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Review Article

AYURVEDIC INSIGHTS INTO NIDRA: UNDERSTANDING PHYSIOLOGICAL ASPECTS

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ABSTRACT

Ahara, Nidra and Brahmacharya plays significant role in preventing major diseases affecting both physical and mental well-being. Nidra stands out as one of the prominent factors to be examined in the contemporary era, constituting a vital component of a healthy lifestyle. Ayurveda defines Nidra (sleep) as the physiological state of rest for the Sharira (body), Mana (mind) and Indriya (sense organs). Lack of Nidra, results in conditions like primary insomnia or Anidra and is associated with the onset of various clinical diseases. Over time, it progress into chronic disorders such as secondary or tertiary insomnia. Aim: To introduce and underscore the concept of Nidra and its physiological impact on the human body. Materials and Method: The literature review was compiled from available Ayurvedic literatures and various relevant articles related to Nidra and sleep. Conclusion: Ayurveda has given more importance to Nidra (sleep) by considering it as one among three pillars of life. The Samhitas provide an in-depth exploration of Nidra, presenting its classification and physiology. Nidra (sleep) is not just a phenomenon to ignore but it has great impact in our body and the study of sleep phenomenon is important for the early diagnosis of sleep disorders.

INTRODUCTION

In ancient Ayurvedic scriptures, Ahara, Nidra and Brahmacharya are identified as 'Trayopastambha'. The word Trayopastambha is made up of two words "Traya" and "Upastamba". Traya indicates three components and *Upastambha* is made up of two words "Upa" and "Stambha". Upa is a prefix which means followed by and Stambha word is derived from the root "Stambharodhane" which means strong pillar. The diverse theories surrounding the phenomenon of Nidra emphasize its significance as one of the essential components for a content and healthy life. Nidra accounting for nearly one-third of a person's life, plays an important role in this perspective.[1] Nidra is the innate state of rest for both the mind and body, characterized by closed eyes and marked by either partial or complete loss of consciousness. This loss of consciousness results in reduced responsiveness to external stimuli and diminished bodily movements.



The natural predominance of *Tama* at night, coupled with a profound relaxation of the mind and intellect, induces sleep. An individual fell asleep when the *Manovaha Srotas* get accumulated with *Sleshma* and the mind gets devoid of sense organs because of fatigue. [2]

MATERIALS AND METHOD

The literature review was compiled from available Ayurvedic texts such as *Samhitas (Caraka Samhita, Susruta samhita, Astanga Hridaya, Astanga sangraha)*. The search for articles was also conducted on online databases including PubMed and Google Scholar with keywords - physiology of *Nidra* and sleep.

Definition of Nidra

As per the "Mandukya upanishad," Nidra is a state where the "Atma" experiences no dreams or desires, known as "Susupti."[3]

Acharya Caraka emphasized that Sleep occurs when the sensory and motor organs become inactive, and both the intellect and soul become fatigued.[4]

Acharya Susruta explained that sleep occurs when Tamas covers the Hridaya, which is the seat of Chetana.^[5]

Sleep

Sleep is defined as temporary state of unconsciousness from which the subject can be aroused with appropriate sensory stimuli.

Mechanism of Nidra

According to *Acharya Susruta*, *Hridaya* is considered as the seat of *Chetana*. When there is an abundance of *Tamo guna*, individuals experiences sleep, while an excess of *Satva Guna* results in awareness of both external and internal surroundings.^[6]

Acharya Caraka proposes that when the mind, along with sensory and motor organs, becomes fatigued and detaches from their objects, individuals enter into a state of sleep. [7]

As per *Ashtanga Sangraha*, when an individual fell asleep the *Manovaha Srotas* become accumulated with *Sleshma* and the mind gets devoid of sense organs because of fatigue. [8]

Acharya Sharangadhara mentions that aggravation of Kapha-Doṣa and Tamoguṇa leads to Nidra. [9]

In Modern Terms

The most notable physiological alterations during sleep primarily take place in the brain. During sleep, the brain consumes notably less energy compared to wakefulness, particularly during Non-REM sleep. In regions exhibiting decreased activity, the brain replenishes its Adenosine Triphosphate (ATP) supply, the molecule utilized for short-term storage and transport of energy. Given that the brain accounts for 20% of the body's energy expenditure in a state of quiet wakefulness, this reduction significantly impacts overall energy consumption.

