pharmacological treatment and early diagnosis are essential, NCD prevention requires sustained changes in everyday behaviour. The risk factors do not operate independently. Irregular sleep may encourage late eating and inactivity; stress can contribute to unhealthy food consumption, substance use and hypertension; and climatic conditions may influence physical activity, blood pressure, sleep and glycaemic control. An integrated lifestyle framework is therefore more appropriate than isolated recommendations. Ayurveda recognizes maintenance of health as one of its principal objectives. The classical statement “*Swasthasya Swasthya Rakshanam Aturasya Vikara Prashamanam*” emphasizes preservation of the health of healthy individuals along with treatment of disease. Dinacharya, or the daily regimen, and Ritucharya, or the seasonal regimen, are important components of this preventive approach. Rather than addressing a single disease, these regimens organize daily and seasonal behaviour in relation to digestion, sleep, physical capacity, mental wellbeing and the natural environment. The objective of this narrative review is to examine the possible role of Dinacharya and Ritucharya in preventing NCDs and to interpret their principles in relation to current evidence on circadian biology, physical activity, meal timing, sleep regularity,

psychological wellbeing and seasonal physiological variation.

Ayurvedic Foundation of Dinacharya:

Dinacharya is a planned sequence of daily activities intended to maintain the equilibrium of *Dosha*, support *Agni*, facilitate proper elimination, preserve the functioning of the sensory and motor organs and promote physical and psychological wellbeing. Detailed descriptions are found in the *Matrasitiya Adhyaya* of *Charaka Samhita* and the Dinacharya chapter of *Ashtanga Hridaya*.

The principal elements include:

1. Waking at an appropriate time, traditionally during *Brahma Muhurta*.
2. Timely elimination of urine and stool without suppression of natural urges.
3. Oral and personal hygiene, including *Dantadhavana* and *Jihva Nirlekhana*.
4. Procedures such as *Gandusha*, *Kavala*, appropriate *Nasya* and care of the sensory organs.
5. *Abhyanga*, or oil massage.
6. *Vyayama*, or physical exercise according to individual capacity.
7. *Udvaartana*, bathing, appropriate clothing and cleanliness.
8. Timely consumption of suitable food according to hunger, digestive capacity and constitution.
9. Proper engagement in occupational, social and intellectual activities.
10. Mental and behavioural discipline through *Sadvritta*.
11. Adequate, regular and physiologically appropriate sleep.

Dinacharya should not be interpreted as an identical schedule for every person. Ayurvedic texts repeatedly consider age, constitution, digestive capacity, strength, disease, occupation, season and geographical region. For example, vigorous exercise may be suitable for a healthy young adult but inappropriate for a frail older adult or a person with uncontrolled cardiovascular disease. The recommendation to wake during *Brahma Muhurta* should similarly be understood in relation to adequate sleep. Waking early after insufficient sleep would contradict the broader Ayurvedic importance assigned to *Nidra*. In contemporary application, regular sleep and wake timing with adequate sleep duration is

more important than imposing an excessively early waking time.

Ayurvedic Foundation of Ritucharya:

Ritucharya refers to systematic modification of diet and behaviour according to seasonal changes. Ayurveda describes six principal seasons: *Shishira*, *Vasanta*, *Grishma*, *Varsha*, *Sharad* and *Hemanta*. These are grouped within *Adana Kala* and *Visarga Kala*, representing cyclic changes in environmental characteristics, physiological strength, digestive capacity and Dosha status. The classical purpose of Ritucharya is to prevent disturbance caused by an inappropriate relationship between the individual and the external environment. The regimen considers:

- Seasonal changes in digestive strength.
- Accumulation, aggravation and pacification of Dosha.
- Variations in bodily strength and exercise tolerance.
- Appropriate qualities of food and beverages.
- Clothing, exposure to sunlight, cold, wind and humidity.
- Changes in sleep, activity and personal care.
- Gradual transition between two seasons, known as *Ritusandhi*.

Ritucharya is therefore an adaptive rather than a rigid calendar-based model. Climatic conditions vary considerably across geographical regions. The practical regimen should be guided by actual environmental temperature, humidity, rainfall, food availability and personal tolerance rather than solely by the names or calendar dates of traditional seasons. Reviews of Ritucharya have emphasized its relevance as a preventive response to changing environmental and lifestyle conditions.

