SLEEP HEALTH

A COLLEGE STUDENT'S GUIDE TO TAKING CONTROL OF THEIR SLEEP HEALTH

INTRODUCTION

Who is this for?

This manual has been written for college students, a common group that suffers from sleep deprivation. This manual is intended to help students take control of their sleep health by learning about its intricacies. College can be a stressful time, and this manual will help students prevent stress and anxiety from impacting their sleep.

How should this manual be used?

This manual should be used a guide and source of information. In the first six chapters, information about sleep and how it impacts health will be shared. In the last chapter, practices and supplements will be introduced. These practices are intended to help one improve their sleep health and overall well being. It is important to always consult a healthcare provider regarding sleep disorders and new practices.

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CHAPTER 1

The Science Behind Sleep

The Body During Sleep

Sleep is the process in which the body decreases its consciousness and response to stimuli.[1] While we are not as active as we are when awake, sleep is far from a passive process. The brain is incredibly active, performing crucial functions for survival.[2] There are many systems that are active and biological processes occurring when we sleep, and examples can be seen below.

01 Cardiovascular System

While sleeping, your blood pressure, heart rate, and overall heart activity decreases. This decrease in activity is beneficial for cardiovascular health, reducing risk of heart disease and obesity.[3]

02 Endocrine System

Important hormones such as cortisol and growth hormones are closely regulated by sleep. For example, when you first wake up, your body reduces cortisol in order to arouse your brain and prepare you to be active.[3]

03 Metabolism

The liver works hard while you sleep to digest fasts. This digestion is crucial to regulate hunger, ensure appropriate response to insulin, and overall maintain weight.[3]

04 Immune System

Specific immune cells increase their workload when you sleep. Without sleep, these immune cells are not able to increase activity, decreasing the body's ability to fight off infection.[3]

HOW MUCH SLEEP IS NEEDED?

Age	Hours of sleep needed
0-3 months	14-17
4-12 months	12-16
1-2 years	11-14
3-5 years	10-13
6-12 years	9-12
13-18 years	8-10
19-64 years	7-9
65+ years	7-8

Due to the importance of sleep for mental, emotional, and physical health, it is crucial to sleep for the recommended about of hours. The chart below[5] contains the recommended hours each age cohort needs. Younger college students should aim for 8-10 hours, while older students should aim for 7-9 hours.

Key Factors to Sleep

There are many working parts that play into falling asleep, staying asleep, and quality of sleep. While each individual is as unique as their sleep is, there are many common factors among the population.

01 Environment - Light, Noise, Temperature

The environment plays a large role in the quality of sleep received. One of the largest factors is light. Light cells in the retina operate even when asleep, so increasing the amount of light in a room can greatly disrupt the bodys internal clock. Similarly, noise and temperature can also affect internal clcks. Circadian rhytyms are largely regulated by how well-adjusted a body is to its environment, so greatly changing noise or temperature can negatively affect sleep.[1]

02 Medical Conditions

Preexisting conditions such as high blood pressure, anxiety, or chronic stress can greatly impact sleep. Those with certain mental conditions can have a much more difficult experience falling and staying asleep. Regarding high blood pressure and other cardiovascular diseases, it is more difficult for the body to relax and slow down heart rate when having these conditions.[1]

03 Diet

Food and drink consumed during the day can greatly affect sleep. Consuming processed foods, caffeine, or alcohol can disrupt the body's internal clock and impact sleep. [1]

04 Medications

Specific immune cells increase their workload when you sleep. Without sleep, these immune cells are not able to increase activity, decreasing the body's ability to fight off infection. [1]

