



REVIEW ARTICLE

Importance of Good Quality Sleep to Combat Stress Caused by Covid19 Pandemic

Author: Nisha Garg¹

Co Authors: Srikant Kumar Panda²

^{1,2}Department of *Kriya Sharir*, Ayurveda and Unani Tibbia College and Hospital, New Delhi, India

ABSTRACT

Sleep is a non-negotiable biological necessity. It is one of our foremost life support system of body. But unfortunately, quality of sleep is being deteriorating day by day in our society due to increasing stress. Currently fear psychosis of death caused by Covid19 Pandemic in our country even in the whole world is the most important one. Deterioration of sleep quality is also impacting overall status of human health even affecting the emotional status of the individual.

The anxiety and tensions that occurs due to Covid 19 pandemic deaths and the spreading of infection is more grievous. So to tackle this problem one must have to acquire psychological immunity by boosting *Sattva* qualities like proper diet, good quality sleep, *achara rasayana*, meditation and *pranayama* etc.

There is a strong regulatory impact of sleep and circadian system on immune functions. The inimical effects of prolonged sleep loss on immune functions shows the necessity of good quality proper sleep for maintaining our general health and homeostasis. The immune system has ability to protect us from viruses and diseases by producing antibodies to kill these pathogens. This review represents a brief overview of advantages of good quality sleep and how it contributes to the physical & psychological immune system to protect the human body from stress due to COVID-19. As there is no absolutely successful medicament against COVID-19 till date, the immune system is the best defence to combat stress as it supports the body's natural ability to defend against pathogenic organism (e.g., viruses, bacteria, fungi, protozoan, and worms) and also defend the negative feelings for which good quality sleep is indispensable.

Key Words *Sleep, Nidra, Covid 19, Immunity, Good Quality*

Received 20th April 21 Accepted 14th May 21 Published 10th July 2021

INTRODUCTION

With stress, grief and anxiety due to COVID-19 infection and its impact on daily life, people are reporting more sleep problems than ever before. Brought on by the stress of living in a global pandemic, sleep experts have labelled these sleep problems “coronasomnia” a portmanteau word of

coronavirus and insomnia. Coronasomnia is a new term that refers to sleep problems related to the pandemic¹.

Sleep is a physiological process by which bodily functions are rested periodically. During sleep, consciousness and power of will are partially or



REVIEW ARTICLE

completely suspended and bodily activity generally is greatly reduced².

Ayurveda emphasizes three supporting pillars of the body, *Aahara* (proper diet), *Nidra* (proper sleep) and *Brhamcharya* (celibacy/control of senses)³. The inclusion of *Nidra* in the three *Upastambha* proves its importance. *Acharya Charaka* explained that when the mind as well as soul gets exhausted or becomes inactive the sensory and motor organs become inactive then the individual gets asleep⁴. Here, sleep is directly connected with mental state. Sleep occurs when the *Hridaya* – the seat of *Chetna* is covered by *Tama*⁵. Predominance of *tamo guna* in individuals causes them to sleep during day and night. *Nidra* can come at any time without *niyama* in people having *rajah* predominance. Sleep among the *sattva* predominant humans comes in *ardharaatri*⁶.

Acharya Charaka arranged the sleep condition into six categories⁷:

- 1) Caused by *Tamas*
- 2) Caused by *Kapha* (vitiated)
- 3) Caused by *Manasika* and *Sharirika Shrama*
- 4) *Agantuki* – indicative of bad prognosis leading to imminent death.
- 5) Caused due to complication of any disease like *Sannipata-jwara* etc.
- 6) *Ratriswabhaavaprbhavaa* i.e. caused by very nature of night.

Acharya Sushruta described three types of *nidra*⁶:

- 1) *Vaishnavi* or *Svabhaviki*
- 2) *Tamasi*
- 3) *Vaikariki*

Each night, a person goes through stages of two major types of sleep that alternate with each other.

These types are⁸:

- 1) Rapid eye movement sleep (REM sleep), in which the eyes undergoes Rapid movements despite the fact that the person is still asleep.
- 2) Slow-wave sleep or non – REM (NREM) sleep, in which the brain waves are strong and of low frequency.

