



A Scientific Exploration on Concept of Chronomedicine and Chronotherapy in Ayurveda

Sonam Agrawal, Vandana Verma* and Sangeeta Gehlot

Department of Kriya Sharir, Faculty of Ayurveda, Institute of Medical Sciences, Banaras Hindu University, Varanasi – 221005, Uttar Pradesh, India; cutesonam.agrawal@gmail.com, vanadana.verma04@gmail.com, sangeetagehlot@gmail.com

Abstract

Human physiology and pathophysiology of diseases have been proved to show rhythmic variation in response to temporal factors. This behavior is intertwined in field of clinical physiology in form of chronomedicine and chronotherapy for the better outcomes of treatment. *Ayurveda* scholars have also described rhythmic variation in biological entities like *Dosha*, *Agni*, *Bala*, presentation of diseases in relation to diurnal, meal intake and seasonal factors. They have well documented different domain of drug i.e. collection of drug, preparation of medicine, intervention of therapeutic procedures and administration of medicine in accordance to variation in biological entities and time. This article is aimed to summarize all these documented observations of *Ayurveda* regarding chronomedicine and chronotherapy and discuss in view of contemporary sciences, so that it can be utilized by the researchers of this field to generate evidence based data and may be applied by the physician for the better prognosis and management of the disease.

Keywords: Aushadha Kala, Dosha, Panchakarma, Meals, Seasons, Time Factor, Vyadhi

1. Introduction

Researches in the field of chronobiology have generated too many insights regarding the understanding of variations in physiologic responses in relation with temporal factors. These variations in physiologic responses of the body are now a day's utilized for the intervention of therapies and medicines to get their maximum effectiveness, which has evolved as a new branch of science in the form of chronomedicine and chronotherapy. Though, there are very early and ancient observations on the daily variation in physiological and pathophysiological functions (e.g. bronchial asthma), more detailed and scientific reports were not published until the beginning of the 17th century¹. Ancient *Ayurvedic* scholars have also documented temporal and environmental influence on human physiology i.e. rhythmic variations (diurnal and seasonal) in functioning of *Dosha* (biological entities

regulating physiology), *Agni* (responsible for digestion and metabolism), *Ojabala* (immunity) with respect to age, day, night and season². *Dosha* are responsible for the maintenance of normal physiology in the body but when get vitiated, they result in manifestation of various diseases. Due to rhythmic variation in functional state of these *Doshas*, the presentation of disease also varies and its intensity is more during the physiological dominant phase of the respective *Dosha*. Prescribing medicine at the time of their physiological dominant phase will cause pacification of vitiated *Dosha* more efficiently. *Agni*, a transforming agent is also not constant all the times in an individual, its functional state varies as per diurnal time, season and age leading to difference in rate of metabolism accordingly. Its strength is good during winter season and adulthood but gets gradually diminished after adulthood during old age and rainy season³. This variation in *Agnibala* occurs due to the seasonal variation in functioning

*Author for correspondence

of *Dosha* i.e. *Sanchaya*, *Prakopa* and *Prasara* phase of *Dosha*². Considering the variation in *Agnibala* (strength of digestion and metabolism), Ayurveda physicians have advised to take medicine and food as per *Agnibala* and *Dosha* for its proper metabolism and effectiveness. It has been also mentioned to take special precautions while prescribing medicine or therapeutic procedures to children, old aged people and pregnant women⁴.

Not only intervention of therapeutic procedures like *Panchakarma* (five procedures for purification of body) but diet and life style to balance the aggravated *Dosha* due to seasonal influences have been also mentioned under the concept of daily regimens (*Dincharya*) and seasonal regimens (*Ritucharya*) to maintain homeostasis and prevention of disorders. Disturbance in circadian rhythm is supposed to be a major contributing factor in manifestation of number of chronic metabolic diseases as well as early aging⁵. Thus it has become important to adopt appropriate measures to synchronize the functioning of central and peripheral clock. Various researches have reported that therapeutic interventions given in accordance to circadian rhythm are showing better response.

