ISBN: 978-93-48091-69-7

2. Sleep

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Sleep plays a vital role in transmitting various information in brain and memory consolidation. Sleep after learning of new information did well. Daytime sleepiness is a reason for sleep deficiency. Daytime sleepiness may cause road accidents and various mental and physical problems. Sleeplessness leads to impatience, moodiness and incapability to concentrate. Sometime hypertension, fluctuating heart beats, imbalanced hormonal levels are the results of disturbed sleep. Sleep also affects our immune system. Researchers suggested that good sleep may help to fight with cancer (Havard Health Publication, 2006).

Numerous studies indicated that individual health and wellness are dependent on sleep. The functioning of learning and memory depends upon how the body restores the energy resources and synaptic homeostasis (Porkka et al., 2013). During the walking period, there must be a clearance of harmful toxins that are accrued in the brain (Xie et al., 2013). Insufficient sleep results in low-quality inflammation and anomaly in energy metabolism, leading to atherosclerosis processes (Meier et al., 2004). This is accompanied by tiredness, learning and memory problems, poor vigilance, motivation, and control of emotions (King, Belenky, and Van Dongen, 2009). Furthermore, it is found that sleep problems increase the risk for somatic problems (Grander et al., 2013).

The individual is characterized by physical symptoms like pain or fatigue which leads to emotional distress and problem related to the functioning of the body. It also causes psychiatric diseases, problems in the immune system, metabolic disturbances and affects the circulatory, cardiac system, and mood disorders.

2.1 Sleep State / Stages/ Phases in Healthy Intellectually Normal Humans:

Human beings are experiencing 2 types of sleep. Rapid Eye Movement (REM) and Non –Rapid Eye Movement Sleep (NREM). Rapid Eye Movement sleep is characterized by active state of brain and is more similar to waking state with rapid breathing, regular eye movements, raised Bp and increased heartbeats. In this state desynchronized and fast brain waves and dreams occur in this period.

Non–Rapid Eye Movement (NREM) is marked by a reduced physical activity and person‟s blood pressure, breathing and heart-rate slow down as sleep deepens. It is a deep sleep state (National Sleep Foundation, 2006).

Non-Rapid Eye Movement sleep is divided into 3 phases. These are N1, N2, N3, during the period of N3 the body‟s metabolic activity is very low (Sharma and Kavuru, 2010).

Following is the detailed description of different Phases /Stages and EEG wave (morphology and hertz) activity with other indicators for different stages of Sleep:

Wake State:

Human brain during wakefulness produces range of frequencies i.e. beta, alpha, theta, delta and Gamma (Iber et al., 2007). Predominantly brain produces Beta (13-35Hz) and Alpha (8-12Hz) waves during this stage (Van Stavern et al., 2019). Betas indicate complete wake stage. Alphas are seen usually in occipital lobes of brain when eyes are closed and are considered as relaxed wakefulness.

2.2 Sleep-Wake Cycle:

Sleep is regulated by complex neuro-physiological processes. It is directed by time (circadian process), amount, period, and quality of sleep (homeostatic). The circadian process is controlled by a part of the brain called the Suprachiasmatic nucleus (SCN).

The homeostatic process is believed to be affected by sleep-inducing molecules, particularly adenosine in the basal forebrain, and reflects sleep pressure as a function of the time since the last suitable sleep. The interaction of these two mechanisms governs the period of sleep-wake, it's pacing, and the depth of sleep (Porkka et al., 2013).

Each person has occasional sleep disturbances, but if there are recurrent disturbances, the risk of disability, somatic and mental disorders, and decreased healing may increase care costs (Buysse et al., 2013). Temperature, meal times, naps, stress, exercise, daily schedules, alarm clocks, etc. can also influence an individual's sleepwake cycle directly or indirectly.

NREM: This stage of sleep starts immediately as one enters sleep. Non-rapid eye movement sleep is divided into 3 states: Stage 1, Stage 2 and Stage 3 sleep. Previously there was Stage 4 sleep as well. This system of scoring was ruled out from 2010 and hence the current study has not considered for analysis.

Stage 1/ Phase 1 of Sleep:

This state of sleep is identified as transition from wake to sleep state, observed at onset of sleep. Stage 1 are signaled with theta waves which are low voltage, mixed frequency waves in the 4-7Hz range and which can also make up background for stage N2 and REM sleep (Iber et al., 2007).