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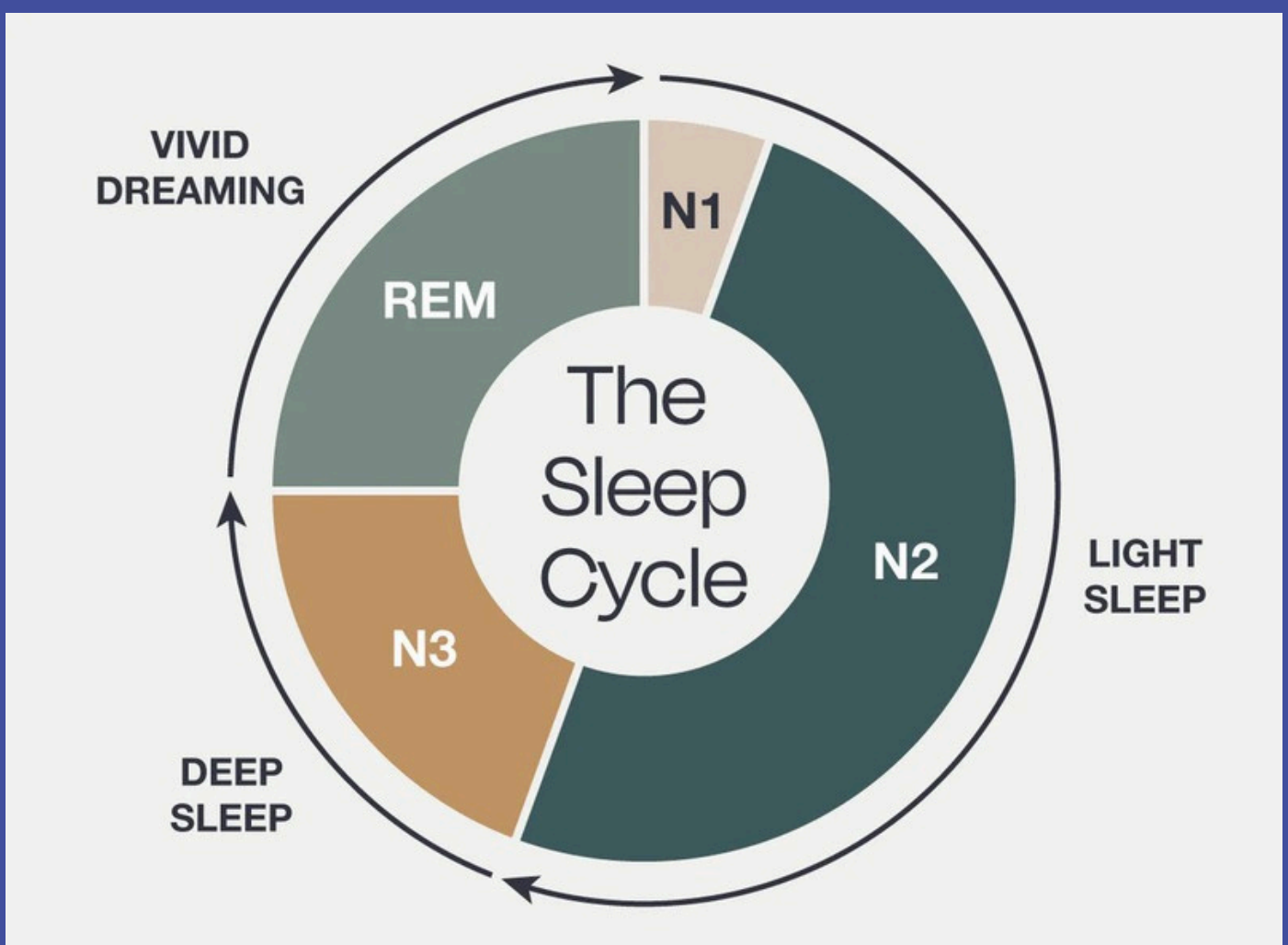
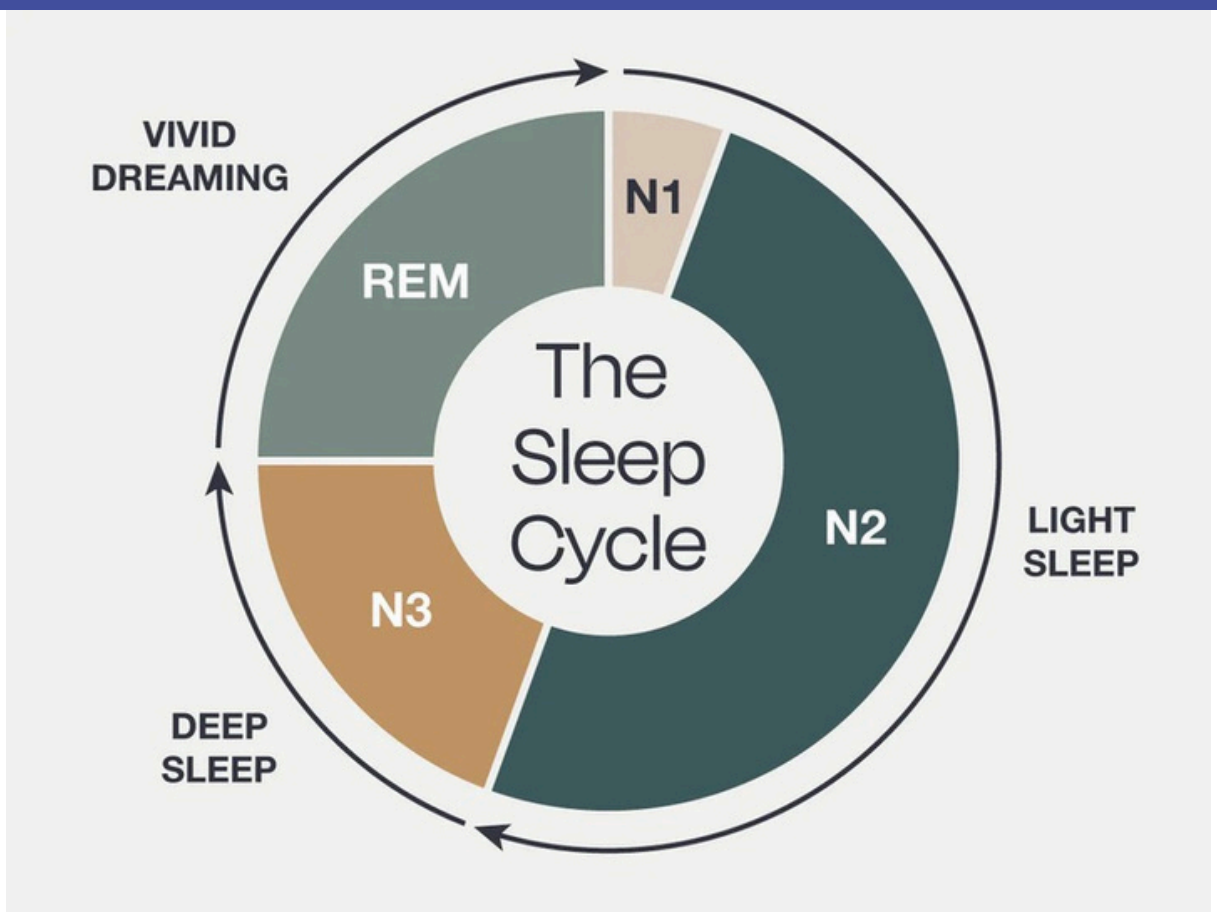
CHAPTER 2