This article is aimed to summarize and interpret the literature related to chronomedicine and chronotherapy in Ayurveda scientifically. These explanations may serve as research question for the researchers in field of chronotherapy and chronomedicines to generate evidence based data which can be applied for the better prognosis and management of disorders.

2. Material and Methods

Ayurveda texts were screened for seasonal and diurnal variation in presentation of different diseases, administration of drugs in relation to meal, diurnal and seasonal time, seasonal therapeutic interventions etc. Electronic databases like PubMed, Medline plus, Science

direct were searched for the relevant matters by putting keywords chronomedicine, chronotherapy, *Ayurveda* etc.

3. Review and Discussion

3.1 Chronobiological Pattern of Disorders

Tridosha i.e. *Vata*, *Pitta* and *Kapha*, the primary biological entities are responsible for normal physiology in their balanced state as well as disorders in their imbalanced state. *Tridosha* follow the circadian rhythm in synchronization with environmental circadian rhythm to maintain the homeostasis for example, *Pitta* is dominant at the mid of the day and night, during the digestion of meal⁶. The presentations of diseases due to a particular *Dosha* are also more prominent during their physiological dominant phase. This variation in presentation of characteristics of *Doshika* disorders in relation to time is described under *Kalabalapravritavyadhi*. Thus time factor (*Kala*) i.e. day-night, food intake and season plays an important role in pathogenesis (*Samprapti*) of the diseases i.e. causation, manifestation, prognosis, alleviation and aggravation of disease⁷⁻⁸. The symptoms of some diseases get exacerbated at specific time. For example, symptoms of diseases due to vitiated *Vata Dosha* are dominant at the end of day and night, after the digestion of food, in old age and rainy seasons which are their physiological dominant phase (Table 1). It shows that chronobiological behavior of disorders also helps in their diagnosis. Recent studies have observed that serum level of certain biochemical parameters like morning elevated value of PAI-1 is associated with frequency of myocardial infarction in morning because of increased thrombosis in critical vessels⁹. Modern medicine researchers have also reported many diseases like myocardial infarction, bronchial asthma, allergic rhinitis, cancer, cardiovascular

Table 1. Disorders mentioned in Ayurveda that exhibit rhythmicity in their presentation

<i>Vataja Shotha</i> (~inflammatory oedema due to <i>Vata Dosha</i>) ¹¹	Aggravated during day.
<i>Kaphaja Shotha</i> (~inflammatory oedema due to <i>Kapha Dosha</i>) ¹²	Aggravated at night.
<i>Sangrahani</i> (~colitis) ¹³	Aggravated during day and relieved at night.

<i>Kaphaja Shula</i> (~pain associated to <i>Kapha Dosha</i> dominance) ¹⁴	Aggravated just after ingestion of food, sun rise, winter and spring season.
<i>Pittaja Shula</i> (~pain associated to <i>Pitta Dosha</i> dominance) ¹⁵	Aggravated at mid night, noon and during the digestion of food. Alleviates during cold season.
<i>Vataja Shula</i> (~pain associated to <i>Vata Dosha</i> dominance) ¹⁶	Aggravated after complete digestion of food, cold season and when there is clouds in sky.
<i>Vataja Shiroroga</i> ¹⁷	Intensity of headache is maximum at night.
<i>Pittaja Shiroroga</i> ¹⁸	Intensity of headache is alleviated at night.
<i>Suryavarta</i> (Headache at supraorbital region) ¹⁹	Headache starts with the sunrise, its intensity gradually increases with and maximum in mid noon, then its intensity diminishes gradually.
<i>Vataja Grahani</i> (~colitis due to <i>Vata Dosha</i>) ²⁰	Manifestation of <i>Aadhamana</i> after digestion of food which gets relieved after ingestion of food
<i>Kaphaja Grahani</i> (~colitis due to <i>Kapha Dosha</i>) ²¹	Aggravated just after meal.
<i>Parinam Shula</i> (~peptic ulcer) ²²	Aggravated during digestion of food and relieved after complete digestion or vomiting.
<i>Annadrava Shula</i> (~dyspepsia) ²³	Aggravated during any phase of digestion and gets relieved by vomiting.
<i>Vataja Gulma</i> (~abdominal distension due to <i>Vata Dosha</i>) ²⁴	Aggravated after digestion of food, gets relieved after food intake.
<i>Pittaja Gulma</i> (~abdominal distension due to <i>Pitta Dosha</i>) ²⁵	Aggravated during digestion of food.
<i>Annaja Hikka and Kshudra Hikka</i> (~type of Hiccup) ²⁶	Gets relieved after intake of food.
<i>Vyapeta Hikka</i> (~type of Hiccup) ²⁷	Gets aggravated after digestion of food.