Stage 2/ Phase 2 of Sleep:

Stage 1 sleep is followed by Stage 2 sleep where chemicals in the brain make senses unresponsiveness to external stimuli. Morphology of EEG waves in this state is in the form of K-complexes and spindles (10-12 Hz). These forms are more prominent in the central area of the brain (Van Stavern et al., 2010). Stage 2 sleep is seen throughout the sleep cycle and occupies 60% of the total sleep in adults.

Stage 3/ Phase 3 of Sleep (Delta Sleep): This stage is an indication for growth hormone secretion. In this stage of sleep EEG's frequency range from 0.5- 2Hz and the signals are of high amplitude. Such EEG waves are also seen in case of deep meditative states.

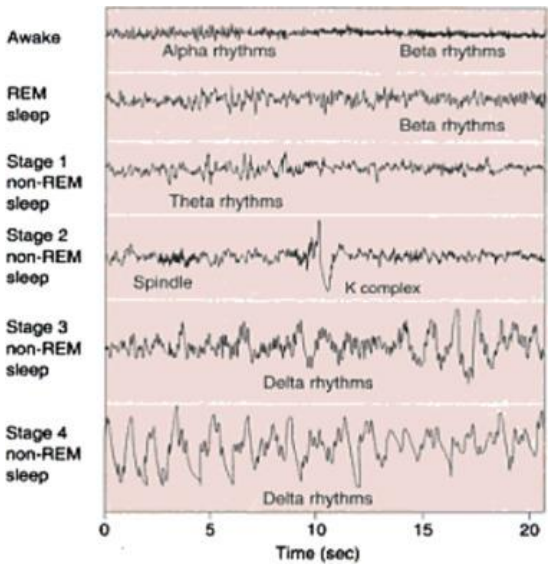

Figure 2.1: EEG waves in different stages of sleep. First being fast beta activity with eyes open wake state followed by different phases of NREM sleep.

REM Sleep: Rapid eye movement sleep is dreaming stage of sleep. This is also the most active phase of all the sleep stages. Hence this stage is also referred to as paradoxical sleep (Butkov & Lee-Chiong 2007) as the brain activity leads to glucose metabolism more than even wake state but at the same time body is completely

paralyzed. This prevents us from acting out our dream in sleep. This is an essential characteristic of REM sleep which is called as muscle atonia (Morgan et al., 1998). During REM sleep the eye movements are seen in form of sharp waves while the EEG representation of saw tooth waves (Iber et al., 2007).

2.3 Sleep Improvement Technique:

a. **Cognitive behavior therapy:** It explains how behaviors that maintain sleeping difficulties are identified and changed.
b. **Relaxation techniques:** It refers to relaxation before going to bed. There are certain calming exercises, listening to music, breathing exercises, muscle relaxation, and certain meditation techniques that can help them to get relieved from sleeplessness.
c. **Meditation:** It concentrates on breathing. The patient is asked to visualize a peaceful location such as a desert, beach, or grassy hill throughout these exercises. It also reduces anxiety and stress.
d. **Exercise:** Health especially physical and mental health becomes better with regular exercise. It enhances hormone-endorphins which relieves mood and lower frustration.
e. **Maintain a to-do list:** There is a need to prioritize the work to be done. The time and energy should be spent on planning in dividing vital and fewer priority tasks. The large task should be divided into small and more easily managed tasks. The free time should be given to recreational activities like listening to soft music. These will help in reducing blood pressure and help in relaxing the mind and body.
f. **Sufficient quantity of sleep:** It recharges the brain and enhances appropriate focus and mood. The individual must have appropriate sleep.
g. **Sleep should be comfortable:** The temperature, light, and noise levels to work out should be of comfort. The dark environment generally makes sleep easier.

h. Maintain a sleep diary: It will help to work out the factors which are affecting our sleep. A sleep diary records information about sleep habits to understand the causes of sleep problems and what's affecting them. A diary includes what time a person goes to bed and what time he gets up, the total number of hours of sleep, how many times a person wakes up in the night, whether there is any nightmares, any medication, any substance use, the amount of physical activity, etc.

i. Establish a routine: Daily routine of the sleeping pattern is very important for good sleep. An individual should always go to bed when they are sleepy, don't avoid sleep.