The Stages of Sleep

SLEEP CYCLES



01 Stage 1

During Stage 1, the body moves from being awake to light sleep.[1] This occurs right after falling asleep, but it is a very short stage. This can be understood as a light sleep.[2]

02 Stage 2

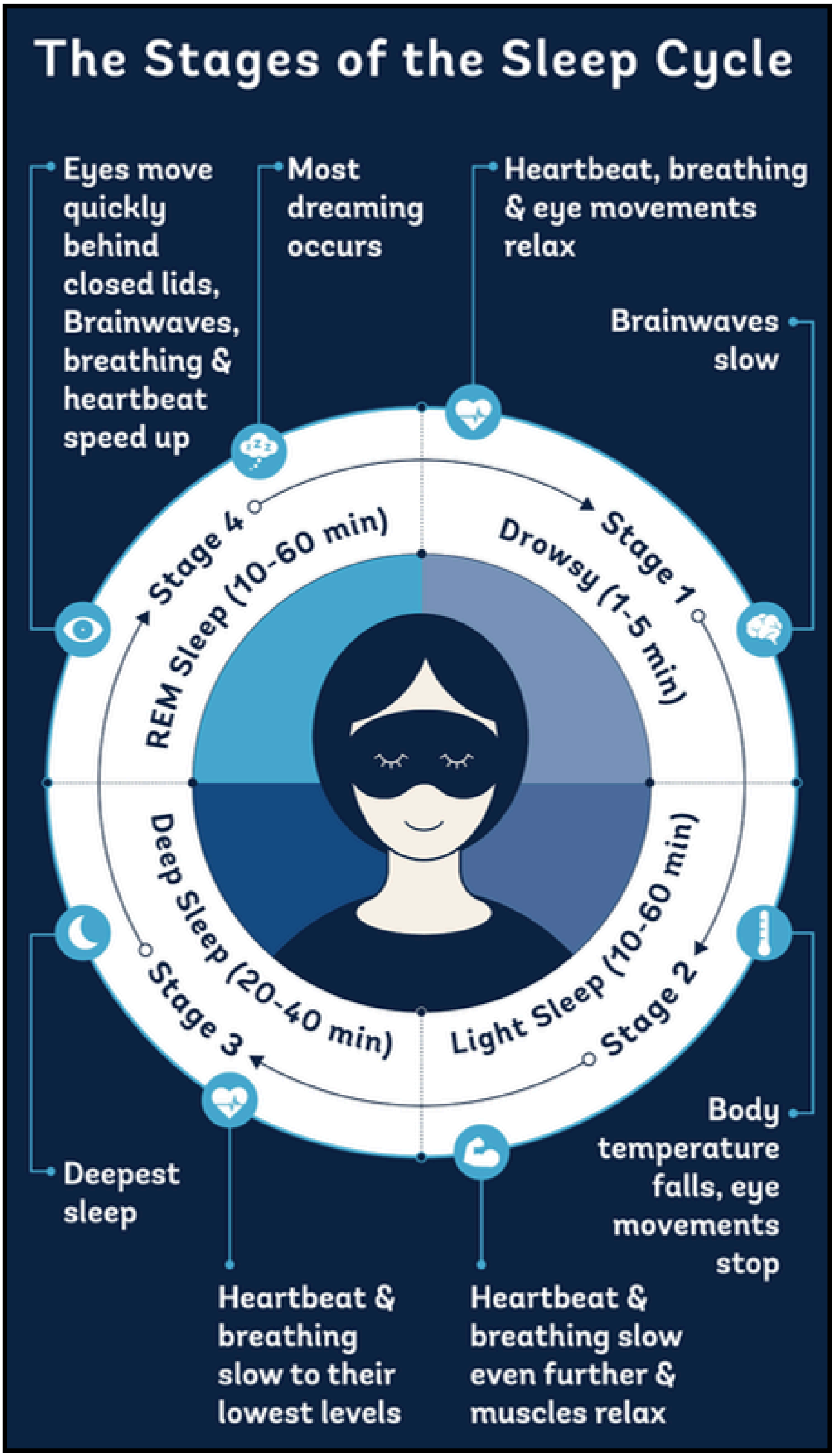
Stage 2 is past just falling asleep, but still fairly light.[1] Brain waves are slowed and less electrical activity passes through neurons. Multiple rounds of stage 2 are cycle through, and this stage accounts for most of sleep. 45% of sleep occurs in stage 2.[2]

