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Sleep Medicine: Understanding the Role of Sleep in Health

Fumbiro Akiriza O.

School of Applied Health Sciences Kampala International University Uganda

ABSTRACT

Sleep is a critical biological process that impacts cognitive function, psychological well-being, and overall physical health. This paper examines the multifaceted domain of sleep medicine, addressing the biological foundations of sleep, the role of sleep in learning and memory, and the association between sleep deprivation and health outcomes such as obesity, hypertension, and psychiatric disorders. It examines common sleep disorders, including insomnia, sleep apnea, and restless legs syndrome, and their implications for long-term health. The diagnostic and treatment modalities of sleep disorders are discussed, highlighting the importance of behavioral, pharmacological, and technological interventions. Lastly, the paper emphasizes the need for advancing sleep medicine research and integrating sleep health into public health policy. By enhancing our understanding of sleep's role in health and improving access to effective treatments, sleep medicine can significantly contribute to reducing the global burden of sleep-related health issues.

Keywords: Sleep medicine, Sleep disorders, Cognitive health, Sleep deprivation, Sleep quality.

INTRODUCTION

Sleep medicine encompasses the biology of sleep, the alteration of cognitive processes that result from inadequate sleep quality or quantity, the cognitive and lifestyle factors that determine sleep duration and quality, the assessment of sleep quality, and the effects of sleep deprivation on health-related outcomes and psychological well-being. Although sleep medicine focuses on sleep and its regulation, most sleep specialists receive advanced training in other disciplines, particularly internal medicine, anesthesiology, family medicine, pediatrics, psychiatry, neurology, otolaryngology, or pulmonology. The field of sleep medicine and science also incorporates investigators who are primarily trained as epidemiologists, biostatisticians, and clinical psychologists, who may belong to or affiliate with departments in public health [1, 2]. One function of sleep from a cognitive or psychological perspective is that it seems to be essential to learning. In controlled experimental paradigms, even relatively small reductions in the duration and quality of sleep or sleep stages have been shown to have detrimental effects on cognitive performance. It has long been suggested that age-related cognitive decline might in part be due to the age-related changes in sleep. Our capacity to access information can be measured behaviorally, by seeking to recall information, but also, increasingly, with neuroimaging techniques, which show that sleep is critical to the brain's systems for forming, consolidating, and reconsolidating long-term memory. In this way, sleep may help us learn new skills in the short term and may also play a role in making our knowledge more permanent and stable in the long term. A second, hypothetically separable function of sleep is to permit the renewal of physiological and phenotypic function. From this stance, sleep is compositional, allowing the brain or other cell aggregates time off to recuperate. Reviews have not found consistent associations between sleep measures and health outcomes such as heart attack, hypertension, or diabetes. There is an increasing number of cross-sectional and prospective relationships between relatively shorter sleep and BMI and obesity. The mechanisms by which these relationships are related are largely speculative. The closest thing to a prevention trial of a sleep intervention is that presented a few years ago, showing that intensive blood pressure management that encouraged or led to some This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited

increased average sleep duration resulted in a slight but significant reduction in the incidence of new cases of hypertension. The study showed that encouraging people to experimentally increase sleep led to less food consumption the following day and, probably for this reason, helped them lose a bit of weight. Like other processes, sleep has been implicated as relevant to factors that could influence health in associative and experimental studies, as well as through other, more indirect pathways such as the benefits of labor in health and the impact of circadian rhythm misalignment on, among other things, the cardiovascular system. It is important to take a few minutes to summarize that each of these dimensions is not in conflict, but rather interrelated. Additionally, it is appropriate to take a few minutes to define certain terms that are unique to sleep medicine $\lceil 3, 4\rceil$.