Sleep Requirement⁹:

Sleep requirement is not constant. However, at different age group average sleep requirement per day must be:

1. Newborn infants: 18 to 20 hrs
2. Growing children: 12 to 14hrs
3. Adults : 7 to 9 hrs
4. Old persons : 5 to 7 hours

ADVANTAGES OF GOOD QUALITY SLEEP

Data shows that around four out of ten people¹⁰ have reported trouble sleeping during this pandemic.

By the wisdom of well regulated support of the three pillars i.e. *aahara*, *nidra* and *brhamcharya*, one can get body with good complexion, proper growth, strength and this continues throughout the life, provided person does not get involved in activities which are deleterious to health³. It is said that in human beings, happiness & misery, nourishment & emaciation, strength & weakness, fertility & infertility, knowledge & ignorance and life & death depends upon proper and improper sleep. Sleep is associated with equilibrium of



REVIEW ARTICLE

dhatus and maintenance of strength that nourishes the body parts and ensures longevity¹¹.

Various studies suggested that sleep is essential for maintaining metabolic-caloric balance, thermal equilibrium, and immune competence¹².

Just as the diet taken is beneficial for the body and maintains its health, in the same way, by sleeping in a normal manner, a person remains healthy and happy. The body's grossness and leanness, especially depends upon sleep and diet¹³.

According to Repair and Restoration theory, sleep is necessary for revitalizing and restoration of physiological processes that keeps the body & mind healthy and functioning properly. This theory also indicates that NREM sleep is essential for repairing the damaged tissues and for restoring physiological functions and REM sleep is necessary for restoring mental functions.

When the person enters deep sleep, it is difficult to wake up. These stages of sleep help rejuvenation of the body. There is release of many vital hormones which induce growth and development as a result immune system is boosted. Muscle and tissues are repaired. Body builds up energy for the next day working¹⁴.

Acharya Sushruta told *nidra* as *vaishnavi*⁶. Just as lord Vishnu is the basis and provides nutrition to the world, similarly good quality sleep is also responsible for providing nutrition and boosting the different system of the body and also serves as one of the three pillars that support the human body as a whole. *Ratri swabhava prabhva* is one among the six types of *nidra* mentioned in *charak samhita* in which healthy humans fall asleep in

night naturally. It is considered as *Bhutadhatri* (*Bhuta* means that have the existence and *dhatri* means to nurse), that means the one who nurtures the whole body⁷.

As, during period of *visargakala*, moon remains strong and continues to satisfy the world by spreading its rays across the globe¹⁵, so as during night energy boosts due to the effect of moon. During sleep, BP, heart rate and respiration decrease, this indicates that slow wave sleep may serve as a period of the body of rest and metabolic restoration¹⁶.

All major physiological systems are influenced by sleep. Endocrine function also varies with sleep. Slow wave sleep is associated with secretion of GH, while sleep in general is associated with augmented secretion of prolactin. Sleep has a complex effect on the secretion of LH. Sleep onset is associated with inhibition of TSH and of the ACTH cortisol axis. Glucocorticoid suppresses the body's immune system by decreasing the number of circulating T-lymphocytes which is done by suppressing T cells's proliferation as well as the lymphoid tissues. Glucocorticoid also prevents the release of IL-2 by T cells. Thus, hypersecretion or excess use of glucocorticoids decrease the immune reactions against foreign bodies entering the body that can leads to severe infection causing death¹⁷.

Serum concentrations of IL-7, that supports T cell growth as well as differentiation of memory T cells, was found to be enhanced during sleep, especially during the late period of the night¹⁸.



REVIEW ARTICLE

Sleep strongly enhanced the concentrations of the soluble IL-6 receptor when compared with continuous wakefulness, whereas the membrane-bound IL-6 receptor remained uninfluenced¹⁹.

A good night's sleep empowers an effective immune system by strengthening body's defences¹.

According to a study being published in the Journal of Experimental Medicine, a good night's sleep can help the T cells function better. T cells are responsible for killing infected cells in the body and regulating the immune response. Studies have also found that people who sleep better have better immune responses than people who do not get enough sleep.

In experimental animals, appropriate sleep is essential for learning and also for memory consolidation. Learning sessions do not improve performance until a period of slow-wave or slow wave plus REM sleep has occurred²⁰.