diseases, osteoarthritis and peptic ulcer exhibit circadian rhythms in the aggravation of intensity of symptoms. The incidence of myocardial infarction mostly occurs between 6:00 a.m. and 12:00 noon, osteoarthritis at late afternoon and evening, rheumatoid arthritis and allergic arthritis at overnight and upon awakening, sickle cell anemia at mid-day, peptic ulcer and gout at night time. Acute myocardial infarction, stroke, hypertensive crisis intensified in morning whereas ischemic chest pain is more reflective during initial 3-4 hours of daytime and epileptic seizures manifest at night while subside at morning¹⁰.

3.2 Season and Proneness towards Diseases

Dosha, *Agnibala* (power of digestion and metabolism) and *Bala* (Immunity) follow the circadian rhythm along with the environmental cues and predominance of this biological entity vary in different seasons. Any change

in the normal seasonal property will desynchronize these rhythm upshots in manifestation of diseases. These diseases may be manifested either due to expression of over, under or abnormal characteristics of that season or in normal seasons too (diseases related to physiological dominant *Dosha*)²⁸. Disorders due to *Vata*, *Pitta* and *Kapha Dosha* get aggravated during rainy, autumn and winter season respectively (Table 2). For pacification of these *Dosha* Ayurveda has advised seasonal *Panchakarma* during their aggravated (*Prakopa*) state²⁹. The seasonal variations produce changes in properties of *Dosha* and the rhythmic functional expression of *Dosha* property can be understood as a genetic adaptation of an organism to the rhythmic seasonal changes in the environment. The same external environmental changes do not produce the identical response in all human beings, since every individual have a particular type of psychosomatic constitution (*Prakriti*) having the inherent dominance of one or two *Dosha*².

Table 2. Chronobiological behavior of diseases as per season

Disease	Season
<i>Vataja Roga</i> ³⁰	Rainy season (<i>Varsha Ritu</i>).
<i>Pittaja Roga</i> ³¹	Autumn season (<i>Sharad Ritu</i>).
<i>Kaphaja Roga</i> ³²	Spring season (<i>Vasanta Ritu</i>).
<i>Raktaja Roga</i> ³¹	Autumn season (<i>Sharad Ritu</i>).
<i>Udarda</i> (~Urticaria) ³³	Aggravated during late winter (<i>Shishira Ritu</i>).
<i>Tamaka Shvasa</i> (~bronchial asthma) ³⁴	Aggravated when clouds appear in the sky, eastern wind.
<i>Raktapitta</i> (~bleeding disorders) ³⁵	Easily curable in late winter (<i>Shishira Ritu</i>).
<i>Vataja and Kaphaja Arsha</i> ³⁶⁻³⁷	Winter seasons (<i>Sheetakala</i>).
<i>Pittaja Arsha</i> ³⁸	Summer season (<i>Ushnakala</i>).
<i>Agnimandya</i> (state of weak digestion and metabolism) ³⁹	Unsuitable place (<i>Desha</i>) season and time.

