Review Article

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SIGNIFICANCE OF NATURAL SLEEP AND EFFECT OF SLEEP DEPRIVATION ON HEALTH: A REVIEW

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ABSTRACT

Sleep is essential for our well being and occupies about one third of our lifespan. Sleep affects how we await, feel and perform on a daily basis, which have a major shock on our overall quality of liveliness. Getting enough quality sleep at the right times can protect our physical and mental health, quality of life, and safety. The way we feel while we are awake depends in part on what happens while we were sleeping. The constructive effects of natural sleep have been very deeply considered and interpreted by both Ayurvedic classics and innovative researches. Certain people had considered sleep as a mere 'break down' time when our brain takes a rest. But recent researches show a very clear connection between proper sleep and well being of a person. Some of the medical conditions like diabetes, obesity and cardiovascular disease, etc. develop over long periods of time due to sleep loss. The present article is aimed to highlight the significance of proper sleep and effect of sleep deprivation on health in the view of Ayurveda and contemporary science.

KEY WORDS: Nidra, Sleep Deprivation, sleep pattern.

INTRODUCTION

Sleep is a basic human need and is essential for good health, quality of life and performing well during the day¹. The importance of sleep in our life can be realised by the time human beings spend sleeping. It is an important physiological function of the body which occupies almost 1/3rd of our lifespan². The constructive effects of natural sleep have been very deeply studied and understood by both Ayurvedic classics and modern researches. Certain people had considered sleep as a mere 'break down' time when our brain takes a rest. Due to busy work schedule people try to trim down their sleeping hours in order to find more time to read, work etc. They are unaware about the long term health issues which can take place due to improper and inadequate sleep. But recent researches have shown a very strong association between proper sleep and well being of a person. Some of the medical conditions like diabetes, obesity and cardiovascular disease, etc. develop over long periods of time due to sleep deprivation.

Physiological effect of natural sleep

Sleeping is essential for us to live a balanced life³. Sleep is a natural way of restoring our physical and mental vitality and plays a vital role in good health and well-being throughout our life. It is a complex and essential function of our life. Since 1950s, there is continuous research in the fields of neurology,

neuroscience, psychiatry, anatomy, and physiology, etc., to understand the biological process of sleep and its effect on various systems of the body⁴. In Ayurveda, sleep naturally occurring at night is considered as Bhootadhatri (mother who protects and nourishes the person)⁵. A number of vital physiological changes occur during sleep and help people stay healthy and function at their best⁶. Good quality sleep during night removes drowsiness and restores the natural equilibrium of the body tissue⁷. When a person is asleep the muscles in his body relaxes thereby⁸ helps to repair the wear and tear of cells and tissues occurring during our day to day life⁹. For better knowledge and learning good sleep is very essential¹⁰. Researches have proved that a good sleep at night can improve learning. A person having a good night's sleep can grasp well than a sleep deprived person. Good night sleep helps in memorizing the things which we studied earlier. It helps in improving creativity. It also helps in a clearer thinking¹¹. Proper nourishment of the body and strength depends upon the adequate sleep during night¹². Studies have proved that being well rested improves the body's responses to infection, which protect us from onslaught of diseases¹³. Proper sleep even enhances longevity in humans¹⁴ and there are enough evidences available that both short sleepers and long sleepers are at an increased risk of all causes of mortality¹⁵. The benefits of proper sleep as described in different classics is given in the Table 1¹⁶⁻²⁰.

Table 1: Merits of healthy sleep as described in Ayurvedic classics

Charaka Samhita/ Astanga samgraha	Sushruta Samhita	Bhavaprakasha / Yogaratnakara
Bala (Strength)	Aroga (Free from disease)	Dhatusamyam (Balance of bodily tissue)
Jnana (Knowledge)	Sumanasya (Pleasant mind)	Atandra (Free from drowsiness)
Paste (Growth)	Varna (color/complexion)	Pusti (Nourishment)
Sukha (Happiness)	Bala (Strength)	Varna (Complexion)
Vrishata (Virility)	Vrishata (Virility)	Utsaha (Enthusiasm)
Jeevitham (Long span)	Natisthoolakrishna (Well built body)	Agnideepti (Digestion)
	Shatayu (100 years of life)	

Natural sleep pattern for healthy living

Ayurveda regards Nidra as one of the most essential factors responsible for a healthy and fulfilled life²¹. Untimely, excessive sleep or prolonged vigil is like the night of destruction that takes away happiness and longevity²². Sleep as Ratrisvabhava Prabhava (naturally occurring at night) is considered as healthy one²³. For healthy, natural sleep, the person should finish dinner at least 2 to 3 hours before the sleeping time; Cot should be adequate in size and height (approx at the level of person's knee joint), Bedding should be clean, soft and suitable in size. While

going to bed one should remember only positive things of life and pray to the elders, teachers and almighty. Head should be directed to east or south direction²⁴. One should lie on left lateral position²⁵. It is always better to avoid sleeping in day time, except in summer season due to the short period of night. Sleeping immediately after taking food and during the Sandhya Kala (dusk and dawn) is also unhealthy²⁶. In general, for a healthy adult 6 to 8 hours quality sleep is enough. During different phases of our life the sleep requirement changes which are shown in table no. 2²⁷ and Ayurvedic view on sleep pattern in different stages of life is shown in Table 3.²⁸