While comparing the immune and the central nervous system, we can see that both systems share a basic feature, i.e. they both respond to external stimuli and generate memory in a multistep process that involves cell to cell contact(synapses)²¹. The different stages of memory operations in the CNS are usually divided into an encoding phase, a consolidation phase and a recall phase. The stage in which the information is transferred from a short term to a long-term store is consolidation phase. This division might in its basic features also similar for the various stages of immunological memory: According to this postulation, the encoding phase would in the

immunological context being represented by the uptake of the antigen(the information which is to be sustained) by APC. The consolidation phase, in which, in the CNS, the information of the newly encoded memory is transferred from its temporary storage site to neuronal networks serving as long-term store, might be represented by the formation of the 'immunological synapse' between APC and T cell²²⁻²³, in the course of which the antigenic information is forwarded from a short-term (APC) to a long-term (T cell) store.

Sleep deprivation increases the levels of many inflammatory mediators, and infections in turn affect the amount and patterns of sleep²⁴.

HOW TO PROMOTE GOOD QUALITY SLEEP?

The way to overcome sleep issues and to having good quality sleep needs to maintain proper sleep hygiene.

An individual should fall asleep when his mind including the sensory and motor organs get exhausted and they detach themselves from their objectives⁴. Sleep is more likely when the subject is tired even though the surroundings themselves do not predispose to sleep².

1. *One should sleep on comfortable bed and house and getting habituated to sleeping at a particular time²⁵ as soon as possible within 10am to 11pm.*

Suprachiasmatic nucleus of hypothalamus plays a major role in setting the biological clock i.e. hypothetical internal clock, by its connection with retina via retinohypothalamic fibres. Through the efferent fibres it sends circadian signals to



REVIEW ARTICLE

different parts and maintains the circadian rhythm of sleep, hormone secretion, thirst and hunger, appetite etc²⁶.

2. *Sleeping in the appropriate direction is very important.*

It is must that you should not sleep with your head pointing towards north, at any cost. Magnetic fields on the Earth are concentrated in the North and the South Pole. Our body's magnetic field interferes with that of earth while sleeping with head towards north. This can alter your blood pressure and can even cause heart problems. Our heart needs to work harder to overcome this. If you are elderly or already a heart patient, then you might be at a higher risk of getting a haemorrhage or paralytic stroke. One more reason is that our blood contains a lot of iron. When we sleep facing north, the magnetic pull of the direction attracts iron, which can accumulate in the brain. Blood circulation can be disrupted while sleeping with your head pointing towards north and can also lead to disturbed sleep. The most ideal directions for sleeping are East and South directions. Sleeping with your head facing towards South may help in reversing the negative effects of North direction²⁷.

3. *For a good quality sleep, one should apply measures such as- body massage, unction, bath, intake of soup made up of meat of domestic, marshy and/or aquatic animals, shali rice with curd, milk, fat, wine, mental pleasure, pleasant smell and sound, application of soothing lepa to head and face²⁵.*

These measures cause induction of sleep. Blood circulation improves, when massage being done in

specific direction. It also facilitates in removal of the toxins from the tissues, relieves physical and mental fatigue, improves the functioning of musculoskeletal system, reduce stiffness and heaviness of the body and leads to feeling of lightness²⁸ that will definitely lead to sleep.

4. *Applying oil on the scalp brings good sleep²⁹.*

Through touch, massage works on the nervous system and influence the circulation of growth hormones²⁸.

Acharya Charaka metaphor the human body as a wooden wheel which by lubricating with oil become firm and much stronger, so does the human body on proper application with oil, the skin becomes beautiful, *vata* disorders are relieved and tolerance to hardship and physical strain is enhanced preventing the wear and tear or we can say prevents the degenerative changes of the body³⁰. *Anidra* is due to *vata* predominance which can be relieved by using oil which helps to pacify *vata*.

Serotonin is considered as a primary sleep promoting neurotransmitter while catecholamines were noted to be responsible for wakefulness. Various sleep promoting substances have been identified; these include PGD₂, Delta sleep inducing peptide, muramyl dipeptide, IL-1, fatty acid primary amides and melatonin. Many putative "sleep factors", including IL1 and prostaglandinD₂ are immunological active, suggesting a link between immune function and sleep wake states³¹.