- Develop a calming pre-sleep routine, such as reading, meditation, or deep breathing.
- Avoid stimulating activities before bedtime.

j. Optimize Sleep Environment:

- Create a dark, quiet sleep environment.
- Maintain a cool room temperature (around 60-67°F).
- Invest in a comfortable mattress and pillows.

k. Stick to a Sleep Schedule:

- Go to bed and wake up at the same time every day, including weekends.
- Gradually adjust sleep schedule if needed.

l. Limit Exposure to Screens Before Bed:

- Avoid screens (phones, tablets, TVs) at least an hour before bedtime.
- Use blue light filtering glasses, apps, or software.

m. Avoid Stimulating Substances:

- Limit caffeine intake, especially in the afternoon and evening.
- Avoid nicotine and heavy meals close to bedtime.

n. Exercise Regularly:

- Engage in regular physical activity, but not too close to bedtime.
- Avoid vigorous exercise within 2-3 hours of bedtime.
- Manage Stress and Anxiety

- Practice stress-reducing techniques, such as yoga, tai chi, or mindfulness meditation.
- Seek professional help if stress and anxiety persist.

o. Limit Naps:

- Avoid napping close to bedtime.
- Limit naps to 20-30 minutes.

National sleep policy (2019) recommends the following aspects to address sleep disorder problems:

- Develop a comprehensive plan for information dissemination through mass communication and public lectures to raise the public understanding of the relevance of sleep in health and disease.
- Emphasise the harmful influence of electronic gadgets on sleep, notably the unfavorable impact of blue light on circadian rhythm.
- The establishment of a governing body to decide appropriate working hours. (Barnes and Drake, 2015) Strict rules will be devised, especially for shift employees in the surface transportation and aviation industries, as well as hospitals, the military forces, law enforcement, and any other industry that necessitates shift work. A deterrent provision should be included.
- Awareness of the public about the dangers of drowsy driving. A sleepy driving module may be made necessary before a driver's license is issued. The maximum duration on wheels in a certain period should be set, as well as the continuous driving time.
- Healthcare workers, particularly in primary care settings, must be trained to recognize sleep-related illnesses early and send them to higher-level care. Government institutions should provide subsidized professional and technical sleep education.
- Medical students should learn about the need for sleep from a young age, ideally during their education. The need for sleep must be instilled in medical students

early on, i.e. during their training years. This necessitates the inclusion of sleep medicine curricula in medical undergraduate and postgraduate programmers.

- It is necessary to ensure the availability of high-quality equipment for diagnosing and treating sleep disorders. For that purpose, higher depreciation on sleep medication equipment should be granted, as should tax incentives for equipment imports. The construction of sleep centers must be made easier, which may involve efforts such as tax benefits. The diagnosis and treatment of sleep problems must be covered by insurance providers.
- To select priority areas for sleep research in India, an expert body should be constituted especially in public health, setting goals for the next five to twenty years is crucial. Government-sponsored sleep research funding is increasing in both the public and private sectors.

2.4 Importance of Sleep:

Sleep plays a vital role in a person's health and wellness. It can be achieved if a person’s substantial amount of Sleep is there. Quality of sleep and also at the right times can safeguard mental health and physical health of life. During sleep, the body is working to support the healthy functioning of the brain and maintain physical health, and when awake feeling depends upon the quality of sleep.

2.4.1 Amount of Sleep Needed:

Sleep is essential at any age, according to scientific evidence. Sleep recharges the mind, heals the body, and fortifies nearly every system in the body. But how much sleep do we need to reap these advantages?

According to Hirshkowitz et al. (2015), healthy adults require 7 to 9 hours of sleep per night. Babies, young children, and teenagers require even more sleep to allow for proper growth and development. People over the age of 65 should also get 7 to 8 hours of sleep per night.

In general, for healthy adults, there is a requirement of 16 hours of wakefulness and need an average of 8 hours of sleep at night. However, some individuals need 6 hours of sleep to perform at their peak (Hans et al., 2005)

According to Youth Risk Behavior, (2010), adults should sleep for 7 to 9 hours daily. The research also suggested that sticking to a consistent sleep schedule is the best way to control the body's clock.

