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SLEEP BIOLOGY: INSIGHTS FROM AYURVEDA

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ABSTRACT

Sleep has emerged as area of interest among clinicians, Scientists and economists too. As modern science is accepting holistic concepts in current era, Sleep has been explored at multiple level for health maintenance & disease prevention as well. *Ayurveda* the living indigenous tradition of health science has advocated sleep as one of the three supporting pillars for health along with diet and righteous psychosomatic behaviour. This article attempts to elucidate the importance of sleep analysing it in the network of *TRISUTRA* of *Ayurvedaie*. *Hetu, Lakshana* & *Sutra*. Proper Sleep renders health & its maintenance. But deviated sleep (in quantity and quality) leads to pathogenesis of many disease conditions. Simultaneously it is noted as the feature of many diseases and Sleep can be also used as a treatment modality, preserving bal and alleviating diseases.

Key words: *Ayurveda, Hetu, Lakshana, Sutra*

INTRODUCTION:

Sleep is preserved across species of animal kingdom with few variations. All species needs recovery sleep to compensate in case they had to stay awake for long. All species faces serious consequences if they are to awake forcefully for too long, especially cognitive impairment or others functions of brain are impeded[1].

Almost all species sleeps for total one third of their lifespan. Again all needs to sleep one third of every single day (24 hrs). It gives an impression that how much importance nature has bestowed on the process of sleep & also how myriad physiological functions must be intricate with this vital life process. Sleep though seems as a single phase of reversible phase of inactivity but it in itself composed of different stages repeating cyclically namely REM (Rapid eye movement) & NREM (non rapid eye movement) phases.

Today most of us live in a 24*7 society where sleep is restricted for one or another reason be it by choice or otherwise. We are not able to fulfil the daily requirement of sleep and chronically sleep deprived leading to impairment in cognition & attention. Also sleep invasion into wakefulness is prevalent now days while working or driving[2] etc.

Chronic sleep deprivation has manyfold consequences like increased number of road accidents, attention deficit & poor performance of students , accidents in industrial setting, depression , surge of negative emotions etc. All these are affecting the society & directly or indirectly posing burden on the healthcare system[3].

Association of Obesity, metabolic syndrome & many other disorders has been found with chronic sleep deprivation. Immunity , healing & repair in cellular level & systemic is found to be a function of sleep, thus sleep deprivation not only causes impairs daily life activities or pose threat on accident prone work force but it is augmenting the surge of metabolic disorders.

Sleep Assessment

Assessing sleep with its duration & quality has been an explorative area of research as its accurate assessment needs a conducive environment & in home environment it is somehow difficult to measure sleep with much accuracy. However there are both subjective & objective methods to assess sleep.

Sleep questionnaire & diaries- Sleep diaries are maintained for a substantial period, questionnaire like PSQI, Epworth etc are widely used.

Polysomnography (PSG) is the widely & most accurate means to assess sleep with Electroencephalogram (EEG), electrooculogram (EOG) & Electromyelogram (EMG).

Other methods to assess sleep objectively in home environment is actigraphy (actiwatches). These are watch like devices with a accelerometer which records the movement of body and infers the sleep wake period.

Therefore modern science is recognizing sleep as a vital life process which if deprived can give rise to many consequences at personal, social, national & to the mankind at large. But still all of its functions are yet to be revealed in modern terms and the connectivity of sleep along with other physiological systems is to be explored. Many new questions has also arisen like does requirement of sleep needs is individualised or all needs same amount of sleep for different ethnicity, geographical region? How much role the quality of sleep plays for restorative functions? How to assess sleep quality & quantity of an individual with accuracy both subjectively & objectively?

Does any reference range could be formulated?

Insights from Ayurveda

Ayurveda the science of Indian health care system has provided very clear description & importance of sleep in physiology, pathology & disease perspective. It had elaborated the factors effecting sleep, regulating principles & guidelines for different age groups, working groups as per their physiological needs and as compensatory requirement.

Actually Ayurveda has conferred sleep as one among the three basic supports for maintenance of life namely *Aahara*(diet), *Nidra* (sleep) & *Brahmacharya* (righteous regulation of senses)[4] These three are the processes which are marks the interaction of individual with the environment and subjects to deviation most often. So they are of paramount significance for optimum health.

Ayurveda has further added the aspects where its optimism may get reflected for example proper diet, sleep & regulation of senses will lead to optimum growth, immunity & healthy skin etc.