03 Stage 3

Stage 3 is a deep sleep.[1] Most of the time spent in this stage is early in the night, and brain waves are very strong. Compared to adults who spend 25% of their sleep in this stage, children require much more time in stage 3.[2]

04 REM

Rapid eye movement (REM) is the stage of sleep where dreams occur.[1] The eyes are continuously moving while being closed, and brain activity is very similar to being awake. While the first cycle of REM is very short, following cycles are longer and can last for an hour.[2]


The Stages of the Sleep Cycle
Eyes move quickly behind closed lids, Brainwaves, breathing & heartbeat speed up
Most dreaming occurs
Heartbeat, breathing & eye movements relax
Brainwaves slow
Stage 1
Drowsy (1-5 min)
Stage 2
Light Sleep (10-60 min)
Stage 3
Deep Sleep (20-40 min)
Stage 4
REM Sleep (10-60 min)
Deepest sleep
Heartbeat & breathing slow to their lowest levels
Heartbeat & breathing slow even further & muscles relax
Body temperature falls, eye movements stop

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CHAPTER 3

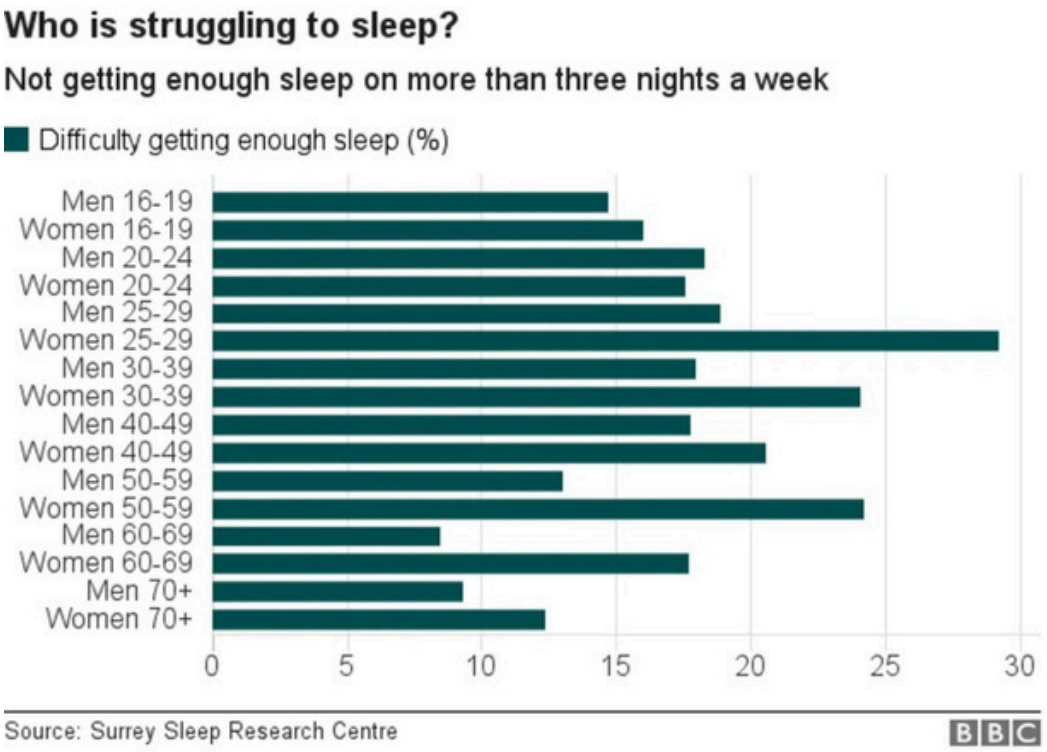
Sleep Statistics and Facts

SLEEP STATISTICS

General Populations Versus College Students

01 General Population

Regarding the global population, average duration of sleep is fairly consistent. Most working adults sleep for about 8 hours each night, and many experience at least one wake up during the night. Additionally, many adults, regardless of age and gender, report difficulty sleeping. A breakdown of each cohort can be seen in the graph below.[1]



02 College Students

Compared to the general populations, college students report significantly more sleeping problems. 40-60% report having sleeping issues.[3] Additionally, roughly 33% of students report sleeping for a short duration.[3] One cause of this shortened sleep could be the use of technology. 45% of college students check their phone after going to sleep, resulting in sporatic and disrupted sleep cycles.[1]

FUN FACTS[4]

75% of people dream in color, but before television, only 15% did.

Humans are the only mammals who intentionally delay sleep and force themselves to stay awake.

The feeling of inability to get out of bed is called dysania.

Full moons can disrupt sleep and cause later bedtimes.

For the average individual, tiredness peaks at 2am then again at 2pm.

Exercise can improve sleep, but intense workouts right before bed can actually disrupt sleep cycles.

Lack of sleep is more likely to cause increased hunger due to imbalanced hormones.