REVIEW ARTICLE

Measures which are stated above help to produce melatonin and other sleep producing biochemicals, which ultimately produce sleep.

5. *Should have a habit of taking milk at night.*

Milk contains several compounds, specifically tryptophan and melatonin known to maintain healthy sleep cycles. Tryptophan is an amino acid which plays an important role in the production of the neurotransmitter known as serotonin³². Serotonin augment mood, foster relaxation, and functions as a precursor in the production of the sleep hormone melatonin which helps in regulating our circadian rhythm and thus prepare our body for entering a sleep cycle³³. Also, the psychological effects of a bedtime routine that includes milk may improve your ability to fall asleep.

6. *One should not take curd and satttu at night³⁴.*

Persons having digestion issues such as acidity, indigestion should avoid curd during night as it can cause constipation when the system is sluggish and sleep ready³⁵.

7. One, who has as much sleep as appropriate, should take as much sleep as possible in the night. If any person is not used to night awakening and has to wake up at night, then he should sleep half the time in the morning without having food³⁶.

8. *Avoiding negative thoughts in the mind.*

There is significant association between negative mood, rumination and subjective sleep quality.

9. One should not stay for long in the temples, sacred places, raised platforms, cross roads, gardens, cremative grounds and places of

execution during nights and should not enter a deserted house or forests alone³⁷.

10. *One should not indulge in undue courage or excessive sleep and night awakening³⁷.*

Staying awake for long at night causes aggravation of *vata* which causes roughness in the body³⁸.

11. One should not wonder in night³⁹.

RESULTS AND DISCUSSION

COVID 19 has changed our life style. For controlling spread of covid19 infection certain measures are mandatory, such as social distancing which is mandatory for reducing the spread, but this can make us feel isolated as well as lonely that can increase stress and anxiety. There is increasing level of anxiety in people in this covid 19 pandemic period which is causing restlessness among them and resulting in poor sleep and causing their immunity depressed.

Poor sleep quality not only contributes to an increase in inflammatory markers but also to deficiency in immune response. In short, recurrent or chronic sleep deprivation can be associated with an unspecific state of chronic stress, which definitely impacts immune functions and our general health. The detrimental effects of chronic sleep deprivation comprises an enhanced risk for various diseases as a result of a persistent low-grade systemic inflammation on the one hand, and also manifests immunodeficiency characterised by an increased vulnerability to infections.

Prolonged sleep restriction and the resulting stress response promote a persistent unspecific



REVIEW ARTICLE

production of pro-inflammatory cytokines, that can be best described as chronic low-grade inflammation, and also produce immunodeficiency, both having detrimental effects on health.

Sleep, unfortunately, is not an optional lifestyle luxury. Sleep is affected by our physical as well as mental health and health is very much affected by sleep quality and duration, they both are interconnected. Sleep quality and duration should be optimum to obtain a good health and for maintaining physiology and thus for a better life.

CONCLUSION

There is a significant interdependence between good quality sleep and human physiology. In general, as good your sleep quality, as good your life will be. That's why it's better to prevent ourselves from any kind of ailment by adopting proper sleep hygiene and taking good sleep which definitely makes us strong to combat this Covid19 pandemic stress and leading long life, As it is stated that "*Jeevem Shardi Shatam*".