Sleep physiology description elaborates the types of sleep one could have incorporating all the influencing factors. Sleep is described to be of six types viz. *Ratrisvabhava prabhaja, tamobhava, Sleshma samudbhava, Manah-sharira-shrama sambhava, Agantuki & Vyadhi anuvartini*[5]

Ratrisvabhava prabhaja Nidra– normal sleep

Tamobhava Nidra – due to excessive tamo guna

Sleshma samudbhava Nidra – due to excessive kapha dosha

Mana-sharira-shrama sambhava Nidra – sleep arisen due to excessive fatigue

Agantuki Nidra - due to any external cause

Vyadhi anuvartini Nidra- as a manifesting feature of disease

These descriptions shows that the sleep which is usually considered as same in different individuals, with different history, at different timings and presented with different diseases are not actually same rather is of different kind and has different pathophysiology altogether.

Here important point is that normal sleep needs to be differentially recognized form the sleep as general feature, this could serve the purpose of getting best benefits of the function the benefits health.

Variability of Sleep

Sleep is also said to be differentially expressed in different *Prakriti* of Ayurveda. For example Vata Prakriti individual may be accustomed to less amount & low quality of sleep and the individual of Kapha Prakriti may be sleeping more & deep [6] Thus universal duration & quality cannot be imposed on each & every individual rather their physiological network could be used to explore the connections of sleep with other physiological processes.

Ayurveda has given relation of sleep with multiple physiological axes like growth, metabolic activity, memory, immunity, vigour, skin lusture etc. Moreover it reveals the psychosomatic axes of happiness linked with the sleep.

Many studies have been conducted on sleep and the physiology of growth, metabolism, chronobiology, memory, immunity, vigour, skin etc. as unilaterally but no study has attempted to explore all aspects as functioning of sleep. This is one of the unique lead to explore sleep biology at a broader context.

Regarding assessing sleep Ayurveda has given very relevant method to assess sleep quality & its functionality contributing to health status as the feeling of happiness & enthusiasm in the morning while awakening.

***TRISUTRA* of sleep**

Beyond viewing Sleep as a phenotype Ayurveda literature has analysed it simultaneously as *Hetu* (aetiology), as *Lakshana* (presenting feature) of a disease or as a therapeutic measure for disease management.

Sleep has been implicated as etiological factor in diseases like

- *Kaphaj & vataj prameha* [7](diabetes),
- *Hridya roga*[8] (CVD)
- *Kustha*[9] (skin pathology)
- *Pandu*[10](Anaemia)
- *Netra roga* [11](eye disorders)
- *Vatarakta* [12](gout)

Sleep as a presenting feature has been described in many diseases like

- *Prameha* [13](Diabetes),
- *Pandu* [14](Anaemia)
- *Majja asthi gata vata*[15] aggravation (vitiation of marrow & bone tissues)

Sleep as a therapeutic measure has been used in diseases like

- *Kshyaya* (emaciation),
- *Atyagni* (hyperactive metabolism),
- *Hridaya roga* (CVD),
- Shiro roga(diseases of head),
- *Prameha* (Diabetes),
- *Oja kshyaya* (low immunity) and
- *Vat Vyadhi* (neurodegenerative diseases)

CONCLUSION:

Sleep is one of the vital life processes which need to be studied in detail to perceive it as an window to multiple axes of physiological processes regulating health & disease stages differently in different individuals. Moreover its regulation, adaptation can be modulated to promote health & prevent or manage diseases.

Though sleep has been studied with various approaches few gaps are there which needs to be addressed. Sleep physiology has been tried to understand largely based on the sleep deprivation and associated disorders, rather it should first studied in healthy subjects with different sleep duration & quality which may reveal the network of functionalities connected with sleep. Mere studying deprivation may limit the study to compensatory physiological mechanisms.

Sleep questionnaires do not account for inter-individual variability for elicitation of basal sleep pattern. This aspect needs to be emphasised as universal sleep requirement cannot hold true. Many studies had related both excess & less sleep with same disease, which inspires to think that different individual may need different amount of sleep normally with qualitative difference. Therefore Sleep needs to be analysed in a broader context with holistic approach as advocated in Ayurveda. Sleep *TRSIUTRA* is a networked approach which would reveal deeper insights related to Sleep biology & help health promotion & disease prevention at large.

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