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CHAPTER 4

How Sleep Impacts Your Health

CONSEQUENCES OF SLEEP DEPRIVATION

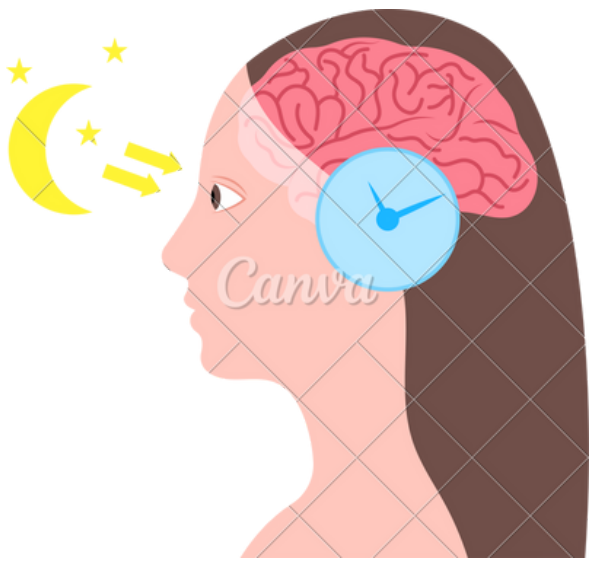
Physical Health

01 Weakened Immune System

Sleep plays a critical role in maintaining a healthy immune system. During sleep, the body produces cytokines - proteins that help combat infections and inflammation. Sleep deprivation reduces the production of these vital immune system components, leaving the body more vulnerable to illness[1]. One study found that individuals who sleep for less than 7 hours a night are almost three times more likely to develop a cold than those with at least 8 hours a night[2]. Students who consistently lack sleep are more likely to experience frequent colds, flu, and infections, which can interfere with academic and social life[3].

02 Hormonal Imbalance

Hormones regulate many vital functions in the body, including metabolism, stress response, and hunger. Sleep deprivation disrupts the production of key hormones like cortisol, the stress hormone, and leptin, the hormone that regulates appetite. Lack of sleep leads to high cortisol levels which contribute to increased stress and anxiety[4]. Additionally, sleep deprivation reduces leptin levels while increasing ghrelin, a hormone that stimulates hunger[5]. This hormonal imbalance can lead to unhealthy eating habits and increased cravings.



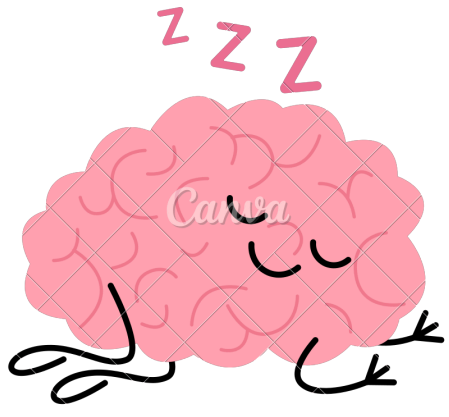
03 Chronic Conditions

Persistent sleep deprivation is linked to several chronic health conditions. Sleeping less than 7 hours per night on a regular basis is associated with health conditions such as hypertension, heart disease, and stroke.[4] Studies have shown that individuals who regularly sleep less than 6 hours per night have a higher than average BMI and those who sleep about 8 hours a night have the lowest BMI.[5] Furthermore, individuals who sleep less than 5 hours per night have an increased risk of developing diabetes[6]. When students cut corners on sleep, they inadvertently put themselves at higher risk for these life-threatening conditions which can often be long-lasting and difficult to manage.

Mental Health

Sleep and mood are closely connected. A lack of sleep can lead to increased irritability, frustration, and heightened emotional sensitivity, as well as feelings of loneliness, worry, anxiety, and depression[7]. Insufficient and irregular sleep schedules can increase depressive symptoms.[1] Along with depression, a chronic lack of sleep has been shown to increase anxiety and heighten the body's reaction to stress.