REVIEW ARTICLE

REFERENCES

1. Shah, S. (2021, May 13). How to overcome COVID- induced insomnia. *Delhi Times*, page no.1.
2. A K Jain, Textbook of Physiology vol.2, 5th edition, Avichal publishing company, 2013, page 1017.
3. Agnivesha, Charaka, Dridhabala, Charaka Samhita, Sutra Sthana, Tisreshniya adhyaya. In: 11/35. Commentary by Kashinatha pandey, gaurakhnath chaturvedi, editor. Varanasi: Chaukhambha bharti Academy; 2014. p. 227.
4. Agnivesha, Charaka, Dridhabala, Charaka Samhita, Sutra Sthana, Ashtaunindatiya adhyaya. In: 21/35. Commentary by Kashinatha pandey, gaurakhnath chsturvedi, editor. Varanasi: Chaukhambha bharti Academy; 2014. p. 416.
5. Sushruta Samhita of Sushruta edited with Ayurveda Tatva Sandipika Hindi Commentary by Acharya Ambika Datta Shastri, Sharira Sthana, chapter 4, verse no.33, edition, reprint 2017, Varanasi: Chowkhambha Sanskrit Sansthan;; p.44.
6. Sushruta Samhita of Sushruta edited with Ayurveda Tatva Sandipika Hindi Commentary by Acharya Ambika Datta Shastri, Sharira Sthana, chapter 4, verse no.32, edition, reprint 2017, Varanasi: Chowkhambha Sanskrit Sansthan;; p.44
7. Agnivesha, Charaka, Dridhabala, Charaka Samhita, Sutra Sthana, Ashtaunindatiya adhyaya. In: 21/58. Commentary by Kashinatha pandey, gaurakhnath chsturvedi, editor. Varanasi: Chaukhambha bharti Academy; 2014. p. 422.
8. Hall, J. E. (2015). *Guyton and hall textbook of medical physiology* (13th ed.). W B Saunders.
9. K Sembulingam, Prema Sembulingam, Essentials of Medical Physiology, 8th edition, Jaypee Brothers Medical Publishers, 2021, page 1004.
10. Jahrami, H., BaHammam, A. S., Bragazzi, N. L., Saif, Z., Faris, M., & Vitiello, M. V. (2021). Sleep problems during the COVID-19 pandemic by population: a systematic review and meta-analysis. *Journal of clinical sleep medicine: JCSM: official publication of the American Academy of Sleep Medicine*, 17(2), 299–313.
11. Agnivesha, Charaka, Dridhabala, Charaka Samhita, Sutra Sthana, Ashtaunindatiya adhyaya. In: 21/42. Commentary by Kashinatha pandey, gaurakhnath chsturvedi, editor. Varanasi: Chaukhambha bharti Academy; 2014. p. 419
12. Kim E. Barrett, Susan M. Barman, Scott Boitano, Heddwen L. Brooks; Ganongs Review Of Medical Physiology, Mc Grew Hill; P.275
13. Agnivesha, Charaka, Dridhabala, Charaka Samhita, Sutra Sthana, Ashtaunindatiya adhyaya. In: 21/51. Commentary by Kashinatha pandey, gaurakhnath chsturvedi, editor. Varanasi: Chaukhambha bharti Academy; 2014. p. 420.
14. K Sembulingam, Prema Sembulingam, Essentials of Medical Physiology, 8th edition, Jaypee Brothers Medical Publishers, 2021, page 1007.
15. Agnivesha, Charaka, Dridhabala, Charaka Samhita, Sutra Sthana, Tasyaashitiya adhyaya. In: 6/4. Commentary by Kashinatha