Table 2: Recommended amount of sleep in different stages of life

Age	Recommended Amount of Sleep
Newborn	16-18 hours a day
Preschool-aged children	11-12 hours a day
School-aged children	At least 10 hours a day
Teens	9-10 hours a day
Adults (including the elderly)	7-8 hours a day

Table 3: Ayurvedic view on sleep pattern in different stages of life

Age	Dominance of Dosha	Sleep Pattern
Balyavastha (Childhood)	Kapha	Ati-Nidrata (Excess sleep)
Yuvavastha (Adulthood)	Pitta	Alpa-Nidrata (Less sleep)
Vridhdavastha (Old age)	Vata	Nidranasha (Insomnia)

Health risk burden due to sleep deprivation

The public health burden due to chronic sleep loss and sleep disorders is an important matter of concern for health care system. It is estimated that 50 to 70 million Americans chronically suffer from a disorder of sleep and wakefulness, hindering daily functioning and adversely affecting health and longevity²⁹. More than one-quarter of the U.S. population reported occasionally not getting enough sleep, while nearly 10% experience chronic insomnia³⁰. Many scientists believe that irregular sleeping patterns lead to illnesses ranging from aches and pains to heart diseases³¹. According to Harvard Medical School, sleeping less than five hours a night increases the hazard of dying from all causes by about 15 percent³².

Psychiatric problem due to sleep deprivation

For better knowledge and memory, good sleep is essential³³. Sleep deprivation can be regarded as one among the reasons of anxiety disorders. Researches state that sleep disruptions can also be viewed in virtually all psychiatric complaints³⁴. Studies show that the people who are doing the night shift duties are more prone to stress. Apart from this they will be having many related ailments like depression, heart disease, infertility, etc. The production of stress in our body is due to the action of various hormones. The human brain releases a hormone called CRH. It will induce the pituitary gland to release ACTH. This in turn will cause the adrenal gland to produce epinephrine and other stress hormones leading to strain. Usually this chain is blocked by a good sleep. But when there is an alteration in the

sleep habits, it can lead to an increased level of the stress hormones and thereby leading to stress³⁵. An increase in stress can be noticed when the length and quality of sleep decreases³⁶. It has been studied that sleep problems can precipitate manic and super manic episodes³⁷. Excessive daytime sleepiness, depressed mood and poor memory or concentrations are the primary symptoms of sleep loss³⁸. Adults with chronic sleep loss report excess mental distress, depressive symptoms, anxiety, and alcohol use³⁹⁻⁴¹. It was found that insomnia is also a predictor of acute suicide among patients with mood disorders⁴². Restricted sleep time can negatively impact the behavioral alertness of a person⁴³. Sleep deprivation negatively impacts our mood, our ability to focus, and our ability to access higher level cognitive functions which are generally referred to as mental performances⁴⁴.

Neurological problem due to sleep deprivation

Sleep deprivation is the cause for diseases due to vitiation of VataDosha⁴⁵ which includes disorders related with neurology like Ardita (facial paralysis), EkangaRoga (monoplegia), SarvangaRoga (paraplegia), Pakshavadha (hemiplegia), Akshepaka (clonic convulsion), Dandaka (tonic convulsion), Bhrama (giddiness), Vepathu (tremors), Vishada (asthenia), Atipralapa (delirium), Atatvabhinivesha (unstable mentality) etc. Studies found that sleep impairment have association with dementia which include virilities of conditions like- Alzheimer's disease⁴⁶, Parkinson's disease⁴⁷ etc. Sleep wake disturbances are found in at least 20 percent of stroke patients,⁴⁸ which results in a sudden loss of consciousness, sensation, and voluntary

movement caused by disruption of blood flow—and therefore oxygen supply—to the brain. Sleep problems can significantly reduce performance and alertness of a person⁴⁹. People with insomnia feel more stressed out than people who have no trouble sleeping at night⁵⁰. Sleep disturbances affect the functioning of the prefrontal cortex, the part of the brain, which is dealing with thinking, emotional regulation etc.⁵¹. Thus an impact of sleep loss on emotions can also be seen⁵². One recent study found that in mice 25% of certain brain cells died as a result of a prolonged lack of sleep⁵³.