Cognitive and Academic Impacts



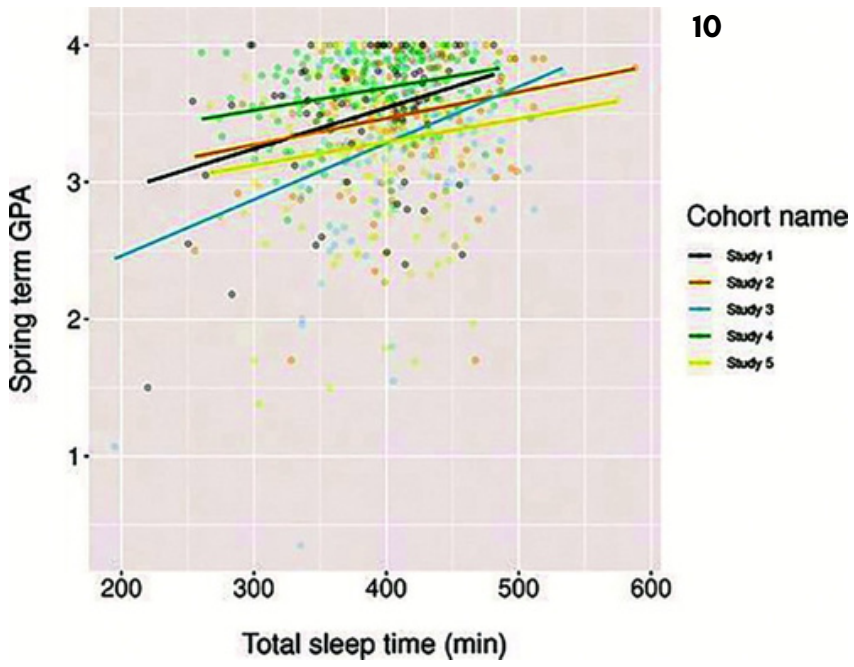
01 Decreased Cognitive Functioning

Cognitive functions such as decision-making, problem-solving, and critical thinking can be impaired by sleep deprivation. Sleep deprivation has a detrimental impact on neural circuits in the brain responsible for executive functions and working memory.[8] In particular, the prefrontal cortex, which is involved in planning, attention, and reasoning, can be significantly affected by a lack of sleep.[9] Students who do not get enough sleep find it harder to process now information, make quick decisions, or thinking creatively, all which could have an impact on academic performance.

02 Impact on Academic Performance

GPA

- For college students, there is an association between sleep and GPA.
- Students who obtain at least 9 hours of sleep have higher GPAs than students with 6 or less hours.[7]
- Students with more regular sleep-wake patterns reported higher GPAs compared with students with lower GPAs, who reported increased daytime sleepiness.[9]
- Every hour of lost total average nightly sleep is associated with an 0.07 decrease in end-of-semester GPA.[10]
    - Although this number may seem small, over time it adds up and can significantly impact a student's academic performance.



EXAMS

- Performance on exams can also be affected by sleep deprivation and sleep patterns.
- Students who average about 8 or more hours of sleep before an exam preform significantly better than students who only slept 6 hours or less.[11]
- Sleep-deprived students have more difficulty recalling information and experience more test anxiety.
- Insufficient sleep schedules have also been found to affect student's performance on exams.
    - Students with higher grades on exams reported more total sleep, earlier bedtimes, and reduced change in weekend sleep schedule compared with students with lower grades.[9]

CONSEQUENCES OF SKIPPING OR DISRUPTING SLEEP STAGES

Each stage of sleep plays a unique and vital role in physical and cognitive health. Missing or disrupting these stages - particularly deep sleep and REM sleep - can have profound consequences.

Deep Sleep

Recap of Importance of Deep Sleep

Deep sleep is essential for physical restoration, immune function, memory consolidation, cognitive function, and emotional regulation. During deep sleep, the body undergoes cell repair and growth, and the immune system is strengthened[13]Deep sleep is also crucial for the clearing of toxins and metabolic wastes from the brain that, if not cleared out, can increase the risk of dementia.

Consequences of Missing Deep Sleep

When deep sleep is insufficient, students may experience persistent fatigue, weakened immune responses, and reduced cognitive abilities. Long-term deprivation of deep sleep has also been linked to an increased risk of chronic diseases such as hypertension and diabetes, as well as cognitive decline.[13]

REM Sleep

Recap of Importance of REM Sleep

REM sleep is the phase during which the brain is most active and dreams occur. REM sleep is essential for helping your brain process and consolidate new information. REM sleep also helps to increase mental concentration and mood regulation.[12]

Consequences of Missing REM Sleep

When REM sleep is insufficient, students may experience difficulties with emotional regulation, fatigue, and issues with memory and performing other cognitive tasks throughout the day. Long term deficiency of REM sleep has been association to a higher risk of cardiovascular disease.[12]

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CHAPTER 5

Benefits of Getting Enough Sleep

BENEFITS OF ENOUGH SLEEP

Physical Health

Strengthened Immune System

- Sleep helps the body repair and regenerate, enhancing the immune system's ability to fight infections[2].

Heart Health

- Adequate sleep supports cardiovascular health by reducing the risk of high blood pressure and heart disease[1].

Weight Management

- Sleep regulates hormones that influence appetite, helping to prevent overeating and obesity[2].

Enhanced Physical Performance

- Proper rest improves endurance, reaction times, and overall athletic performance[1].

BENEFITS OF ENOUGH SLEEP

Mental Health

Improved Cognitive Function

- Sleep enhances memory, focus, and decision-making abilities[1].

Better Emotional Regulation

- Quality sleep reduces stress, anxiety, and mood swings[2].

Lower Risk of Mental Disorders:

- Chronic sleep deprivation is linked to an increased risk of depression and other mental health issues[1].

Enhanced Stress Resilience

- Adequate sleep improves your ability to handle stress by allowing the brain to process and recover from daily challenges, reducing feelings of being overwhelmed[3].

BENEFITS OF ENOUGH SLEEP

Energy and Productivity

Increased Energy Levels

- Well-rested individuals have higher energy and stamina throughout the day[1].

Better Problem-Solving

- Sleep enhances creativity and the ability to process and solve complex problems[3].

Improved Productivity

- Proper sleep leads to higher efficiency and effectiveness in daily tasks[2].

Reduced Risk of Burnout

- Consistent sleep helps prevent exhaustion and burnout by giving the body and mind time to recharge, sustaining long-term productivity[2].

BENEFITS OF ENOUGH SLEEP

Hormonal Balance and Longevity

Healthy Growth and Repair

- Sleep is crucial for the release of growth hormones, especially in children and adolescents[1].