3.3 Consideration of Time Factor in Prognosis of Disease

Manifestation of diseases also depends upon the time factor in the similar fashion as seeds in soil are sprouted after rain in *Sharad Ritu*, it means etiopathogenesis of disease is based on favorable environmental conditions⁴⁰. It is also one of the factor for deciding the prognosis of diseases. Diseases having the same *Dosha*, *Dushya*, *Kala* and *Desha* are having bad prognosis and vice versa⁴¹⁻⁴². For example

- *Kaphaja* fever manifesting in spring season is easy to cure⁴³.
- *Raktaja Gulma* is curable after 9 months of manifestation of symptoms⁴⁴.
- *Ardita* (~facial paralysis) is incurable if persists for three years and accompanies with shaking of head⁴⁵.
- *Shleepada* (~Elephantiasis) and *Shvitra* (vitiligo) of more than 1 year cannot be treated⁴⁶.
- *Galganda* (~goiter) is incurable within one year⁴⁷.

3.4 Consideration of Time Factor in Management of Diseases

Physiological processes like metabolism are not constant in whole day and will also affect the pharmacokinetic and pharmacodynamic behavior of the drugs, so to maximize the effectiveness of the drug one should follow the circadian rhythm for the management of disease. This behavior of drugs is studied under chronopharmacology and chronopharmacokinetics. Chronopharmacology is the investigative science that elucidates the biological rhythm dependencies of medications. Studies elucidating the chronopharmacological behavior of drug have explained that pharmacokinetics of drug are affected by time of administration of any drug⁴⁸.

3.5 Time Factor and Pharmacological Property of Ayurvedic Drugs

The quality of *Ayurvedic* drug also depends on the time/season on which they are procured because of complete attainment of their taste (*Rasa*), smell, color, touch, specific action (*Veerya*) (Table 3). So, it is advised to collect the drug on particular time when it contains maximum amount of active ingredients, so that, it will show its maximum pharmaceutical effect. For the collection of drugs like *Randia spinosa* (*Madanphala*) has been recommended to collect when moon is in constellation of *Pushya*, *Ashvini* or *Mrigshira* in *Maitramuhurta* in middle of spring and summer season⁴⁹. Different parts of plant have been recommended to collect in different seasons⁵⁰. Ming-Chih-Shih et al (2011) have observed difference in composition of various chemical compounds in different part of *Moringa oleifera* (*Shigru*) in summer and winter season. These descriptions refer that different plants should be collected in a particular seasons to gain its maximum therapeutic effect⁵¹.

3.6 Chronotherapy

Chronotherapy involves the administration of medication in coordination with the circadian rhythms of the body to maximize therapeutic effectiveness and minimize/avoid adverse effects. Pulsatile drug delivery is one such system that, by delivering a drug at right time, right place and in right amounts, holds good promises of benefit to the patients suffering from chronic problems like arthritis, asthma, hypertension etc.

Table 3. Parts of medicinal plants to be procured in different seasons

Parts of plant	Season in which they should be collected
Fresh branches and tender	Rainy and spring season.
Root	Summer or in late winter when the leaves are ripened.
Bark, rhizome and latex	Early winter.
Flower and fruits	Appropriate season when they appear.

Extended release and immediate release formulations are not efficient in treating the diseases especially showing chronological pathophysiology, for which, pulsatile drug delivery is beneficial⁵². It is also suggested that morning administration of omeprazole is preferable for patients with reflux resulting from physical activity, whereas patient with nocturnal reflux prefer evening administration. The combination of amlodipine/hydrochlorothiazide, amlodipine/olmesartan and amlodipine/valsartan showed higher effectiveness for bedtime than morning administration⁵³.

3.7 Ayurveda Descriptions on Consideration of Time Factor in Drug Administration

Ayurveda classics have well described the variation in presentation of disease in accordance with day, night, seasons and meal time to get the maximum effectiveness of drug. Similarly for the selection of a right drug, not only the strength of disease and patient, age, constitution (*Prakriti*), psychological aspect (*Satva*), digestive capacity (*Agni*), accustoms of patient (*Satmya*), involved *Dosha* and *Dushya* have been considered but also the time of administration of drug has been also taken in to consideration⁵⁴. “*Na Kevalam Vyadhyaturabalameva Bheshajayogytamapadyati Yaavata Kaloapi Bheshajayogytamutpadyati*”⁵⁵. Drug or food article given at different time has different effect for example: Milk taken in morning is strengthening (*Balya*), nourishing (*Brihana*) and appetizing (*Agnivardhaka*), if taken in the noon it enhances strength (*Balya*), cures dysuria (*Mutrakrichha*) and stones (*Ashmari*) while if taken at