2.5 Causes of Sleep Problems:

When sleep is inappropriate, then the day is miserable which ultimately results in poor concentration, irritability and headache will appear. Sleep is affected by various factors. The reasons for sleep disorders problems are directly or indirectly related to the following systems:

a. **Physiological systems: -** Brain and the nervous system disease, Cardiovascular system, and immune system cause sleep problems including sleep conditions, pathology, sleeplessness, accidents, musculoskeletal disorders, hormonal changes, elevated risk of cardiovascular disease, obesity, metabolism, and diabetes, menopause, emotional disorder (depression, bipolar disorder), Alcohol and drug abuse also alter sleep disorder (Dinges, 2004).
b. **Stress**: Stress can be positive or negative. Negative stress can create tension, anxiety, discomfort all of these leads to sleep problems, loss of health, and poor well-being. Occupational stress, school pressure, marital problems and illness, death in the family can cause short-term sleeping difficulties.
c. **Anxiety:** It is also related to difficulty in sleeping. Excess anxiety makes it more difficult to fall asleep and stay asleep through the night. Anxiety can intensify sleep deprivation, spurring a harmful cycle involving insomnia and anxiety disorders. It also causes sleep-related problems or makes existing problems worse.

d. **Substances use:** Substances like alcohol, caffeine, tea, etc. affect the individual's ability to sleep. The adenosine chemical is produced by the brain and it is auxiliary in persuading sleep. Substances such as alcohol, caffeine, tea often affect the capability of the person to sleep. The brain produces the chemicals of Adenosine and they are supplementary in stimulating sleep. All of these substances inhibit adenosine development thus preventing the person from sleeping. Among all, alcohol gives rise to sleep but affects the overall sleep quality.

e. **Travelling:** Travelling across several time zones causes jet lag and having disturbed sleep. This upset biological or "circadian" rhythms. Travel will wreak havoc on a sleep schedule, as thrilling and rewarding as seeing the world can be. In unfamiliar cities, late nights out, uncomfortable beds in hotels and hostels, and long trips in rental cars or public transport can all make one feel more exhausted and sleep-deprived than normal.

f. **Environmental factors:** Sound sleep can be affected by room temperature i.e. too hot or too cold, noise pollution, bright lighting in the room, size of the bed, room partners' habits also affect sleep.

g. **Family disturbances:** Many factors in a family also causes sleep difficulties. Child sleep habits may also be disrupted by parental activities that are conditioned by parental cognitions and attitudes about sleep, as well as external stressors (e.g. career or marital issues). Family conflicts, defective home environment, sibling rivalry also contribute to disturbances. Children or family members can also interrupt sleep.

h. **Working time:** Working patterns and timings also affect sleep. The 24/7 lifestyle interrupts regular sleep. The workers who work in shifts, especially in the industry sector have severe sleep disturbances.

i. **Health Problems:** Unhealthy physical problems can inhibit the capability to stay asleep. People with medical issues might cause pain, back pain, or discomfort and make sleep difficult. The self-reported sleep studies show a rise

in the risk of cardiovascular illnesses and a loss of life/death rate (morbidity and death) in the self-assessing sleep conditions. In the case of women, pregnancy and hormonal imbalance also cause premenstrual syndrome (PMS) or menopause induce sleep deficits. Medication for hypertension, asthma, depression also cause sleeping difficulties as a side effect. Tiredness is a significant symptom of mental illness, such as severe depressive disorders, low depression, dysthymia, mixed anxiety depression, seasonal affective disorder, and bipolar disorder.

j. Shift Work: Workers who work on different shifts and scheduled continuous shift work may have an adverse effect on the sleep-wake cycle of the body. According to the Bureau of Labor Statistics (2019), around 16% of salaried employees adhere to shift work patterns. This includes the 6% who work evening hours and the 4% who work night shifts. People who work at night, early in the morning, or on rotating shifts are more likely to develop shift work disorder and sleep problems (Watson et al., 2015).

k. Medical conditions: Physical and psychological conditions can hamper the ability of an individual to proper sleep. The body imbalance can be created as a result of physiological problems such as gastric reflux, joint inflammation, premenstrual syndrome, and a multitude of other medical conditions that causes body imbalance. Similarly, psychological problems like stress, depression, anxiety also interfere with proper sleep.

l. Use of medicines: The ingesting of certain kinds of medication can also cause sleep deprivation. Medications like alpha and beta-blockers, antidepressants, and antihistamines. These medications have a tremendous influence on sleep patterns. The medicine beta-blockers, used for high blood pressure glaucoma, heart failure, or cure migraines cause low levels of REM and affect deep sleep. It causes an increase in daytime sleepiness.

m. **Genetics:** It is found to be the main cause of narcolepsy which is a neurological disorder of sleep regulation that affects the control of sleep and wakefulness. It also contributes to sleeplessness.

n. **Aging:** The majority of adults over the age of 65 have some type of sleep disorder. Sleep habits tend to move with aging. Many individuals find that aging causes them to fall asleep at a harder time. During the night and early in the morning, they awaken more frequently. The average sleep time remains the same or decreases slightly (6.5 to 7 hours per night) with age.