During slow-wave sleep, bursts of growth hormone are released by humans. Additionally, the secretion of prolactin is associated with all types of sleep, even during daytime rest.

The biological clock of our body is situated in the hypothalamus of the brain, known as the suprachiasmatic nucleus (SCN) which consists of a group of nerve cells. The SCN regulates the secretion of the hormone melatonin, which induces sleepiness. In conditions of reduced light, the SCN signals the brain to produce more melatonin, a phenomenon referred to as the circadian rhythm. Consequently, the sleep and wake cycle synchronizes with the natural rhythm of night and day. [10]

Types of Nidra

Ashtanga Hridaya mentions about four types of sleep. They are; Mithya yogaroopa (untimely sleep), Atiyogaroopa (sleep with more duration), Hina yogaroopa (improper sleep) and Samyak yogaroopa (timely with concern duration). [11]

Ashtanga Sangraha mentions about seven types of sleep. They are; Kala swabava, Amayaja, Chittakedodbava, Dehakedodbhava, Krodhodbava, Agantubava and Tamobava. [12]

Three categories are identified by *Acharya Susruta*; *Vaishnavi* (formed by the sustaining deity, a natural one), *Tamasi* and *Vaikariki* (due to diseases). [13]

Vaiṣaṇavi Nidra: It is a normal type of *Nidra* and it is the energy of god, which helps in maintaining the life of human being.

Vaikariki Nidra: This type of *Nidra* appears due to *Kapha Doṣa* and aggravated *Vata Doṣa* or due to any troubles which affects both mind and body

Tamasi Nidra: It is the type of *Nidra* which appears due to influence of *Tamo guṇa*. It produces unconsciousness at the time of death.

Caraka Samhita mentions seven types of sleep. They are; Tamobhava (caused by Tamas), Sleshmsamudbhava (caused by Kapha), Manah Sharira Sram Sambhava (caused by physical and mental exertion), Agantuki (adventitious) Vyadhi-Anuvartini (as sequel to a disease), Ratri Svabhava Prabhava (normal sleep that occurs at night). [14]

The *Tamodbhava Nidra* in the modern point of view relates to the comatose state, as the individual is unable to perform the virtuous files.

The concept *Sleshma Samudbhava Nidra* can be related to sleepiness caused due to substances like antidepressants, antihistamines, anti-psychotics and anti-convulsants.

Nidra due to Sharira Srama Sambhava in modern point of view relates to the breakdown of ATP, where the excess amount of adenosine is accumulated which induces sleep. Excess activity during the daytime also helps to produce sleep during night. In respiratory medicine, theophylline does not cause sleep because it works by reducing the adenosine action.

The concept of *Agantuki Nidra* reveals that in some cases the cause of sleep remains obscure and the cause is not explainable. This sleep can be an indicator for death.

In contemporary context, the concept of *Vyadhi Anuvartini* is associated to the cytokines that are formed by the immune cells during infection which induces sleep.

In the modern perspective *Ratri Svabhava Prabhava Nidra* relates to the sleep which is influenced by hormone called melatonin which induces sleep. This hormone is formed only at night and is destroyed during the day.

Types of Sleep

Sleep is divided into two broad types:

Non-Rapid Eye Movement (Non-REM or NREM) sleep - The American Academy of Sleep Medicine (AASM) divides NREM into three stages: N1, N2, and N3, the last of which is also called delta sleep or slowwave sleep. The whole period normally proceeds in the order: $N1 \rightarrow N2 \rightarrow N3 \rightarrow N2 \rightarrow REM$

Rapid Eye Movement (REM) Sleep- REM sleep occurs as a person returns to stage 2 or 1 from a deep sleep.

A complete sleep cycle typically lasts around 90-100 minutes and a typical night sleep consists of 4-5 complete sleep cycles. Each sleep cycle is comprised of approximately 5 phases, with the first 4 cycles dedicated to Non-Rapid Eye Movement (NREM) sleep. The NREM cycles conclude before transitioning to the Rapid Eye Movement (REM) cycle.

Stage 1: The initial stage of Non-REM sleep signifies the shift from wakefulness to sleep. This phase usually lasts for under 10 minutes and is characterized by a decrease in heart rate, breathing, and eye movements, along with the relaxation of muscles.

