Sleeping for Health

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Sleep is an essential physiological process in a living being. It is a complex biological pattern consisting of period of temporary unconsciousness from which a person can be aroused by sensory or other stimuli.[1] Sleeping less is often regarded as a good attribute in some communities which is actually a misconception as sleep deprivation often leads to serious health consequences. Sleep is actually an active repetitive and reversible behavior involved in repair and growth of neurons resulting in consolidation of learning, memory and other restorative processes working throughout brain and body and so sleep deprivation may result in psychological and neuro-cognitive impairments.[2] Accumulated evidence from several studies indicates that chronic sleep loss may lead to obesity and various metabolic disorders including decreased glucose tolerance, decreased insulin sensitivity, increased evening concentrations of cortisol, increased levels of ghrelin, decreased levels of leptin and increased hunger and appetite.[3]

The quality of sleep is a measure of both the quantitative and qualitative components of sleep; the quantitative component includes duration of sleep while the qualitative component is a subjective measure of the depth and feeling of restfulness upon awakening.[4]

The specific physiological mechanisms involved in sleep, however, remains a mystery and they are the subjects of much research. Sleep is believed to be caused by an active inhibitory process; a center located below the mid-pontine level of the brain stem is responsible for producing sleep by inhibiting other parts of the brain.[1] When the sleep centers are not activated, the mesencephalic and upper pontile reticular activating nuclei are released from inhibition which allows the reticular activating nuclei to become spontaneously active and wakefulness occurs, then, after the brain remains active for many hours, the neurons in the activating system become fatigued and the sleep-promoting effects cause rapid transition from wakefulness back to sleep.[1]

The question is- why sleep is an essential part of life? It has been observed that mild sleep restriction over even a very short period may impair cognitive and physical integrity, overall productivity and health of a person. Laboratory experiments demonstrated the fact that rats deprived of sleep for 2 to 3 weeks may actually die.[1]

Wakefulness for a prolonged period is often associated with progressive impairment of the thought processes leading to abnormal behavioral activities. Insomnia often leads to excessive daytime sleepiness which is associated with increased risks for accidents, impaired productivity and difficult interpersonal relationship.[5]

Insufficient sleep affects endocrine, immune and nervous systems and is associated with an increased risk of cardiovascular disorders including hypertension, diabetes and impaired glucose tolerance and obesity.[6] Insufficient sleep positively influences body weight regulation and metabolism.[7] Production of hormones such as leptin and ghrelin which are concerned with regulation of appetite is altered during the period of sleep restriction which leads to increased hunger resulting in increased calorie intake, decreased physical activity owing to fatigue and thus weight gain.[8]

On the other hand, sleep in multiple ways restores normal levels of brain activity and it has been postulated to serve many functions including neural maturation, facilitation of learning or memory, cognition and conservation of metabolic energy.[1] Sufficient sleep plays a role in improving memory and has been implicated with good scholastic attainments. For students, specially medical students, adequate sleep is required for maintaining good physical health which is a pre-requisite for attaining proper mental stability to carry out the academic load.

Medical college students often sacrifice sleep to comply with their demanding academic schedule thus experience a number of sleep problems which may influence their health and academic performance.[9] Sometimes owing to peer pressure students stay up late and interact on social networking sites. A study was conducted to observe sleep patterns among pre-clinical students of Armed Forces Medical College with an aim to ascertain whether the medical students are facing any type of sleeping difficulty which may affect their physical and mental health, cognitive ability and thus their academic accomplishment.[10] The study reveals that about 37.44 % of the medical students of pre-clinical course are poor sleepers. This finding is in consistence with the results of a study on medical students of Taif University which observed that about 40.6 % of the study subjects were having poor quality of sleep.[11] The said study conducted on the students of Armed Forces Medical College

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revealed that a total of 62.56 % study subjects were found to be good sleepers and only 8.11% had severe excessive day time sleepiness. Overall scenario representing the sleep behavior of these students is not very discouraging as because the concerned study subjects are medical cadets who reside in well maintained dormitories and attend regular physical training sessions amidst their busy academic schedule.

The national Sleep foundation recommends 7-9 hrs of sleep for the 18-25 years age group of young adults of whom many are university level students.[12] Insufficient or poor quality sleep is associated with physical and emotional distress, decreased cognitive ability and poor academic performance and a host of behavioral problems. Bedtime extension in short sleepers should be explored as a novel behavioral intervention that may prevent weight gain or facilitate weight loss[3] and also may promote sound physical and mental health by regulating circadian mechanisms involved to maintain sleep health.

Sleep is essential for maintaining sound health and mind of an individual. To promote healthy sleep behavior and to prevent sleep disorders we need to focus on health related lifestyle factors such as physical exercise, proper nutrition, abstinence from smoking, alcohol and related factors associated with sleep deficiency and circadian dysfunction. More studies are needed to identify intervention strategies to improve sleep and circadian alignment and also to detect multi-factorial contributors for health disparities. Mindfulness based stress reduction programs including group therapy, educational interventions through seminars, workshops and physical training sessions need to be conducted to improve quality of sleep and thus minimize incidence of sleep disorders in the community.

References

1. Guyton A Hall, Text book of Medical Physioloty. 13th ed. New Yourk, Chapter 60, Elsevier, 2016:763.

2. Curcio G, Ferraraa M and Luigi De Gennaroa. Sleep loss, learning capacity and academic performance. Sleep Medicine Reviews. 2006: 10:323-37.

3. Loche S, Cappa M, Ghizzoni L et al. Role of sleep and sleep loss in hormonaol release and metabolism. Basel Karger. 2010; 17:11-21.

4. Lemma S, Gelaye B, Berhane Y et al. Sleep quality and its psychological correlates among university students in Ethiopia: A cross-sectional study. BMC Psychiatry. 2012:1-7.

5. Anjum A, Bajwa MA, Saeed R. Sleep patterns; among medical and non-medical students of University of Lahor, 2010-11. Professional Med J. 2014; 21(1):148-56.

6. Knutson KL. Sleep duration and cardiometabolic risk: A review of the epidemiologic evidence. Best Pract Resc Clin Endocrinol Metab. 2010: 24(5):731-43.

7. Chaput JP, Despr'es JP, Bouchard C, Tremblay A. Short sleep duration is associated with reduced leptin levels and increased adiposity: Results from the Quebec family study. Obesity. 2007; 15(1):253-61.

8. Penny McLean-Nowinski. Sleep Hygiene and How to Sleep Better. Brown University Health. Available from https://www.brownhealth.org.

9. Alsaggnf MA, Wali SO, Merdah RA, Merdad LA. Sleep quantity, quality and insomnia symptoms of medical students during clinical years. Saudi Med J. 2016; 37(2):173-82.

10. Sultana S, Chowdhury MS, Akbar FM, Shams NAB. Sleep Patterns among the Pre-clinical Medical Students of a Selected Medical College in Bangladesh. JAFMC Bangladesh, 2022; 18(1):61-6.

11. Alqarni AB, Alzahrani NJ, Alsofyani MA, Almalki AA. The interaction between sleep quality and academic performance among the medical students in Taif University. EJHM. 2018: 70(12):2202-8.

12. National Sleep Foundation. National sleep foundation recommends new sleep times; 2020. Available from: https://www.sleepfoundation.org/press-release/national-sleep-foundation-recommends-sleep-times.