



Review Article

BIOLOGICAL RHYTHMS- AN AYURVEDIC PERSPECTIVE

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Article info

Article History:

Received: 02-01-2022

Revised: 28-01-2022

Accepted: 06-02-2022

KEYWORDS:

Circadian, Ultradian, Infradian rhythms, Ayurvedic routine.

ABSTRACT

A daily routine is essential to maintain health by bringing the fundamental changes required in body, mind, and spirit. An appropriate routine helps to establish the necessary structure for Human beings to maintain the equilibrium of *Tridoshas*. Biological rhythms like Circadian, Ultradian, and Infradian rhythms maintain the bodily functions regulating with an internal clock in a rhythmic way. Each *Dosha* exhibits diurnal variations. It also varies according to digestion phase and age. Age of the individual, Circadian rhythm and food intake are the basic factors that influence the physiology of the human body. Certain Environmental factors and bodily changes cause the Circadian rhythm to be out of sync, leading to many unhealthy conditions and are termed as Circadian rhythm disorder. A befitting routine has been described elaborately in the classical texts of Ayurveda in the form of *Dinacharya*, *Rutucharya* etc, which specifies out a daily, also as seasonal routine, for people to follow in order to enjoy optimal health and harmonious existence. The concepts mentioned in Ayurveda make us understand the best time for daily routines by keeping *Doshic* rhythms at an optimal level. Understanding the circadian rhythm in Ayurveda, causes for its derangement, its pathogenesis and ways to reset the circadian rhythm as mentioned in Ayurveda is needed to maintain health and to avoid present-day lifestyle disorders.

INTRODUCTION

A daily routine is essential to maintain health by bringing the fundamental changes required in body, mind, and spirit. An appropriate routine helps to establish the necessary structure for Human beings to maintain the equilibrium of *Tridoshas*.

Biological rhythm is biological fluctuations occurring in an organism in a cyclic manner and it is in response to periodic environmental change. There are three types of biological rhythms, they are Circadian rhythm, Ultradian rhythm and Infradian rhythm. To attain a healthy state, we have to live a life in harmony with nature.

Nature is not still, it moves in cycles changing from the day, night and also through various seasons. Every creature in this universe adjusts itself with these changes of nature and follows the routine which is in tune with nature's rhythmic changes in order to have a balanced state of health. But nowadays we humans because of our work patterns, for convenience and comfort are living a life that is separating us from nature by which we are failing in following a proper routine. This is the reason, giving rise to dire consequences leading to lifestyle disorders due to stress, imbalances etc

OBJECTIVES OF THE STUDY

1. To understand the concept of biological rhythms as per *Ayurveda*
2. To know the rhythmic pattern of *Doshas* varying with the changes of the day, night and seasons
3. Understanding that Disruption of this rhythm causes disequilibrium of *Doshas* leading to *Vyadhi* conditions and measures to reset the circadian rhythm as mentioned in *Ayurveda* through *Dinacharya* and *Rutucharya*.

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MATERIALS AND METHODS

The *Samhitas* of *Ayurveda* along with their commentaries, other *Ayurvedic* texts, books of contemporary medical sciences, relevant information from articles, periodicals, journals, and other published works and websites will be referred to fulfill the objectives of the study.

Biological Rhythms

Biological rhythm is biological fluctuations occurring in an organism in a cyclic manner and it is in response to periodic environmental change. There are three types of biological rhythms, they are Circadian rhythm, Ultradian rhythm and Infradian rhythm.

Circadian Rhythm

Circadian rhythm is the regular recurrence of physiological processes or activities which occur in cycles of 24 hours. It is also called a diurnal rhythm. The term circadian is derived from the Latin word "circa" which means 'around' and 'Diem' which means a 'day'; Circadian - around the day^[1].

This rhythmic change is developed in response to changes occurring in daylight and dark at night which are recurring every 24 hours.

Ultradian Rhythm

Ultradian rhythms are the series of bodily functions which take place during the course of a 24-hour day, occurring more than once a day.

Infradian Rhythm

Infradian rhythm is the changes that occur cyclically in bodily functions lasting for more than 24 hours but shorter than 1 year; occurring weekly, monthly, and annually.