Stage 2: Non-REM sleep represents a phase of light sleep occurring before the onset of deeper sleep, lasting approximately 20 minutes. In this stage, there is a continued slowing of both the heartbeat and breathing. Additionally, the brain initiates the generation of bursts of rapid, rhythmic brain wave activity known as sleep spindles.

Formerly referred to as stages 3 and 4, stage 3 (N3) represents the ultimate phase of Non-REM sleep. This is the most profound stage of sleep, lasting from 20 to 40 minutes. During this period, both the heartbeat and breathing reach their lowest levels, and the muscles become so relaxed that waking you up may prove challenging. This phase is commonly known as Delta sleep or slow-wave sleep.

Rapid Eye Movement (REM) sleep emerges approximately 90 minutes after the initiation of sleep and is notably deeper than any of the three phases of Non-REM sleep. REM sleep is characterized by swift eye movements, nearly complete body paralysis, and a tendency for dreaming. [15]

Timing of Nidra

According to *Ashtanga Sangraha*, sleep which is prevalent everywhere manifest at night as *Tamo guna* is more predominant during night hours. ^[16] *Acharya Susruta* explains the significance of being awake during the day and sleeping at night. ^[17] According to *Ashtanga Hridaya*, sleep at right time for right duration should be followed and remaining awake during night should be compensated by sleeping for half the time that has been awake, without having food. ^[18] As per *Kaiyadeva Nighantu*, the optimal time for sleep is after the initial two *Yamas*, approximately six hours after sunset. In

Ayurveda, a healthy individual typically experiences sleep during Night hours known as *Ratri Svabhava Prabhava*. It is recommended to refrain from sleeping during the early and late night hours and to awaken before sunrise. [19]

The need for sleep varies and is not constant. However, the average daily sleep requirements for different age groups are as follows:

- 1. New born infants: 18 to 20 hours
- 2. Growing children: 12 to 14 hours
- 3. Adults: 7 to 9 hours
- 4. Older individuals: 5 to 7 hours

Childhood, being a *Kapha* dominant phase, naturally entails increased sleep, essential for healthy growth and development. The middle period of life, dominated by *Pitta*, requires substantially less sleep. As one ages, *Vata* becomes predominant, leading to a natural reduction in sleep duration. [20]

Criteria for Better Sleep

According to *Acharya yogaratnakara*, After having dinner, one should walk for hundred steps before going to sleep, then one should lie down in recumbent posture in bed taking 8 times breath and changes the posture to right lateral till taking 16 times breath and thereafter to left lateral taking 32 times breath and then can sleep in any posture. Left lateral position is more preferred for easy digestion of the food as the '*Jatharagni*' is located over the *Nabhi* region. [21]

Ayurveda provide guidance for promoting peaceful sleep. It is recommended to avoid beds that are uneven or lack pillows, as well as those which are uncomfortably small or narrow. Additionally, it is suggested to avoid sleeping on your back. The utilization of comfortable bedding not only encourages a peaceful night sleep but also enhances overall wellbeing and contentment.

The mattress should be soft and comfortable, with the bed positioned at knee level. It is recommended to focus on positive thoughts during the beginning and end of the night, as well as when falling asleep and waking up, while avoiding negative thoughts. Assuming a different position while lying down will have an opposing effect. [22]

Lying down in a relaxed position on a comfortable bed helps alleviate fatigue, soothes *Vata Dosha*, encourages sleep, restores lost memory to the mind *(Dhriti)*, acts as an aphrodisiac, and supports overall body growth. Gentle massage, known as *Samvahana*, exhibits calming, sedative, and aphrodisiac effects. It alleviates *Kapha* and *Vata Doshas*, relieves fatigue and soothes the body.^[23]

Divaswapna

Divaswapna or sleeping during the day is generally considered unhealthy. According to Acharya Susruta, Divaswapna does Prakopa of all the three Doshas. However, as mentioned by Hemadri, there are other opinions also i.e., Khaaranadi says that Divaswapna does the Prakopa of only Pitta and Kapha Doshas while Bhela opines that Divaswapna in a supine position only increases Kapha in the Koshta.