REVIEW ARTICLE

- pandey, gaurakhnath chsturvedi, editor. Varanasi: Chaukhambha bharti Academy; 2014. p. 135.
16. A K Jain, Textbook of Physiology vol.2, 5th edition, Avichal publishing company, 2013, page 1018.
17. Kasper, Dennis L, et al. Harrison's Principles of Internal Medicine. 19th edition. New York: McGraw Hill Education, 2015 page 155.
18. Benedict C, Dimitrov S, Marshall L, Born J (2007) Sleep enhances serum interleukin-7 concentrations in humans. *Brain Behav Immun* 21:1058–1062
19. Dimitrov S, Lange T, Benedict C, Nowell MA, Jones SA, Scheller J, Rose-John S, Born J (2006) Sleep enhances IL-6 trans-signaling in humans. *FASEB J* 20:2174–2176
20. Kim E, Barrett, Susan M, Barman, Scott Boitano, Heddwyn L. Brooks; Ganong's Review of Medical Physiology, McGraw Hill; P.275
21. Kioussis D, Pachnis V (2009) Immune and nervous systems: more than just a superficial similarity? *Immunity* 31:705–710
22. Dustin ML, Colman DR (2002) Neural and immunological synaptic relations. *Science* 298:785–789.
23. Grakoui A, Bromley SK, Sumen C, Davis MM, Shaw AS, Allen PM, Dustin ML (1999) The immunological synapse: a molecular machine controlling T cell activation. *Science* 285:221–227.
24. Opp, M. R., & Toth, L. A. (2003). Neural-immune interactions in the regulation of sleep. *Frontiers in bioscience: a journal of*
- virtual library*, 8, d768–d779.
<https://doi.org/10.2741/1061>.
25. Agnivesha, Charaka, Dridhabala, Charaka Samhita, Sutra Sthana, Ashtanindatiya adhyaya. In: 21/52-54. Commentary by Kashinatha pandey, gaurakhnath chsturvedi, editor. Varanasi: Chaukhambha bharti Academy; 2014. p. 421.
26. K Sembulingam, Prema Sembulingam, Essentials of Medical Physiology, 8th edition, Jaypee Brothers Medical Publishers, 2021, page 932.
27. Times of India, Jun 16, 2020 Why you should never sleep with your head facing North
28. Madhukar LS, Nivrutti BA, Bhatnagar V, Bhatnagar S (2018) Physio-Anatomical Explanation of Abhyanga: An Ayurvedic Massage Technique for Healthy Life. *J Tradit Med Clin Natur* 7: 252. DOI: 10.4172/2573-4555.1000252.
29. Agnivesha, Charaka, Dridhabala, Charaka Samhita, Sutra Sthana, Maatrashtitiya adhyaya. In: 5/83. Commentary by Kashinatha pandey, gaurakhnath chsturvedi, editor. Varanasi: Chaukhambha bharti Academy; 2014. p. 127.
30. Agnivesha, Charaka, Dridhabala, Charaka Samhita, Sutra Sthana, Maatrashtitiya adhyaya. In: 5/85-86. Commentary by Kashinatha pandey, gaurakhnath chsturvedi, editor. Varanasi: Chaukhambha bharti Academy; 2014. p. 128.
31. Jameson, J. L., & Loscalzo, J. (2001) Harrison's principles of internal medicine (16th edition.). New York: McGraw Hill Education page 154.
32. Friedman M. (2018). Analysis, Nutrition, and Health Benefits of Tryptophan. *International July 10th 2021* Volume 15, Issue 1 **Page 43**



REVIEW ARTICLE

journal of tryptophan research : IJTR, 11,
1178646918802282.

<https://doi.org/10.1177/1178646918802282>.

33. Xie, Z., Chen, F., Li, W. A., Geng, X., Li, C., Meng, X., Feng, Y., Liu, W., & Yu, F. (2017). A review of sleep disorders and melatonin. *Neurological research*, 39(6), 559–565.

34. Agnivesha, Charaka, Dridhabala, Charaka Samhita, Sutra Sthana, Indriyaupakramaniya adhyaya. In: 8/20. Commentary by Kashinatha pandey, gaurakhnath chsturvedi, editor. Varanasi: Chaukhambha bharti Academy; 2014. p. 184.

35. Mishra B., 2020 Feb 07, Should you eat yoghurt just before bed?, *Hindustan times*.

36. Prof. B L Gaur, Ashtang hrudiyam by vagbhatta, sutra sthana, chapter 7 verse 65, page 145, chaukhamba orientalia Varanasi, reprint 2013

37. Agnivesha, Charaka, Dridhabala, Charaka Samhita, Sutra Sthana, Indriyaupakramaniya adhyaya. In: 8/19. Commentary by Kashinatha pandey, gaurakhnath chsturvedi, editor. Varanasi: Chaukhambha bharti Academy; 2014. p. 183.

38. Agnivesha, Charaka, Dridhabala, Charaka Samhita, Sutra Sthana, Ashtaunindatiya adhyaya. In: 21/50. Commentary by Kashinatha pandey, gaurakhnath chsturvedi, editor. Varanasi: Chaukhambha bharti Academy; 2014. p. 183.

39. Agnivesha, Charaka, Dridhabala, Charaka Samhita, Sutra Sthana, Indriyaupakramaniya adhyaya. In: 8/25. Commentary by Kashinatha pandey, gaurakhnath chsturvedi, editor. Varanasi: Chaukhambha bharti Academy; 2014. p. 187.