The Importance of Sleep for Health

Sleep is essential for good mental and physical health. Adequate and regular sleep is linked to lower instances of several diseases and complaints: inadequate sleep is linked to the development and progression of behavioral and psychiatric disorders, cardiovascular diseases, hypertension, cardiac arrhythmias, stroke, metabolic syndrome, diabetes, obesity, infection rates, autoimmune diseases, and heightened functioning of the immune system, cognitive disorders, and greater metabolic function, as well as a strengthening of mental health and cognitive function. Sleep onset appears to be the time at which the immune system comes to life, with the production of white blood cells increasing to protect us from infection. Slow-wave sleep is the time for renewed blood production with an increase in red blood cells. Rapid eye movement sleep aids in consolidating information for future retrieval, learning, and regulating emotions. This aims to provide a deeper understanding of that involvement [5, 6]. Poor quality of sleep or lack of sleep can result in many adverse short- and long-term health consequences if left untreated. Sleep deprivation severely impairs judgment, motivation, problem-solving strategies, and emotional stability. The total sleep time per year has been declining for decades in Western countries because of changes in lifestyle and social and economic reasons. Evidence of substantial sleepiness is prevalent among college-aged and adolescent students. Blue light from LED screens of electronic devices has been noted to interrupt the release of melatonin. Exercise is a valuable intervention for the simultaneous enhancement of sleep duration, sleep quality, and sleep onset latency. A clear understanding of the practical advice given to patients is sustainability. By learning and adhering to proper sleep hygiene practices and using interventions that help to promote better sleep, both children and adults can benefit from enhanced sleep $\lceil 7, 8 \rceil$.

Common Sleep Disorders and Their Impact on Health

Insomnia, sleep apnea-hypopnea syndrome (SAHS), and restless legs syndrome (RLS) are the most common sleep disorders encountered in clinical practice. Insomnia is diagnosed by the presence of complaints of difficulty falling asleep, maintaining sleep, or early morning awakenings, along with the presence of daytime functioning symptoms. Insomnia is frequently associated with psychiatric diseases, primarily major depression and anxiety disorders. SAHS is diagnosed by an apnea-hypopnea index of more than 10 episodes per hour of sleep or an index of 5 or above with clinical signs such as habitual snoring, ever-occurring apnea, fragmented sleep, or daytime sleepiness. RLS, diagnosed by the presence of uncomfortable sensations in the legs and an overwhelming urge to move them, is commonly comorbid with iron deficiency and some brain and nerve diseases [9, 10]. Chronic insomnia, SAHS, and RLS are linked to a range of medical illnesses such as hypertension, diabetes, congestive heart failure, obstructive cardiomyopathy, coronary heart disease, stroke, chronic kidney disease, gastroesophageal reflux disease, and asthma. Insomnia increases morbidity and mortality and decreases the quality of life, and patients suffering from chronic insomnia report poor psychological and emotional well-being; frustration with impaired cognitive performance, physical stamina, and sexual desire; disturbed interpersonal relations; and a menacing sense of being socially stigmatized. The assessment of a sleep problem requires a detailed history of sleep and wake schedules, environmental settings, sleep behaviors, and daytime activities. Sleep history and complaints can help determine the type, frequency, and severity of the sleep disorder as well as all the potential causes that can be modifiable factors. Epidemiological studies have highlighted a significant association among insomnia, poor health, and increased use of health-related resources. Central to the clinical assessment of sleep disturbances, the criteria for many sleep disorders concentrate on daytime consequences and how they are associated with a myriad of physiological and psychological systems. Numerous forms of insomnia exist, but the most common are differentiated by the length of chronicity: transient (lasting a few days), short-term (lasting for one month or less), and chronic. The effects of untreated sleep disorders can encompass all aspects of the sufferer's life, as well as the members of their family. Pragmatically, chronic sleep problems can also place a significant burden on the provision

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of individual industries as well as health care. Even with such staggering financial, clinical, and social impacts, sleep disorders remain undiagnosed or untreated because of patients' and, in some cases, healthcare professionals' lack of awareness or unresponsiveness. Furthermore, many deny themselves appropriate diagnosis, treatment, and resolution of the illness out of social stigma. Both insomnias, primary and secondary, are often poorly understood and instead typed as psychiatric dramas; hence the importance of diagnosing them since they are easily treatable and curable to a significant extent in a collaborative community [11, 12].