Regulated Blood Sugar Levels

- It reduces the risk of developing insulin resistance and type 2 diabetes[3].

Longevity

- Research shows that people who consistently get adequate sleep (7-9 hours for most adults) are more likely to live longer, healthier lives[3].
- Reduced Risk of Chronic Diseases: Consistent, high-quality sleep lowers the risk of developing chronic conditions like Alzheimer's, cancer, and kidney disease, contributing to a longer, healthier life[2].

BENEFITS OF ENOUGH SLEEP

Why is Sleep Important?

Getting enough sleep is essential for maintaining ones health and well-being, as it impacts almost every system in the body[1]. Sleep allows for the brain to recharge, enhancing cognitive functions such as memory, concentration, and decision-making[1]. It also helps regulate mood, reducing stress and anxiety while promoting emotional resilience[1]. Physically, sleep supports immune function, muscle recovery, and heart health, lowering the risk of chronic diseases like diabetes, hypertension, and heart disease[1]. Additionally, adequate sleep is crucial for hormonal balance, which affects appetite, metabolism, and energy levels[1]. Without sufficient rest, the body struggles to perform optimally, leading to fatigue, irritability, and impaired performance[1]. Prioritizing quality sleep is not just about feeling rested—it's a fundamental pillar of a healthy and fulfilling life[1].

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CHAPTER 6

Supplements and Practices to Improve Your Sleep

SUPPLEMENTS FOR SLEEP HEALTH

Melatonin

Melatonin is a hormone in the body that plays an important role in the sleep cycle. The releasing of melatonin is triggered by the dark.[1] It causes one to experience feelings of sleepiness. Most people produce enough melatonin on their own, but if one is having trouble getting to sleep taking a small amount can help greatly. It can help improve circadian rhythm sleep disorders and insomnia. It is a generally safe supplement to take, but one could possibly experience a headache, dizziness, nausea, or drowsiness as a side effect. It is recommended to take 1-3mg two hours before bedtime.[1] It is best to take to a provider and get a professional opinion on personal usage of any supplement.

Ashwaganda

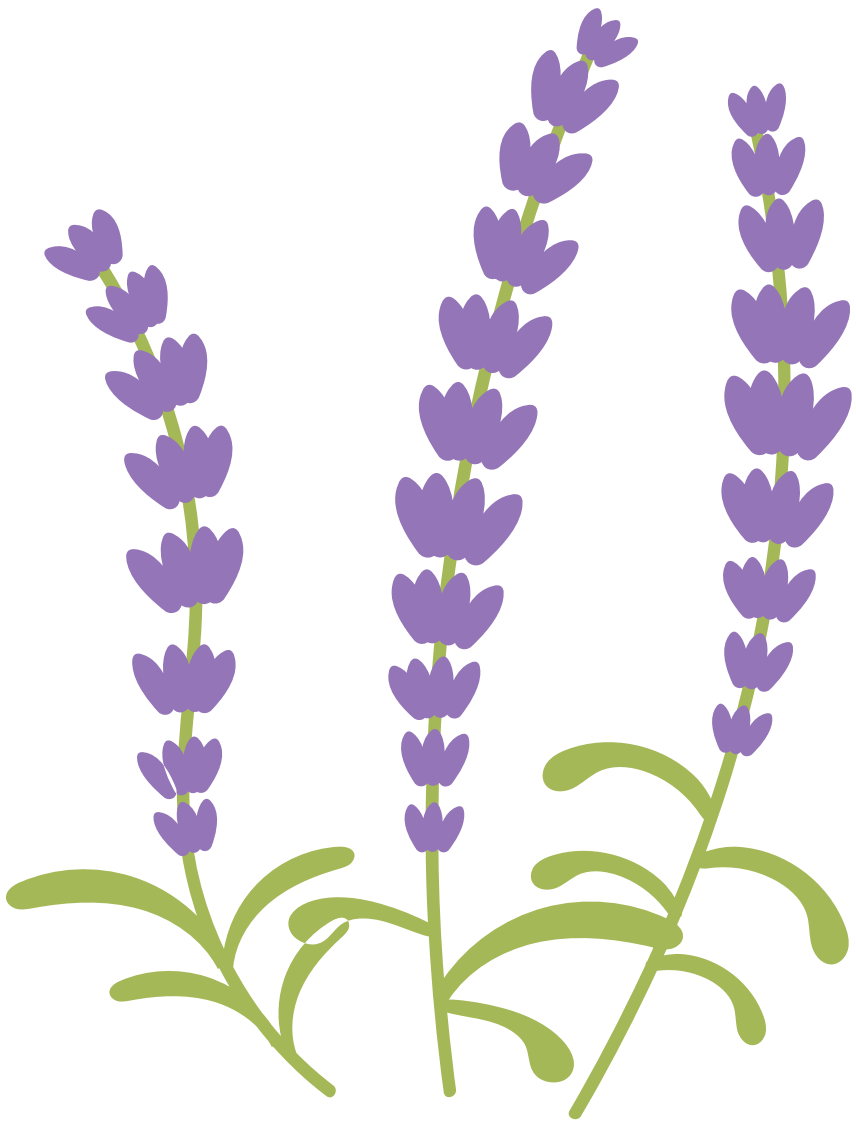
Ashwagandha is an adaptogenic supplement that may reduce stress, lower blood pressure, and alter the immune system[3]. It is made from an evergreen plant that is grown in Africa, India, and parts of Europe. It can also be used to reduce anxiety, a common source of sleep loss[3]. Ashwaganda may help people sleep better, fall asleep faster, and stay asleep longer[4]. Researchers suggest that the consumer should take 500-600 milligrams per day to experience sleep benefits. Once again, always consult with a doctor before trying a new supplement like this[4].