o. **Relationship problems:** It also affects sleep. The feeling of irritability or anger with a loved one, particularly a family member, can keep one up at night. The conflicts between the couple lead to psychological distress.

p. **Food habits:** Various food items are reported to induce sleep disturbances. The most commonly used food products are caffeine or alcohol which disrupt sleep patterns to a greater extent.

q. **Light:** It has a major impact on our sleep cycle. Synthetic light makes the brain process information correctly. It confused circadian rhythm, which leads to impairment in our sleep time. Light disruptions could be a TV left “on” in the room or any other source of light that can induce sleep disturbance.

2.6 Sleep Disorder:

A sleep disorder (somnipathy) is "a disturbing pattern of sleep that may consist of difficulty, delayed or staying sleep, go to asleep at improper times, excessive total sleep time, or abnormal behaviors associated with sleep (Czeisler et al.,1980).

Sleep is related to the neurological system of the body and it provides rest and restores the energy level of the body. Every individual spends one-third of his life span in sleep. Normal human sleep is comprised of NREM (Non-Rapid Eye Movement) AND REM (Rapid Eye Movement). The alteration between NREM & REM occurs about 4-5 times during a night of normal sleep.

2.6.1 Prevalence of Sleep Disorder in India:

The prevalence in India of sleep disorders is high. Despite this, the Indian National Health Policy, which was changed in 2017, fails to address the essential issue of the population's need for proper sleep, which could affect India's public health statistics. In this day and age, a comprehensive national sleep policy is required.

Adults and children both suffer from a lack of sleep which shows a high prevalence of sleep disorders. Sleep deprivation affects mood, cognition, and decision-making capacity, as well as causing obesity and increased cardiovascular mortality. Driving when tired increases the chances of being involved in a car accident. In these circumstances, India will need a national sleep policy with 5- 20-year public health objectives (Akhtar and Mallick, 2019).

After nearly 15 years, The National Health Policy of India for 2017 has been updated (the last health policy was formulated in 2002). Its goal is to provide the highest possible health and well-being for all citizens of all ages without causing financial hardship. The 2017 policy focuses on non-communicable illnesses, mental health, geriatric health, palliative care, and rehabilitative services, and it moves the emphasis from selected to comprehensive primary healthcare. Primary healthcare has received the most funding. It does not, however, address the crucial issue of getting enough sleep. The policy has neglected the effects of sleep restriction, deprivation, and disorders on public health and, as a result, the nation's health.

India has a large population and a growing economy. So far, little attention has been paid to the health consequences of a lack of sleep, both in terms of quality and quantity. Getting enough good quality sleep is essential for good health (Irish et al., 2015) and longevity. Adults should get at least 7-8 hours of sleep per night (Watson et al., 2015), and children should get at least 10 hours (Paruthi et al., 2016). The population, on the other hand, does not get enough sleep. In India, sleep disorders are very common. According to one study, as many as 33% of adults in India suffer

from insomnia (Bhaskar, Hemavathy, and Prasad, 2016) Sleep deprivation has a profound and far-reaching impact on health. Adults who are sleepy during the day may be less productive. People who lack sleep are less effective at making quality decisions are more likely to experience distress, (Glozier et al., 2010) become obese, and are more likely to develop coronary heart disease (Ayas et al., 2003).

First, there is a shocking lack of awareness about sleep disorders in the country, which has an impact on treatment-seeking behavior. Second, any intervention in this area will lead to a large impact.

Research has pegged the percentage of insomnia among adults in India to as high as 33 percent (Bhaskar, Hemavathy, and Prasad, 2016). In the general population, the recorded prevalence of insomnia is 9 percent and about 30 percent suffer from intermittent insomnia (Shah, Bang, and Bhagat, 2010).

Ancoll-Israel and Roth (1999) & Morin et al. (2006) found that Insomnia was reported by 18.6 percent in their study cohort. In another study among the urban population of northern India, a higher prevalence of sleep disorders related to sleep initiation and maintenance (28 percent) has been recorded.

These results indicate that in India, insomnia is an unrecognized burden and highlights the need for community-based studies in various socio-economic situations. In addition to healthrelated variables, anxiety and depression are the most significant risk factors associated with insomnia (LeBlanc et al., 2009).