Diagnosis and Treatment of Sleep Disorders

Healthcare providers may be able to recognize the various types of sleep disorders. Several techniques can also be used that will help to diagnose. Subjective assessments require that patients carry out activities that can help to uncover a sleep disorder. The most commonly used method for the subjective assessment of sleep is the sleep diary. Polysomnography is a developing field in technology and should always be attended to diagnose a sleep disorder. The most challenging part during the diagnosis of a sleep disorder is distinguishing between the complaints of poor sleep and sleep disorders. To differentiate the true sleep disorders from the maladaptive behaviors of long-term poor sleep involves taking a detailed history from the patient, along with a full physical examination. The exact treatment regimen recommended for each patient diagnosed with a sleep disorder is determined by the health professional [13, 14]. The evidence in the management of the treatment strategy is collected from acute insomnia following the use of pharmacological or behavioral intervention in the guidelines developed by healthcare practitioners. There are ways in the intervention of treating a person that uses a single approach or a multidisciplinary approach. For the management of sleep disorders, there are variations in the intervention strategies. Behavioral interventions can be suggested for patients that have minimal risk effects such as insomnia or circadian rhythm problems. Pharmacological approaches are suggested for those with the symptoms of severe restless leg syndrome or temporomandibular disorder pain that is problematic for the treatment of sleep. Minimal improvement is seen in the compliance and efficacy of the intervention strategies in sports total across a 21-year intervention study if the patient does not have a good education. The possibility of speeding up and easing sleep disorder treatment is being shown in counseling to modify lifestyle from a diet, exercise, and weight loss perspective. The lengthy wait times for sleep services are also found to be aided by the intervention strategies. Telemedicine and wearable devices are currently being developed further to help with the development of self-management treatment $\lceil 15, 16 \rceil$.

Future Directions in Sleep Medicine Research

The field of sleep medicine research is growing, and there are opportunities in the scientific landscape, policy, and technology to further advance sleep research and education. One area that remains a major need is advancing both basic and clinical research to better understand changes in sleep throughout development, including genetic contributions and responses to medications and treatments. This research would lead to the development of clinical guidelines and diagnostic and medical care for children and adolescents that are evidence-based. While we have made substantial advancements in our understanding of the mechanisms of sleep, there remain many areas that require further examination. The development of new technologies has greatly advanced our ability to investigate sleep disorders and the mechanisms of action of the drugs and treatments we use in sleep medicine. These include technologies that use actigraphy, multisensory-based devices, neuroimaging, and tools of artificial intelligence and big data analytics that can analyze complex data that we are only beginning to collect. These advanced functionalities open additional doors for increasing our capacity to diagnose and treat sleep disorders. Sleep can also inform non-sleep specialists and needs to be integrated into public health efforts and public policy to make sleep a significant national goal. By increasing the awareness of the disparate social determinants of sleep, including but not limited to the social determinants, we can begin to think about sleep in a more comprehensive framework. It is clear that the need for sleep education and sleep research also spans many domains of scientific investigation, including epidemiology, psychology and psychiatry, social medicine, informatics, and diverse fields of biology and evolution. Sleep and sleep disorders are expanding fields. Identifying new areas of collaboration with sleep researchers and educating others about the focal points of research will be mutually beneficial at academic conferences and conferences on public health and education. A need to advance translational research is echoed in the importance of understanding clinical sleep medicine to move basic science in sleep medicine forward. The modern clinical sleep community, built on the shoulders of early researchers, should now leverage all the resources to advance chronic and acute care sleep medicine across the translational spectrum. Specifically, a network for clinical sleep medicine trials that emulate the translational networks in oncology and

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mental health research; these trials are embedded trials within large healthcare systems. This is the innovation and collaboration that furthers the important findings into actionable sleep solutions for our country. Adaptation to these new funding opportunities and strategies will help face the future with collaborative and innovative research. The need to include patients and communities in research is also echoed. Sleep scientists and practitioners must be on the front lines of this effort, engaging as experts and encouraging input from patients as well as community-wide participation in sleep-focused research networks being established [17, 18].

CONCLUSION

Sleep is an essential determinant of health and well-being, influencing physical, cognitive, and emotional domains. Sleep disorders, though common, often remain undiagnosed and untreated, contributing to a cascade of adverse health outcomes, including cardiovascular diseases, metabolic syndrome, and mental health disorders. Advances in sleep research, innovative diagnostic tools, and interdisciplinary approaches are transforming sleep medicine. Public health initiatives must prioritize sleep health education and policy, ensuring equitable access to sleep disorder management. By addressing the intricate interplay between sleep and health, the field of sleep medicine can foster a healthier and more resilient society.