Biological Rhythm and the Prevention of NCDs:

Circadian alignment:

Human physiological processes follow approximately 24-hour rhythms coordinated by the central circadian clock and peripheral clocks present in metabolic tissues. Sleep, food intake, light exposure and physical activity act as important time signals. Irregularity in these behaviours may create circadian misalignment, in which behavioural schedules occur at biologically

inappropriate times. A controlled human experiment demonstrated that circadian misalignment produced adverse changes in glucose, insulin, leptin, cortisol and blood pressure, providing a plausible mechanism through which irregular daily schedules may increase cardiometabolic risk. Dinacharya places repeated daily behaviours within an orderly sequence. Regular waking, elimination, exercise, food intake, work and sleep may act collectively as behavioural time cues. The value of Dinacharya may therefore lie not only in the individual activity but also in the regularity and coordination of the complete daily pattern. However, Dinacharya should not be described as scientifically equivalent to modern circadian medicine. It is more accurate to state that the two systems converge in recognizing that the timing and regularity of behaviour can affect physiology.

Sleep regularity:

Irregular sleep timing has emerged as a potential independent cardiovascular risk factor. In the Multi-Ethnic Study of Atherosclerosis, greater variability in sleep duration and timing was associated with an increased risk of cardiovascular events, even after consideration of traditional risk factors and sleep quantity. A stable night-time sleep schedule may support glucose regulation, blood-pressure rhythms, autonomic balance, appetite control and psychological health. Dinacharya can contribute by encouraging:

- A regular bedtime and waking time.
- Reduction of unnecessary late-night activity.
- Timely meals, particularly avoidance of heavy late-night food.
- Appropriate daytime activity that supports night-time sleep.
- Regulation of sensory and digital stimulation before sleep.

These practices may be especially relevant for students, professionals, shift workers and individuals with prolonged screen exposure. Nevertheless, people working unavoidable night shifts require individualized occupational-health guidance rather than rigid application of a daytime schedule.

Physical Activity and Vyayama:

Physical inactivity contributes directly to obesity, insulin resistance, hypertension, cardiovascular disease, certain cancers and premature mortality. A large national cohort of more than 416,000 adults demonstrated a dose-response relationship between aerobic and muscle-strengthening activity and mortality. Even relatively modest weekly activity was associated with meaningful reductions in mortality risk. Ayurveda recommends regular Vyayama but cautions against excessive exertion. Exercise is generally advised according to *Bala*, age, diet, season and health status. The classical concept of exercising within one's capacity is highly relevant because sedentary behaviour and excessive, poorly supervised exercise can both be harmful. Regular, individualized Vyayama may prevent NCDs through:

- Increased energy expenditure.
- Improved insulin sensitivity.
- Reduction of visceral adiposity.
- Maintenance of muscle mass and functional capacity.
- Improvement in endothelial and cardiovascular function.
- Reduction of stress and anxiety.
- Improvement in sleep quality.
- Support of bowel regularity and digestive function.

Exercise intensity should be reduced in extreme heat, dehydration, acute illness, frailty, pregnancy-related complications and uncontrolled cardiovascular or respiratory disorders. The seasonal regulation of exercise recommended under *Ritucharya* adds an environmental-safety dimension to the general recommendation for daily activity.

Dietary Regularity, Agni and Meal Timing:

Ayurveda considers *Ahara* one of the major supports of life. Food should be consumed according to hunger, digestive capacity, quantity, quality, compatibility and season. Eating before the previous meal has been properly digested, habitual overeating, emotional eating and consumption at inappropriate times are discouraged. Modern chrononutrition also recognizes that the timing of food intake affects metabolic responses. In a small controlled trial involving men with prediabetes, early time-restricted feeding improved insulin sensitivity

and blood pressure even without weight loss. Another randomized trial found that early time-restricted eating was more effective than a mid-day schedule for certain metabolic outcomes in healthy adults without obesity. These studies support the importance of meal timing but do not establish that one restricted schedule is appropriate for every individual.

A practical *Dinacharya*-based dietary model for NCD prevention may include:

- Consistent meal timing.
- Eating in response to genuine hunger rather than continuous snacking.
- Avoidance of very heavy meals late at night.
- Preference for freshly prepared and minimally processed foods.
- Appropriate quantity according to physical activity and digestive capacity.
- Inclusion of vegetables, pulses, whole grains, fruits and other locally appropriate foods.
- Limitation of excess salt, added sugars, trans fats and highly processed foods.
- Mindful eating without excessive digital or emotional distraction.
- Adjustment of food qualities and quantity according to climate and season.