night it pacifies various *Dosha*⁵⁶. Similarly sugarcane if taken before meal alleviates *Pitta* while if taken after meal aggravates *Pitta* and on intake in between meals delays its digestion (*Guru*)⁵⁷. The same drug if taken at different time in relation to meal cures the different diseases for example *Triphala Modaka* is given before the meal, in between the meal and after the meal in diseases of lower extremities, abdomen and in diseases of head and neck respectively⁵⁸. Moreover it has been also described that the diseases occurring due to effect of time should be treated even before the onset of symptoms of diseases⁵⁹. These observations of Ayurveda physician can be seen in case of administration of hypolipidemic drug in evening which is more effective than morning. These drugs inhibit the synthesis of cholesterol by inhibiting the activity of enzyme (HMG-CoA) which is maximum at night thus breaking the pathogenesis of disease even before it is formed⁶⁰.

3.8 Administration of Drug in Relation to Meal Time

These timings of drug intake are associated with the maximum activity time of that *Dosha* from the vitiation of which the disease have manifested for example, in diseases produced due to vitiation of *Samana Vata* like *Gulma* (abdominal distension), diarrhea; indigestion drugs are taken in between the meals and in diseases like fever, bleeding disorders, diarrhea due to vitiation of *Vyana Vata* is taken after morning meal, while in *Udana Vata* associated diseases involving eye, ear, nose, head drug is taken after evening meal. In diseases produced by derangement of *Apana Vata* like difficulty in micturition, constipation, bladder calculus, piles, fistula, diabetes (*Prameha*) drug should be taken before the ingestion of meal. These timings are the time of maximum activity of *Dosha*, intake of medicine at that time will have better pacification effect on them^{61,62}.

These deceptions might be also indicating towards possibilities of food drug interaction. Some might be, to avoid any food drug interaction and some might be, to enhance the effectiveness of drug. For example, the *Rasayan* drug for rejuvenating effect on whole body should be taken on empty stomach to avoid any food interaction and for better absorption. The *Deepana Pachana* medicines like *Hingwashtaka Churna* has been advised to take with the first bolus as it is well known

that secretion of digestive juices starts as soon as the first bolus is taken and this way of medicine intake might be enhancing the qualitative and quantitative digestive secretions. Although this is still an area of research and needs to be tested in an experimental model.

3.9 Ten Timings for Administration of Drug (Dash Aushadha Kala)

Ten different timings for drug intake have been described in relation to food intake.

3.9.1 Abhakta (Empty Stomach)

When only medicine is given or is given at *Abhakta Kala* i.e. on empty stomach before taking any food. It has so powerful in action that it definitely cures the diseases. It should be given when the *Kapha* has been moved out from the stomach⁶³. Old individuals, women and individuals having delicate body should not be given drug on empty stomach as this may cause exhaustion and decreased strength⁶⁴.

3.9.2 Pragbhakta (Just Before Meal)

Medicines given just before the meal are digested quickly, do not harm the strength of the body and do not cause nausea and vomiting as being enclosed by food. Thus old aged, children, women, fearful and emaciated person should be advised to take medicine at this time⁶⁵. It is beneficial in diseases caused by *Apana Vata*, disease of lower extremities, for strengthening (*Balavardhana*) the body and thinning of the body (*Krishikarnarth*)⁶⁶.

3.9.3 Madhyabhakta (In Mid of Meal)

Medicine administered in mid of meal i.e. drug is given after half of the meal is taken then remaining half meal is given. It cures the diseases of upper and middle part of body and bestows the strength⁶⁷ and useful in diseases caused by *Samana Vata*, in *Pittaja* and GIT (*Koshtha*) diseases⁶⁸.

3.9.4 Adhobhakta (Just After Meal)

Medicine is given after morning meal in disorders of *Vyana Vata* and after evening meal in disorders of *Udana Vata*. It is useful in curing the disease of *Shleshma*, strengthening the upper part of the body and for stoutness/plumpness (*Sthulikarnarth*) of the body⁶⁹.