REFERENCES

- Gierthmühlen J, Böhmer J, Attal N, Bouhassira D, Freynhagen R, Haanpää M, Hansson P, Jensen TS, Kennedy J, Maier C, Rice AS. Association of sensory phenotype with quality of life, functionality, and emotional well-being in patients suffering from neuropathic pain. Pain. 2022 Jul 1;163(7):1378-87. <u>lww.com</u>
- 2. Bacaro V, Miletic K, Crocetti E. A meta-analysis of longitudinal studies on the interplay between sleep, mental health, and positive well-being in adolescents. International Journal of Clinical and Health Psychology. 2024 Jan 1;24(1):100424. <u>sciencedirect.com</u>
- 3. Lewis LD. The interconnected causes and consequences of sleep in the brain. Science. 2021 Oct 29;374(6567):564-8.
- Galván A. The need for sleep in the adolescent brain. Trends in cognitive sciences. 2020 Jan 1;24(1):79-89.
- Chaput JP, McHill AW, Cox RC, Broussard JL, Dutil C, da Costa BG, Sampasa-Kanyinga H, Wright Jr KP. The role of insufficient sleep and circadian misalignment in obesity. Nature Reviews Endocrinology. 2023 Feb;19(2):82-97. <u>nature.com</u>
- 6. Yeghiazarians Y, Jneid H, Tietjens JR, Redline S, Brown DL, El-Sherif N, Mehra R, Bozkurt B, Ndumele CE, Somers VK. Obstructive sleep apnea and cardiovascular disease: a scientific statement from the American Heart Association. Circulation. 2021 Jul 20;144(3):e56-67. ahajournals.org
- Liew SC, Aung T. Sleep deprivation and its association with diseases-a review. Sleep medicine. 2021 Jan 1;77:192-204.
- 8. Lee S, Kim JH, Chung JH. The association between sleep quality and quality of life: a populationbased study. Sleep Medicine. 2021 Aug 1;84:121-6.
- 9. Subramanian S, Hesselbacher SE, Nye P, Aiyer AA, Surani SR. Comorbid insomnia and sleep apnea: characterization of the syndrome and understanding its associations with comorbid sleep conditions. Sleep and Breathing. 2021 Dec 1:1-6. [HTML]
- 10. Yuan F, Hu Y, Xu F, Feng X. A review of obstructive sleep apnea and lung cancer: epidemiology, pathogenesis, and therapeutic options. Frontiers in Immunology. 2024 Mar 28;15:1374236.
- Li L, Gan Y, Zhou X, Jiang H, Zhao Y, Tian Q, He Y, Liu Q, Mei Q, Wu C, Lu Z. Insomnia and the risk of hypertension: a meta-analysis of prospective cohort studies. Sleep Medicine Reviews. 2021 Apr 1;56:101403. <u>[HTML]</u>
- 12. Li X, Sotres-Alvarez D, Gallo LC, Ramos AR, Aviles-Santa L, Perreira KM, Isasi CR, Zee PC, Savin KL, Schneiderman N, Wassertheil-Smoller S. Associations of sleep-disordered breathing and insomnia with incident hypertension and diabetes. The Hispanic Community Health Study/Study of Latinos. American journal of respiratory and critical care medicine. 2021 Feb 1;203(3):356-65. <u>atsjournals.org</u>
- 13. Jaqua EE, Hanna M, Labib W, Moore C, Matossian V. Common sleep disorders affecting older adults. The Permanente Journal. 2022 Dec 12;27(1):122. <u>thepermanentejournal.org</u>

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- Folmer RL, Smith CJ, Boudreau EA, Hickok AW, Totten AM, Kaul B, Stepnowsky CJ, Whooley MA, Sarmiento KF. Prevalence and management of sleep disorders in the Veterans Health Administration. Sleep medicine reviews. 2020 Dec 1;54:101358. <u>researchgate.net</u>
- 15. Bisdounis L, Saunders KE, Farley HJ, Lee CK, McGowan NM, Espie CA, Kyle SD. Psychological and behavioural interventions in bipolar disorder that target sleep and circadian rhythms: a systematic review of randomised controlled trials. Neuroscience & Biobehavioral Reviews. 2022 Jan 1;132:378-90. <u>ox.ac.uk</u>
- 16. Şakir GI, Selvi Y. Sleep interventions in the treatment of schizophrenia and bipolar disorder. Archives of Neuropsychiatry. 2021;58(Suppl 1):S53.
- 17. Johnson KG, Sullivan SS, Nti A, Rastegar V, Gurubhagavatula I. The impact of the COVID-19 pandemic on sleep medicine practices. Journal of Clinical Sleep Medicine. 2021 Jan 1;17(1):79-87. <u>aasm.org</u>
- 18. Meltzer LJ, Williamson AA, Mindell JA. Pediatric sleep health: it matters, and so does how we define it. Sleep medicine reviews. 2021 Jun 1;57:101425.

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