The Ayurvedic concept of *Agni* should not be reduced to a single biochemical process. It is a broader functional concept related to digestion, transformation, assimilation and metabolic balance. Its clinical interpretation should be made cautiously and should not replace validated assessment of blood glucose, lipids, liver function or other metabolic markers.

Stress Regulation, Behavioural Discipline and Mental Health:

Persistent psychological stress can affect the hypothalamic–pituitary–adrenal axis, sympathetic activity, sleep, eating behaviour, blood pressure and adherence to treatment. *Dinacharya* is not limited to physical procedures; it also includes orderly work, social conduct, control of harmful impulses, self-reflection and *Sadvritta*. A predictable daily routine may reduce decision fatigue, encourage healthier habits and provide a sense of behavioural stability. Prayer, meditation, breathing practices, study, supportive social interaction and periods of quiet

reflection can be incorporated according to personal belief and preference.

These measures may indirectly prevent NCDs by improving:

- Emotional regulation.
- Sleep quality.
- Adherence to diet and exercise.
- Reduction of stress-related eating.
- Control of tobacco and alcohol dependence.

- Social connectedness.
- Treatment adherence among people already diagnosed with an NCD.

Behavioural and spiritual practices should remain supportive. They should not be represented as independent cures for major depression, severe anxiety disorders, addiction or other conditions requiring professional care.

Table no .1 Component-Wise Relationship Between Dinacharya and NCD Prevention

Dinacharya component	Possible contemporary interpretation	Potential relevance to NCD prevention	Present level of evidence
Regular waking and sleeping	Stable sleep–wake schedule and circadian alignment	May support glucose regulation, blood pressure rhythm, appetite and cardiovascular health	Moderate observational and mechanistic evidence
Timely elimination and non-suppression of natural urges	Bowel and bladder regularity, adequate hydration and attention to physiological signals	Supports comfort and routine; direct NCD prevention remains uncertain	Limited direct evidence
Dantadhavana and Jihva Nirlekhana	Tooth brushing, tongue cleaning and oral hygiene	Prevents oral disease; possible inflammatory relevance	Strong for oral health; uncertain for direct NCD prevention
Abhyanga	Self-massage or therapeutic oil	Relaxation, body awareness, musculoskeletal comfort and possible stress reduction	Limited NCD-specific evidence
Vyayama	Regular aerobic, strengthening and flexibility activity	Strong relevance to obesity, diabetes, cardiovascular disease and functional decline	Strong evidence for physical activity
Snana and cleanliness	Personal hygiene and restorative bathing	Supports hygiene, comfort and readiness for daily activity	Limited direct NCD evidence
Timely and measured meals	Regular meals, portion control and avoidance of heavy late eating	May improve weight regulation, glucose control and metabolic rhythm	Moderate and evolving evidence

Sadvritta	Ethical conduct, stress management and healthy social behaviour	May improve mental wellbeing, adherence and avoidance of harmful habits	Indirect but clinically relevant evidence
Appropriate occupational activity and rest	Balance between physical activity, sedentary work and recovery	May reduce prolonged sitting, stress and musculoskeletal burden	Moderate evidence
Night-time sleep	Adequate duration and quality of sleep	Relevant to obesity, hypertension, diabetes and cardiovascular health	Strong and increasing evidence

The evidence supporting individual components is substantially stronger than the evidence supporting the complete Dinacharya package as a standardized intervention. This distinction should be maintained when presenting its preventive potential.

Seasonal Variation and NCD Risk:

Environmental temperature, daylight duration, rainfall and humidity influence human behaviour and physiology. Seasonal variations have been observed in blood pressure, glycaemic control, physical activity and sleep. Seasonal variation in HbA1c has also been documented among people with type 2 diabetes. In one long-term cohort,

statistically significant differences were observed between seasonal peaks and troughs, possibly reflecting changes in temperature, diet and physical activity. The Rotterdam Study demonstrated seasonal differences in physical activity, sedentary behaviour and sleep among middle-aged and older adults. Physical activity was generally higher in summer than in winter, illustrating how environmental conditions influence NCD-related behaviours. These findings do not directly validate all classical seasonal prescriptions. They do, however, support the underlying principle that diet, physical activity, hydration, clothing and exposure should be adjusted to environmental conditions.