Rasendra Gutika or *Vrihadarasendragutika*, if given after the digestion of meal, cures anorexia (*Arochaka*), cough (*Kasa*), emaciation (*Kshaya*)⁷⁰⁻⁷¹. Administration of *Mahashankhavati* at the end of meal augments *Agni* and cures incurable hemorrhoids (*Arsha*) and IBS (*Sangrahani*)⁷².

3.9.5 Antarabhakta (In Between Meals)

Medicine is taken after the digestion of previous meal and after the digestion of medicine next meal is taken. Medicine is taken at afternoon after the digestion of morning meal, and at evening after the digestion of mid-day meal⁷³. It is useful in individuals having strong digestive power and disorders of *Vyana Vata*.

3.9.6 Sabhakta (Mixed with Food)

It is suitable for women, weak person, old people and children and one who dislikes the medicine, have loss of appetite, suffering from the disorders affecting the whole body⁷⁴⁻⁷⁵. For example *Drakshaadighritam* is given with meal to cure dyspepsia (*Amlapitta*)⁷⁶.

3.9.7 Samudga (Just Before and After Meal)

Medicine is given twice i.e. just before and after meal. Food should be less in quantity and easily digestible (*Laghu*). Medicine in the form of powder (*Churna*), *Avaleha* and having *Pachana* property can be given. It alleviates the *Dosha* involving whole body, tremors, convulsion⁷⁷⁻⁷⁸.

3.9.8 Muhurmuhu (Repeated Intake of Medicine)

Repeated intake of medicine is advised in hiccup, *Kasa*, *Shvasha*, *Trishna*, *Chhardi* and *Visha*⁷⁹⁻⁸⁰.

3.9.9 Grasa

Medicine is taken only once with the first bite. *Deepaniya* and *Vaajikarana Aushadhi* or medicine in form of *Churna*, *Vataka*, *Avaleha* is given through this⁸¹. For example, *Hingwashtaka Churna* given with the first bolus causes augmentation of digestive power (*Agni*)⁸².

3.9.10 Grasaantara (Taken After Every Bolus)

It is especially beneficial for *Hridaroga*, *Grasa* and *Grasantara*, both types are especially beneficial for

diseases of *Prana Vata* like hiccup, dyspnea and cough⁸².

3.9.11 Nishi (At Night)

Medicine at night is suitable for administration of emetics (*Vaman Aushadhi*) and medicated smoke (*Dhuma*) in disorders of head and neck (parts above clavicle)⁸³. Some drugs like *Mashaadi Modaka* with cow milk on giving at night enhance the aphrodisiac action⁸⁴.

3.10 Relation of Food Intake and Time

Food should be taken at proper time. Intake of food at proper time is one of the best ways to achieve health⁸⁵. *Aardraka* (*Zingiber officinalis*) and salt if taken before meal enhances appetite (*Agni*) and cleans throat and tongue. Sweet substances should be taken at starting of meal, sour and salty substances in mid of meal while bitter, pungent and astringent one should be taken at the end of meal. Fruits like pomegranate (*Dadima*) should be taken before meal but not banana, cucumber⁸⁶. Curd should not be taken at night and if taken it should be with ghee, sugar, green gram soup, honey or *Emblica officinalis*. If these rules are not followed may lead to various diseases⁸⁷.

3.11 Administration of Drug in accordance with Season

Some drugs are recommended in a particular season or same medicine is advised with different *Anupana*. For example, *Chandrakala Rasa* which is one of the best medicines to cure *Pittaja* and *Vata-Pitta* disorders is especially recommended in summer (*Greeshma*) and autumn (*Sharad*) seasons⁸⁸. Intake of *Hamsodaka* (water which is purified by the rays of the sun and the moon) and moon light in evening has been recommended during the autumn⁸⁹.