Metabolic problem due to sleep deprivation

In the Kaiyadeva Nighantu chapter on “Viharavarga” explains that staying awake at night specifically after 10 pm which is considered as Pitta kala causes delayed digestion of consumed food and continuing being awake after 2 pm which is considered as Vata Dosha dominant period completely disturbs the digestion process⁵⁴. Sushrutacharya has described the untimely sleep pattern as an important cause of Ajirna (indigestion)⁵⁵. In Modern science also sleep is found to have a strong relation with metabolism. The ghrelin also known as hunger hormone secreted by the stomach is having the function of appetite regulation. Leptin is a peptide secreted by adipose tissue, which has the satiety inducing function. These two help in maintaining a good appetite, metabolism, etc. Usually the leptin level increases during the daytime and has its peak during the night.

An irregular pattern during sleep can cause alteration in ghrelin-leptin ratio. It can cause an increase in the level of ghrelin and decrease in leptin level. This can enhance the appetite and craving for especially carbohydrate rich foods. Studies have proved that higher BMI in children is associated with their short sleep⁵⁶. According to some cross sectional epidemiological studies, both reduced and increased sleep duration is linked with hypertension, diabetes and obesity. Recent studies have suggested that there is a strong association between sleep disturbances and gastrointestinal diseases⁵⁷. Persons with irritable bowel syndrome and “sensitive stomachs” experience an aggravation of their symptoms after a restless night. Stress which is produced due to sleep irregularity can exacerbate the digestive symptoms⁵⁸. Sleep deprivation, specifically Insufficient SWS (small wave sleep), can cause impaired glucose tolerance.⁵⁹ Studies have shown that people who reported sleeping less than five hours per night had a greatly increased risk of having or developing type 2 diabetes⁶⁰.

Consequences of sleep impairment

Irregular sleep pattern vitiates all the three Dosha⁶¹⁻⁶³ which become the cause of manifestation of various diseases. Here at the Table 4 the list of symptoms associated with an improper sleep pattern which are described in different classics of Ayurveda⁶⁴⁻⁶⁷. Table 5 shows the effect of Nidravegadharana (suppression of the natural urge to sleep)⁶⁸⁻⁷³.

Table 4: Symptoms produced due to inappropriate sleep

Charaka Samhita	Astanga Samgraha	Sushruta Samhita	Astanga Hridaya
Halimaka (Jaundice)	+		
Sirasoola (Headache)	+	+	+
Staimityam (Timidness)	+		
Guruta (Heaviness)	+		
Angamarda (Body aches)	+	+	+
Agni nasam (Loss of digestive fire)	+	+	+
Hridayapralepa (Feeling of coating over heart)	+		
Sopha (Oedema)	+		+
Arochaka (Anorexia)	+	+	
Hrillasa (Nausea)	+		+
Peenasa (Rhinitis)	+	+	
Ardhavabhedaka (Hemicrania)	+		
Koda (Urticaria)	+		
Pidaka (Abscess)	+		
Kandu (Pruritis)	+		
Tandra (Drowsiness)	+		
Kasa (Cough)	+	+	
Galamaya (Throat disease)	+		
Smriti (Memory loss)	+		
Srotorodha (Obstruction to channels)	+		+
Jwara (Fever)	+		
Vishavegavardhanam (Increases the toxicity of poison)	+		

Table 5: Effect of NidraVegadharana (Suppression of urge to sleep)

Charaka Samhita	Sushruta Samhita	Astanga Hridaya	Astanga Samgraha	Bhavaprakasha	Yogaratanakara
Jrimbha (Yawning)	+	+	+	+	+
Angamarda (Body aches)	+	+	+	+	+
Tandra (Stupor)	+	+	+	+	+
Siroroga (Diseases of head)	+		+	+	+
Sirogaurava (Heaviness of Head)		+			
Akshigaurava (Heaviness of eyes)		+	+	+	+
Akshiroga (Diseases of eyes)	+				
Tandra (Drowsiness)		+			
Anannapaka (Indigestion)			+	+	+

CONCLUSION

Sleep is an important physiological function of our body. Ayurveda regards Nidra as one of the most essential factors responsible for a healthy and satisfying lifetime. It is explained as one among the Trayopastambas i.e. the three great subsidiary pillars which support the life the others being Ahara and Brahmacharya. Any irregularities in these three can alter the homeostasis of the physical structure. Among these the Nidra (sleep) plays a vital role in maintaining health. The duals of life like Sukha (happiness), Dukha (miseries), Pushti (nourishment), Karshya (leanness) etc are dependent on proper and improper sleep. According to Ayurveda sleep occurring at night is to be viewed as normal while the remaining is abnormal and leads to unwanted health outcomes. Improper sleep is a condition which can affect the quality of life of a person. The concept of sleep is to be studied and explored well to maintain the health of a society.

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