Table no .2 Practical Interpretation of Ritucharya for NCD Prevention

Season	Classical physiological consideration	General dietary and behavioural approach	Possible relevance to NCD prevention
Hemanta—early winter	Strong digestive capacity and greater physical strength	Nourishing but measured food, regular exercise, Abhyanga and protection from cold	Prevents inactivity while avoiding excessive seasonal caloric intake; supports temperature adaptation
Shishira—late winter	Continued cold exposure with risk of dryness and Vata disturbance	Warm food, suitable fats in moderation, exercise, warm clothing and skin care	May support activity and blood-pressure awareness during cold weather
Vasanta—spring	Classical aggravation of Kapha	Lighter meals, increased activity, Udvartana and reduction of excessively sweet, oily and heavy foods	Relevant to weight control and reversal of winter inactivity

Grishma— summer	Reduced strength, heat exposure and fluid loss	Hydration, light and cooling foods, avoidance of excessive exercise, heat and alcohol	Prevention of dehydration, heat stress and cardiovascular strain
Varsha— monsoon	Reduced digestive tolerance and environmental contamination	Warm, freshly prepared and easily digestible food; safe water; avoidance of stale or contaminated food	Supports gastrointestinal safety, metabolic regularity and maintenance of activity during rainfall
Sharad—autumn	Classical aggravation of Pitta and residual heat	Light and cooling diet, avoidance of excessive heat, appropriate hydration and gradual increase in activity	Supports heat adaptation and return to regular exercise
Ritusandhi— seasonal transition	Period of physiological adjustment	Gradual withdrawal of the previous regimen and gradual adoption of the next	Prevents abrupt dietary and behavioural changes

The table provides broad preventive principles rather than fixed prescriptions. Seasonal food advice should also consider diabetes, hypertension, kidney disease, obesity, food allergies and concurrent medication. For example, a “nourishing” winter diet should not justify unrestricted intake of sugars or saturated fats in a person with obesity or dyslipidaemia. Similarly, sweet or cooling beverages during summer should not mean sugar-rich drinks for a person with diabetes.

Discussion:

Dinacharya and Ritucharya provide a comprehensive behavioural model in which health is maintained through regularity, moderation, environmental adaptation and individualization. Their greatest contemporary relevance lies in addressing clusters of risk factors rather than isolated diseases. Dinacharya promotes regular timing of sleep, physical activity, eating, personal care and occupational behaviour. Contemporary research supports the importance of these factors in metabolic and cardiovascular health. Ritucharya extends the daily model by recognizing that physiological capacity and health behaviour change with environmental conditions. Seasonal variations in blood pressure, HbA1c, activity and sleep provide scientific support for adaptive preventive strategies, although they do not validate every classical seasonal recommendation. The complete regimens may also offer an implementation advantage. Modern preventive

advice is often fragmented into separate instructions concerning diet, exercise, sleep and stress. Dinacharya organizes these behaviours into a coherent daily routine, whereas Ritucharya introduces planned seasonal modification. This may improve understanding and adherence, especially within communities familiar with Ayurvedic concepts. At the same time, scientific caution is necessary. It would be inappropriate to claim that Dinacharya or Ritucharya alone can prevent every cardiovascular disease, cancer, respiratory disorder or case of diabetes. NCDs have genetic, environmental, occupational and socioeconomic determinants that cannot be eliminated solely through personal routine. Air pollution, food systems, working conditions, poverty, access to healthcare and commercial determinants also require policy-level interventions. Therefore, Dinacharya and Ritucharya should be integrated with established public-health measures, including tobacco control, reduction of harmful alcohol use, healthy food policies, physical-activity promotion, pollution control, vaccination, screening and accessible primary healthcare.

Conclusion:

Dinacharya and Ritucharya represent comprehensive Ayurvedic frameworks for organizing daily behaviour and adapting lifestyle to seasonal conditions. Their major components—regular sleep and waking, physical activity, measured and timely food intake, personal hygiene, psychological discipline,

adequate rest and environmental adaptation—address several modifiable determinants of non-communicable diseases. Contemporary evidence regarding circadian misalignment, sleep irregularity, physical inactivity, inappropriate meal timing and seasonal variation in cardiometabolic parameters provides biological plausibility for many of these principles. The strongest evidence relates to individual components such as physical activity, sleep regularity, dietary moderation and avoidance of harmful habits. Direct evidence that the complete classical regimens reduce long-term NCD incidence remains limited. When individualized and implemented alongside medical screening and evidence-based treatment, Dinacharya and Ritucharya may provide culturally acceptable, low-cost and sustainable strategies for primordial and primary prevention. Further prospective and interventional research is required to standardize these regimens and establish their effectiveness, safety and feasibility in different populations and climatic regions.

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