The population data from the Indian adult population for two disorders have been found in research for two types of sleep disorders: Obstructive Sleep Apnea (OSA) and Restless Legs Syndrome (RLS). Sleep issues have been explored more often among Indian children using a range of methods, the most popular of which is questionnaire-based screening in school-based cohorts (Gupta et al., 2017).

2.6.2 Types of Sleep Disorders:

Insomnia: Insomnia is the most frequent type of sleep deprivation (Ohayon, 2002). Insomnia is a disorder that has both nocturnal and diurnal symptoms. It's marked by a preponderance of dissatisfaction with sleep quality or duration, as well as difficulties falling asleep at night, frequent or extended awakenings, or early-morning awakenings with the inability to return to sleep. These issues arise despite enough sleep opportunities and are linked to clinically significant distress or impairment of the daytime performance, such as weariness, low energy, mood swings, and reduced cognitive skills, such as impaired attention, focus, and memory. When sleep issues occur three evenings a week for more than three months, insomnia is diagnosed (Sateia, 2014). Insomnia is defined as trouble falling asleep, staying asleep, or sleeping for a short period while having the chance for a full night's sleep.

The common symptoms of Insomnia include: • Night sleep becomes Difficult. • Sleep Walking. • Non-restorative sleep • Sleepiness is excessive in the daytime. • Lacking energy. • Poor concentration. • Disturbance in mood and behavior i.e. irritability, aggression, and impulsive behaviors. • Habit of forgetting things. • Poor performance at work or school. • Fatigueless and accidents. • Deterioration in quality of life • Depression.

Insomnia may be categorized by symptom, duration, and frequency. Insomnia occurs when the loss of sleep, from one night to several weeks, lasts for a short period. But in the case of Chronic insomnia signs of poor sleep quality persists for a month or longer for at least 3 nights a week.

Symptoms of insomnia can be anything from being linked to a medical or psychiatric condition, effects on the environment, stress and worry, or simply occurring without purpose. Stress is probably the significant single cause of insomnia, causing millions of people to lie awake at night.

Sleep Apnea:

Obstructive sleep apnea involves breathing interruptions during sleep. A person with sleep apnea will have repeated episodes of airway obstruction during sleep causing snoring, snorting/gasping, or breathing pauses. This interrupted sleep causes daytime sleepiness and fatigue. Sleep apnea is diagnosed with a clinical sleep study. The sleep study (polysomnography) involves monitoring the number of obstructive apneas (absence of airflow) or hypopneas (reduction in airflow) during sleep.

Sleep apnea affects an estimated 2 to 15 percent of middle-aged adults and more than 20 percent of older adults. Major risk factors for sleep apnea are obesity, male gender, and family history of sleep apnea.

Lifestyle changes, such as losing weight if needed or sleeping on your side, can improve sleep apnea. In some cases, a custom-fit plastic mouthpiece can help keep airways open during sleep. The mouthpiece can be made by a dentist or orthodontist. For moderate to severe sleep apnea, a doctor can prescribe a CPAP (continuous positive airway pressure) device. The CPAP works to keep airways open by gently blowing air through a tube and face mask covering your mouth and nose.

Obstructive Sleep Apnea (OSA) is a serious health problem and is diagnosed commonly in sleep clinics. It occurs when there is a blockage in the upper respiratory system, breathing stops for several seconds, especially during the night, then it is called OSA. During sleep, soft tissues in the neck relax and crumble into the airways that prevent oxygen from entering the lungs. Snoring happens when the obstruction is partial, complete blockage leads to a breathing stop and gasping or choking noises when the breathing begins. When the blockage is continued several times, then sleep quality is disturbed and the person feels fatigued for the whole day.

The most common symptoms of sleep apnea include: • Chronic or loud snoring. • Frequent breaks or pauses in breathing. • Gasping for air during sleep • Awakening

with a dry mouth. • Frequently awake with a Morning headache. • Excessive daytime sleepiness (Hypersomnia). • Feel tired all the time. Difficulty paying attention while awake. • Feeling depressed, irritable, and experiencing mood swings. • High blood pressure/Hypertension. • Overweight.

Periodic Limb Movement disorder (PLMD):

The adults with this disorder may have experienced an acute or prolonged set of jerks, involuntary jerks that arise between wakefulness and approximately 3.9% of the general population and is somewhat more common in women than men. PLMD has been studied as a sleep disorder, which usually disturbs sleep and leads to drowsiness throughout the day.