Various physiological processes changing cyclically are set by means of a hypothetical clock that is often called a biological clock. Every tissue and organ are said to have a scheduled internal biological clock that operates as per biological rhythms, regulating processes like sleeping, eating, exposure to light, temperature etc. activities. And these clocks are governed by a master clock which is situated in the brain named the SCN-Suprachiasmatic nucleus.

The agents or events of the environment such as light, temperature, food, social interactions etc which stimulate in setting or resetting an internal biological clock of humans are termed as Zeitgeber.

Concepts To Be Understood In Knowing Rhythms In Ayurveda

Doshas maintain the integrity of *Shareera* as they are the primary constitutional factors of the body. There are three *Doshas*^[2] basically, namely *Vata*, *Pitta* and *Kapha*. The state of equilibrium of these *doshas* results in the orchestrated, harmonious wellbeing of the human body whereas their disequilibrium may cause ill-health or even death^[3]. And as *Purusha* is the

replica of the Universe^[4], a balance between the body's constitution and the environment is essential to maintain the *Swasthya*. And that is why *Ayurveda* explains that changes in the *Shareera* take place in accordance with the changes of our surroundings. Adapting the changes of external variations is essential to maintain the *Samavastha* of *Doshas*, if not it leads to the *Vyadhi* conditions.

Biological Rhythms as Per Ayurveda

Circadian Rhythm and Ultradian Rhythm in Ayurveda

Ashtanga Hrudaya mentions about Circadian rhythm and Ultradian rhythm with the simple *Shloka* – "Vayo Ahoratribhuktanam te Antamadhyaadigaha Kramath"^[5] meaning *Vata*, *Pitta* and *Kapha* respectively exhibit their marked presence in the end, middle and beginning of life, day-night and digestion.

Each *Dosha* exhibits diurnal variations. It also varies according to digestion phase and age.

Considering the *Ahoratri*, if the time interval, either day or night is divided into three equal parts, *Vata*, *Pitta* and *Kapha* show predominance during the last, middle and first parts respectively. This rhythmic variation of *Doshas* occurring in the 24-hour cycle is itself the circadian rhythm in *Ayurveda*.

Table 1: Diurnal Variations Of Doshas

	<i>Vata</i>	<i>Pitta</i>	<i>Kapha</i>
<i>Aho</i> (Day)	Evening	Mid-day	Morning
<i>Ratri</i> (Night)	Late night	Midnight	Early night

Likewise, if the period of digestion of food is considered, *Vata* will be predominant during the last phase of digestion, *Pitta* during the middle of the digestion and *Kapha* in its preliminary phase. This rhythmic variations of *Doshas* occurring during food intake, *Nidra* etc which takes place during the course of 24 hours in a day is itself the explanation for Ultradian rhythm in *Ayurveda*.

Table 2: Variations of Doshas According To The Phase of Digestion

	<i>Vata</i>	<i>Pitta</i>	<i>Kapha</i>
Phase of digestion	Colonic phase	Intestinal phase	Gastric phase

Age of the individual, Circadian rhythm and food intake are the basic factors that influence the physiology of the human body. As *Doshas* represent the function of various body systems in health as well as disease, these factors influence them also in the respective orders mentioned above.

Infradian Rhythm in *Ayurveda* can be explained considering the variation of *Doshas* that is *Sanchaya*, *Prakopa* and *Prashama* of *Doshas* in different *Rutus* which comprises two *Maasa*.

Table 3: *Rutus* and Their Relation to *Dosha*

<i>Rutu</i>	<i>Doshas</i>		
	<i>Sanchaya</i>	<i>Prakopa</i>	<i>Prashama</i>
<i>Shishira</i>	<i>Kapha</i>	-	-
<i>Vasanta</i>	-	<i>Kapha</i>	-
<i>Grishma</i>	<i>Vata</i>	-	<i>Kapha</i>
<i>Varsha</i>	<i>Pitta</i>	<i>Vata</i>	-
<i>Sharat</i>	-	<i>Vata</i>	<i>Vata</i>
<i>Hemanta</i>	<i>Kapha</i>	-	<i>Vata</i>

Zeitgeber as per Ayurveda

Zeitgeber such as light, temperature, food, social interactions etc has an influence in maintaining the proper functioning of the biological clock. In Ayurveda maintaining the *Samavastha* of *Doshas* is essential to have a *Swasthya* condition and the factors influencing the circadian rhythm as per Ayurveda include the changes in a day and night, seasonal variations, dietic rules, codes of conduct, etc. Ayurveda explains about regimens to be followed in a day, rules while eating, sleeping, specific regimens during different *Rutus* and behavioural conducts including ethical conduct, moral conduct, mental and physical conducts etc which have an impact on *Doshic* changes thereby which helps in maintaining proper functioning of the internal biological clock.