According to *Susruta Samhita, Divaswapna* can be done by those who stayed awake at night for half the time stayed awake at night by them. And *Divaswapna* is mentioned to be permitted during *Greeshma Ritu* or summer season. [24]

Acharya Vagbhata mentions Divaswapna can be done in many diseased conditions like Rajayakshma and can be done by old aged people and children. [25]

Ratrijagarana

According to *Acharya Caraka*, keeping awake at night increases *Vata* and *Pitta*. This causes complaints like constipation, weakness, giddiness, lack of concentration, hyperacidity, burning of eyes, burning of eyes, burning of eyes, burning of hands and feet. If due to unavoidable reasons person has to keep awake at night, he should sleep during next morning, half hours of night sleep, before taking any food. However, the health of those who are habitually used to workers in night and sleeping during the day (industrial night workers), is not affected as they get used to this abnormal sleep rhythm.^[26]

Nidranaasha

Nidranaasha or loss of sleep is also considered unhealthy. It is caused by Vata, Pitta, Kshaya and Injury. Nidranaasha has been mentioned generally as a condition caused due to multiple factors and the treatment for this condition is mentioned as Abhyanga, Udvartana and General Brimhana Chikitsa.[27]

Atinidra

Sleeping excessively is considered a pathological condition which happens because of Increase in *Shleshma Dosha*. In such condition, treatments like *Dhumapana, Virechana, Nasya,* and *Langhana* are advised. [28]

Nidra as a Vegadharana

According to *Acharya Caraka* following are some symptoms which appears due *to Nidravegdharaṇa* (suppression of urge) of sleep - *Jṛmbha* (yawning), *Angamarda* (body pain), *Tandra* (drowsiness), *siro-roga* (disorders related to head) and *Akṣigaurava* (heaviness in eyes). The treatment for the *Nidra-vega-dharaṇa-janya-lakṣaṇa* is to take proper *Nidra* (sound sleep) and *samvahana* (massage) over the hand and foot. [29]

According to Acharya Vagbhaṭa the symptoms of *Nidra vegadharaṇa* are as follows: *Moha, Murdha akshi gourava, Alasya, Irmbha & Angamarda.* [30]

As per *Acharya Bhavamisra, Nidra vegvidharaṇa* causes *Jṛimbha, Shirolocana-gaurava* (heaviness in eyes and head), *Aṅgamarda, Tandra and Annapaka* (improper digestion of food). [31]

Acharya Susruta mentioned that the Nidravega-dharaṇa-janya-lakṣaṇa resembles to that of the diseases of Vata and Pitta. The symptoms includes Kasa, swasa, Pratisyaya, Sirogaurava, Angamarda, Arodhaka, Jwara, Agnidaurbalya. [32]

Significance of Nidra

Nidra plays a determining role in various factors such as Sukha (happiness), Dukha (unhappiness), Pushti (good physique), Karshya (emaciation), Vrushta (sexual strength), Klibata (impotence), Gyan (knowledge), Agyan (illiteracy), Jivita (long life) and Ajivita (death). Samyak Nidra contributes to Sukha, Pushti, Bala, Vrushta, Gyan, and Jivan, while Asamyak Nidra is responsible for Dukha, Karshy, Abala, Klibata, and Agyan.

Acharya Caraka described Nidra as a therapeutic aspects in the treatment of Atikrisata (leanness), Acintanacya karya (freedom from anxiety about any work), Nidra along with Ahara etc. factors leads to brimhana and make the individual like a Varaha. [33] Just like Ahara is required for maintenance of health similarly Nidra is required for attaining Sukha and Arogya. [34]

Sleep is more than just a periodic rest; it's an important phase for the body's recovery. Adequate and restful sleep is essential for maintaining excellent health and well-being. [35]

DISCUSSION

Nidra stands out as one of the most prominent factors to be examined in the contemporary era, constituting a vital component of a healthy lifestyle. Ayurveda has given more importance to *Nidra* (sleep) by considering it as one among three pillars of life. The Samhitas provide an in-depth exploration of Nidra, presenting its classification and physiology. In modern science, sleep is divided into NREM and REM which involves five stages. The intrusion of work hours into sleep time, combined with stress, has led to a reduction in overall sleep duration. Similar to a balanced diet, sufficient sleep is important for maintaining optimal health. Neglecting adequate sleep can transform a healthy individual into a diseased person. The exploration of sleep phenomena is paramount for the timely detection of sleep disorders, underscoring its significance in contemporary healthcare.

CONCLUSION

It is evident that sleep, often overlooked, exerts a profound influence on our physiological well-being. Embracing a holistic approach to health, sleep emerges as a fundamental pillar of a balanced lifestyle. Therefore, further research and awareness efforts are imperative to fully comprehend and address the complexities of sleep and its implications for human health.

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