Terminalia chebula (*Haritaki*) is advised to be taken in different season with different *Anupana* (after drink) and this method of giving *Terminalia chebula* is described as *Ritu Haritaki* (seasonal use of *Terminalia chebula*). It should be taken with salt (*Saindhava lavana*) in rainy season, with sugar in autumn, with *Zingiber officinalis* (ginger) in early winter, with *Piper longum* in late winter, with honey in spring season and with jiggery in summer⁹⁰.

3.12 Consideration of Time in Application of Therapeutic Procedures

While prescribing the medicine the circadian and infradian rhythm of *Dosha*, season as well as disorders should be considered in administration of various therapeutic procedures like *Panchakarma*, cauterization (*Agni karma*), inhalation of medicated fumes (*Dhumpana*). *Panchakarma* procedures are performed during the physiological dominant phase of respective *Dosha* for its proper elimination. Emetic procedure (*Vamana Karma*) is advised to be done at early morning which is the physiological dominant phase of *Kapha Dosha*⁹¹. Similarly for the *Snehan Karma* *Sneha Dravya* (unctuous substances) are chosen as per season. For example, *Ghee* should be taken in autumn, oil during rainy season and *Majja* and *Vasa* in spring⁹². Again timings of these *Panchakarma* procedures also vary in accordance to type of diseases and season. *Anuvasana Basti* (enema containing unctuous medicines) should be given during day time in winter and spring season while it should be given at night in autumn and summer season⁹³. *Snehapana* (oral intake of medicated oil, ghee) in improper time results in causation of disease⁹⁴. Hence it is advised to take *Snehapana* at night during summer and at day time during the cold season⁹⁵. The quality of therapy depends upon the seasonal effects too, during cold season *Ushna* therapies are given and vice versa⁹⁶. (Table 4) For *Rasayana Chikitsa* (Rejuvenating therapy) like *Kutipravesika Rasayana* (rejuvenation), the person should enter the cottage (*Kuti*) on auspicious constellation and in favorable *Muhurta* and *Karana*⁹⁷.

Table 4. Seasonal indications/contraindications of therapeutic procedures (*Panchkarma*)

Therapeutic Procedures (<i>Panchakarma</i>)	Seasonal indications/contraindications
<i>Agni Karma</i> ⁹⁸	Contraindicated during autumn (<i>Sharad</i>) and summer (<i>Greeshma</i>) seasons, if emergency they should be given with appropriate counter methods.
<i>Nasya</i> (nasal drops) by Anu Taila ⁹⁹	Indicated in rainy, autumn and spring season when sky is free from cloud.
<i>Raktamokshana</i> ¹⁰⁰	Indicated in <i>Sharad Ritu</i> .

<i>Snehaika Dhumpana</i> ¹⁰¹	Indicated in <i>Kapha</i> aggravating <i>Kala</i> .
<i>Virechanic Dhumpana</i> ¹⁰¹	Indicated in <i>Pitta</i> aggravating <i>Kala</i> .
<i>Anuvasana Basti</i> (enema containing unctuous medicines)	To be given during day time in winter and spring season while it should be given at night in autumn and summer season.
<i>Snehapana</i> ⁹⁵	Given at night during summer and at day time during the cold season.
<i>Nasya</i> ¹⁰²	It should be given in forenoon in person with <i>Shleshmaroga</i> , in <i>Pittaja Roga</i> in mid-day and in <i>Vataja Roga</i> in afternoon.

4. Conclusion

Disturbance in circadian rhythm of human physiology has become one of the leading factors for the manifestation of diseases especially the metabolic syndromes. Evidence based researches in animal and human models, systematic reviews have proven that metabolism rate too shows rhythmic variation thus causing difference in metabolism of drug and food. This has been utilized for the therapeutic interventions for the maximum effectiveness. Ayurveda scholars have also documented variation in physiology and pathophysiology factors along with therapeutic interventions and procedure in accordance to circadian rhythm for the maximum effectiveness and to minimize the side effects. All these explanations starting from presentation of diseases, collection and preparation of drugs, timing of drug intake could be taken as research question to carry out evidence based researches, so that it can be utilized in public domain for better health outcomes and improving quality of life which is one of the major areas of concern for us.

5. Declaration

Authors have no conflict of Interest.

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