Amongst all the rhythms, the Circadian rhythm has a powerful impact on health as it is the main rhythm most people are concerned with because it is experienced on the daily basis. Hence it becomes important to understand it in detail.

Cause for Impaired/Reduced Circadian Rhythm

Certain Environmental factors and bodily changes cause the Circadian rhythm to be out of sync leading to many unhealthy conditions and are termed as Circadian rhythm disorder.

The only cause of the disease is recognized as either insufficient union (*Heenayoga*), perverted union (*Mithyayoga*) and excessive union (*Atiyoga*) of *Kala* (season), *Artha* (objects) and *Karma* (action) [6].

Kala refers to time. The importance of this etiological factor lies in the fact that the effect of time is natural and unavoidable. Day and night, various seasons, different stages of life - all these represent different aspects of time, producing versatile effects on the human body. Each *Dosha* attains the state of *Chaya*, *Prakopa* and *Prashama* in particular seasons which is inevitable and it is also dependent upon the diurnal variations. And every creature of this world is subjected to the process of continuous transformation. *Heenayoga*, *Mithyayoga* and *Atiyoga* of *Kala* are unpreventable and these certainly will lead to diseases. But nowadays even the disequilibrium state of health

occurs in *Samyogyoga* of *Kala* due to stress, night shift work etc and by not following the seasonal regimens and day-to-day regimens. Due to irregular sleep patterns, untimely food intake, wrong food combinations, etc duration of the various stages of digestion deviate from normalcy leading to diseases. *Adharaneeya vegas* if not passed timely then it will lead to many complications.

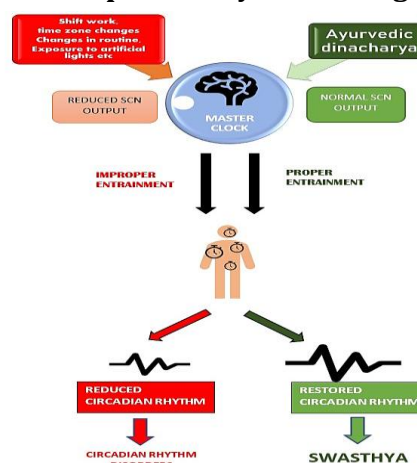
'*Artha*' implies to the objects of senses. *Heenayoga*, *Mithyayoga* and *Atiyoga* of the sense organs with their objects form important etiological factors in disease causation. For example, hearing low-frequency sounds cause strain to the ears, watching the intense lights of electronic devices late at night listening to irritative sounds, etc leads to disease conditions.

'*Karma*' refers to the deeds of a person. The *Heenayoga*, *Mithyayoga*, and *Atiyoga* of *Karma* (committed by body, speech, and mind) can also lead to preventable diseases, the importance of which is described as *Prajnaparadha*.

Thus, the complications that arise out of *Heenayoga*, *Mithyayoga*, and *Atiyoga* of *Kala*, *Artha*, and *Karma* will disrupt the normal circadian rhythm leading to the *Vyadhi* condition.

The Pathogenesis for Impaired Rhythm

In the present-day main cause for the impairment in circadian rhythm are doing jet lag or night shift work, *Prajnaparadha*[7] by excess use of the electronic device at night confusing our internal clock, stress, improper conduct with self and social interaction, not following a proper routine of day or seasons, etc. These causes effects negatively on the human body reducing the SCN output which causes improper entrainment of the various body clocks. By the variations in the body's normal functioning, it leads to the reduced circadian rhythm in the body hampering the proper rhythmic functions leading to various circadian rhythm disorders causing imbalances, stress, and various lifestyle disorders.

Chart no.1 Impaired Rhythm Pathogenesis

Reset the Internal Biological Clock with Ayurveda

A befitting routine has been described elaborately in the classical texts of Ayurveda, which specifies out a daily, also as seasonal routine, for people to follow in order to enjoy optimal health and harmonious existence. The concepts mentioned in Ayurveda make us understand the best time for daily routines by keeping *Doshic* rhythms at optimal levels.