Causes of Periodic Limb Movement Disorder are: • Diabetes mellitus. • Iron deficiency and Anemia. • Spinal cord tumor and spinal cord injury. • Sleep apnea syndrome. • Excessive daytime sleepiness. • Uremia-build up waste products in blood because of poor kidney functions • Medication

Narcolepsy:

Narcolepsy is a sleep attack neurological condition. In this, the brain is not able to control its sleep-wakefulness cycle. Narcolepsy attacks can occur at any time, including school time, working hours, talking, eating, exercising or playing sports, or even driving. These patients are narcolepsy sufferers. Sleep attacks are characterized by chronic daytime sleepiness and falling asleep unexpectedly at any time.

The most common symptoms of Narcolepsy are: • Excessive Daytime Sleepiness (EDS). • Long term feeling of sleepy and spontaneous or uncontrolled episodes of falling asleep without warning from several seconds to several minutes. • Feeling foggy "mental clouding", deteriorated energy level, and poor concentration. •

Depressed mood, or intense exhaustion. • People often feel illusions when they are awake from sleep (hypnopompic) or while they are in sleep (hypnogogic). The visions are sometimes very intense, and they can even be scary. • Disrupted sleep and have difficulty staying awake in the daytime and also have trouble sleeping at night. • The patients will not have a clear reason and wake up for 10 or 20 minutes, up to four or five times. • Insomnia, vivid dreams, sleep talk, acting out while dreaming, and having intermittent limb movements may disrupt their sleep.

2.7 References:

1. Akhtar, N. (2019). sleep deprivation on health is deep and extensive. Daytime sleepiness in adults can lead to reduced productivity. Sleep deprived people are less effective in making quality decisions and are more likely to experience distress, 6 develop obesity and are more likely to get coronary heart disease. 7. *THE NATIONAL MEDICAL JOURNAL OF INDIA*, *32*(1).
2. Ancoli-Israel, S., Klauber, M. R., Stepnowsky, C., Estline, E., Chinn, A., & Fell, R. (1999). Sleep-disordered breathing in African-American elderly. *American journal of respiratory and critical care medicine*, *152*(6), 1946-1949.
3. Ayas, N. T., White, D. P., Manson, J. E., Stampfer, M. J., Speizer, F. E., Malhotra, A., & Hu, F. B. (2003). A prospective study of sleep duration and coronary heart disease in women. *Archives of internal medicine*, *163*(2), 205-209.
4. Barnes, C. M., & Drake, C. L. (2015). Prioritizing sleep health: public health policy recommendations. *Perspectives on Psychological Science*, *10*(6), 733-737.
5. Bhaskar, S., Hemavathy, D., & Prasad, S. (2016). Prevalence of chronic insomnia in adult patients and its correlation with medical comorbidities. *Journal of family medicine and primary care*, *5*(4), 780-784.
6. Butkov, N., & Lee-Chiong, T. L. (Eds.). (2007). *Fundamentals of sleep technology*. Lippincott Williams & Wilkins.

7. Buysse, D. J. (2013). Sleep health: can we define it? Does it matter? *Sleep*, *37*(1), 9-17.
8. Czeisler, C. A., Richardson, G. S., Coleman, R. M., Zimmerman, J. C., Moore-Ede, M. C., Dement, W. C., & Weitzman, E. D. (1980). Chronotherapy: resetting the circadian clocks of patients with delayed sleep phase insomnia. *Sleep*, *4*(1), 1-21.
9. Glozier, N., Martiniuk, A., Patton, G., Ivers, R., Li, Q., Hickie, I., ... & Stevenson, M. (2010). Short sleep duration in prevalent and persistent psychological distress in young adults: the DRIVE study. *Sleep*, *33*(9), 1139-1145.
10. Gupta, L., Morgan, K., & Gilchrist, S. (2017). Does elite sport degrade sleep quality? A systematic review. *Sports Medicine*, *47*, 1317-1333.
11. Han, K. S., Kim, L., & Shim, I. (2005). Stress and sleep disorder. *Experimental neurobiology*, *21*(4), 141.
12. Havard health publication. (2006). Importance of Sleep: Six reasons not to scrimp on sleep. Retrieved from http://healthysleep.med.harvard.edu/ healthy/getting/treatment/an-overview-of-sleep-disorders,2006.
13. Hirshkowitz, M., Whiton, K., Albert, S. M., Alessi, C., Bruni, O., DonCarlos, L., ... & Hillard, P. J. A. (2015). National Sleep Foundation's sleep time duration recommendations: methodology and results summary. *Sleep health*, *1*(1), 40-43.
14. Iber, C., Ancoli-Israel, S., Chesson, A. L., & Quan, S. F. (2007). The new sleep scoring manual–the evidence behind the rules. *Journal of Clinical Sleep Medicine*, *3*(02), 107-107.
15. Irish, L. A., Kline, C. E., Gunn, H. E., Buysse, D. J., & Hall, M. H. (2015). The role of sleep hygiene in promoting public health: A review of empirical evidence. *Sleep medicine reviews*, *22*, 23-36.
16. King, A. C., Belenky, G., & Van Dongen, H. P. (2009). Performance impairment consequent to sleep loss: determinants of resistance and susceptibility. *Current opinion in pulmonary medicine*, *15*(6), 559-564.

17. LeBlanc, M., Mérette, C., Savard, J., Ivers, H., Baillargeon, L., & Morin, C. M. (2009). Incidence and risk factors of insomnia in a population-based sample. *Sleep*, *32*(8), 1027-1037.
18. Meier-Ewert, H. K., Ridker, P. M., Rifai, N., Regan, M. M., Price, N. J., Dinges, D. F., & Mullington, J. M. (2004). Effect of sleep loss on C-reactive protein, an inflammatory marker of cardiovascular risk. *Journal of the American College of Cardiology*, *43*(4), 678-683.
19. Morgan, L., Arendt, J., Owens, D., Folkard, S., Hampton, S., Deacon, S., ... & Taylor, K. (1998). Effects of the endogenous clock and sleep time on melatonin, insulin, glucose and lipid metabolism. *Journal of endocrinology*, *157*(3), 443-452.
20. Morin, C. M., Vallières, A., & Ivers, H. (2006). Dysfunctional beliefs and attitudes about sleep (DBAS): validation of a brief version (DBAS-16). *Sleep*, *30*(11), 1547-1554.
21. National Sleep Foundation (2006). Retrieved from https://www. sleepfoundation.org/professionals/sleep-americar-polls/2005-adult-sleephabits-and-styles
22. National Sleep Foundation (2019). Retrieved from https://www. sleepfoundation.org/articles/new-research-identify-and-treat-insomnia-earlyreduce-risk-other-illnesses
23. Paruthi, S., Brooks, L. J., D'Ambrosio, C., Hall, W. A., Kotagal, S., Lloyd, R. M., ... & Wise, M. S. (2016). Recommended amount of sleep for pediatric populations: a consensus statement of the American Academy of Sleep Medicine. *Journal of clinical sleep medicine*, *12*(6), 785-786.
24. Porkka-Heiskanen, T., Zitting, K. M., & Wigren, H. K. (2013). Sleep, its regulation and possible mechanisms of sleep disturbances. *Acta physiologica*, *208*(4), 311-328.

25. Rubens, S. L., Gudiño, O. G., Fite, P. J., & Grande, J. M. (2013). Individual and neighborhood stressors, sleep problems, and symptoms of anxiety and depression among Latino youth. *American Journal of Orthopsychiatry*, *88*(2), 161.
26. Sateia, M. J. (2014). International classification of sleep disorders. *Chest*, *146*(5), 1387-1394.
27. Shah, N., Bang, A., & Bhagat, A. (2010). Indian research on sleep disorders. *Indian journal of psychiatry*, *52*(Suppl1), S255-S259.
28. Sharma, S., & Kavuru, M. (2010). Sleep and metabolism: an overview. *International journal of endocrinology*, *2010*(1), 270832.
29. Van Dongen, P. A., Baynard, M. D., Maislin, G., & Dinges, D. F. (2004). Systematic interindividual differences in neurobehavioral impairment from sleep loss: evidence of trait-like differential vulnerability. *Sleep*, *27*(3), 423-433.
30. Van Stavern, G. P., Bei, L., Shui, Y. B., Huecker, J., & Gordon, M. (2019). Pupillary light reaction in preclinical Alzheimer's disease subjects compared with normal ageing controls. *British Journal of Ophthalmology*, *103*(7), 971-975.
31. Watson, D., Stasik, S. M., Ellickson-Larew, S., & Stanton, K. (2015). Explicating the psychopathological correlates of anomalous sleep experiences. *Psychology of consciousness: Theory, research, and practice*, *2*(1), 57.
32. Xie, L., Kang, H., Xu, Q., Chen, M. J., Liao, Y., Thiyagarajan, M., ... & Nedergaard, M. (2013). Sleep drives metabolite clearance from the adult brain. *science*, *342*(6156), 373-377.