Dinacharya

Ayurveda mentions not only waking up at *Brahmi Muhurth*^[8], brushing teeth, etc, but also the other regimens like *Danta Dhavana*^[9], *Gandusha*^[10], *Kavala*^[11], *Vyayama*^[12], *Snana*^[13] etc.

Vata, *Pitta* or *Kapha* predominance occurs in both the cycles of day and night at a specific time.

Vata Dosh- 2 am -6 am and 2 pm - 6 pm

Pitta Dosh- 10 am - 2 pm and 10 pm - 2 am

Kapha Dosh- 6 am - 10 am and 6 pm - 10 pm

Morning Regimen of Kapha Time (6-10 AM)

Waking up at *Brahmi Muhurta* before *Kapha Kala* begins to avoid laziness, evacuation of excreta, *Danta dhavana*, *Jivha nirlekhana*, *Gandusha*, *Kavala*, *Nasya*, *Pranayama*, *Abhyanga*, *Snana*, etc.

Mid-Day Regimen of Pitta Time (10 am to 2 pm)

The main meal of the day is to be taken during this time of the day. As *Pitta* is at its peak during this time it facilitates proper digestion. *Ahara vidhi*^[14] mentioned in *Charaka Samhita* should be adopted.

Late Afternoon Regimen of Vata Time (2 pm to 6 pm)

This is the best phase of the day to indulge in creative, daily, and heavy tasks can be done during this phase of the day as there will be abundant energy due to active *Vata*

Evening Regimen of Kapha Time (6 pm to 10 pm)

Laghu ahara, *Vihara*, and early to bed should be followed during this phase of the night. Avoid the use of artificial light and exposure to light of electronic devices.

Rutucharya

From a Universal perspective, it is very difficult to define *Rutucharya* as seasons have got many variables even in the same country. The narration of *Rutucharya* in our classics is applicable to seasons in India and of nations with similar geographical nature. But it goes without saying that the seasonal *Doshic* alterations remain the same anywhere in the Universe. *Doshas* attaining *Sanchaya* in a particular season are to be pacified in that season itself to prevent the disruption in the normal working of circadian rhythm which occurs due to *Prakopa* state further. Hence the various regimens mentioned in our classics in each *Rutu* aims at preventing *Dosha Sanchaya* and pacifying

Sanchita Dosha. Accustoming ourselves to changes of each *Rutu* by following the regimens as mentioned in classics helps in maintaining proper functioning of internal clock leading to *Swasthya*.

Circadian rhythm involves not only the physiological rhythms but also the mental and behavioral changes. For this *Ayurveda* mentions the concept of *Sadvrutta*^[15], *Achara Rasayana*^[16] and *Dharaneeya Vega*.

It may not be out of place to state that *Ayurveda* has explained concepts like *Dinacharya*, *Rutucharya*, other lifestyle practices about *Nidra*, *Ahara Vidhi*, social conducts through *Sadvrutta* concepts, etc, all of which helps the human body to be in tune with the changes of his surrounding environment.

DISCUSSION

Circadian rhythm of *Tridosha* is *Shareera's* adaptation to the repeating patterns in nature. Infradian rhythms of *Tridosha* will start to mismatch to changing weather as global warming drives climate change. Ultradian rhythms of *Tridosha* have a deep evolutionary history. Changing diet and sleep patterns would disturb the *Doshic* rhythms and cause diseases. The biological rhythms of *Tridosha* orchestrate the physiological processes of *Shareera*. Understanding these rhythms could help us redesign public health to reduce the incidence of NCDs.

CONCLUSION

The biological rhythms of *Tridosha* help us adapt to the environment. *Ayurvedic* texts have used this understanding to devise daily and seasonal regimens that help us maintain the balance of *Tridosha* in response to the changing environment.

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Cite this article as:

Nishath M Ingalagi, Mahantesh R Sajjanashetty, G N Kannolli. Biological Rhythms- An Ayurvedic Perspective. AYUSHDHARA, 2022;9(1):63-67.

<https://doi.org/10.47070/ayushdhara.v9i1.905>

Source of support: Nil, Conflict of interest: None Declared

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