Teas

Enjoying a cup of tea before bed is a great step to implement into one's bedtime routine. Certain teas like chamomile and nighttime blends can help one get to sleep. It is important to stay away from teas that contain caffeine like black and green tea at night.

Chamomile Tea

Chamomile tea relaxes the nervous system, promoting restful sleep[5]. It contains a flavonoid called apigenin that has a mild sedative effect. It is best to drink chamomile right before bedtime to reap these beneficial sleep effects.



Lavendar Tea

Also known for reducing pain and inflammation, lavender tea can help with sleep[5]. It can help one get relaxed and fall asleep quickly. It has also been shown to help with depression and anxiety, a common cause of restlessness before bed.[5]

WAYS TO IMPROVE YOUR SLEEP

01 Go to bed and wake up at the same time everyday.

- This regulates your internal clock![6]

02 Try to get 7-8 hours of sleep every night.

- Oversleeping can make one feel more tired, since it throws off the circadian rhythm by disrupting one's sleep schedule.[7]

03 Avoid heavy meals within 2-3 hours of bedtime.

- In order to digest food the body must expend energy, and this can disrupt one's cardiac rhythm, making it harder to sleep.[7]

04 Pay attention to your alcohol, nicotine, and caffeine intake.

- Caffeine and Nicotine are stimulants that can make it hard for one to stay asleep and alcohol disrupts your sleep cycle. Try a decaf version of these drinks or a non-caffeinated tea if it is past 12pm![7]

05 Limit long daytime naps. If you choose to nap, keep it an hour max.

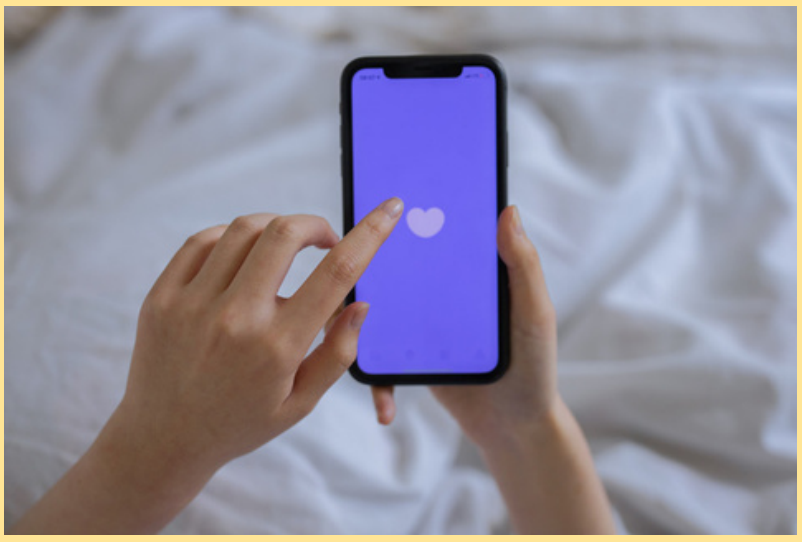
- Oversleeping can make it harder to fall asleep and stay asleep at night. This is a tiring cycle to fall into.[6]

06 Exercise during the day.

- Exercising during the day can help people sleep better, fall asleep faster, help with insomnia, and regulate your circadian rhythm. Some helpful beneficial exercises include yoga, aerobic exercise, resistance training, and stretching.[6]

07 Avoid electronics before bed. Try reading instead!

- Blue light can hinder the production of melatonin, making it hard for a person's body to feel tired at bedtime.[7]

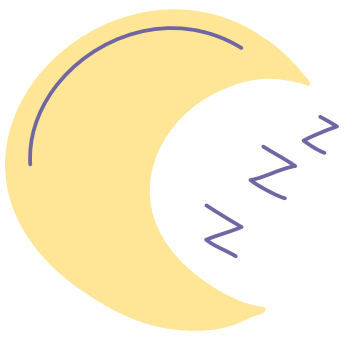


08 Create a relaxing environment, and try not to lay in your bed before its time to sleep.

- In order for the brain to associate its bed with sleep it is best to only lay in bed when it is time to sleep. It is also helpful to create a dark, cool, and relaxing environment.[6]

09 Develop a bedtime routine.

- This will help the body realize it is time to sleep and help it relax and wind down.
- Some techniques to implement before bed include meditation, journaling, and mindfulness practices. These techniques will help ease stress while ending the day on a good note.[7]



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CONCLUSION

Chapter Summaries

01 The Science Behind Sleep

Chapter one dives into the science of sleep. It talks about the cardiovascular, endocrine, metabolic, and immune systems processes during sleep. It also explains how much sleep is needed for different age groups. Lastly, it reveals the key factors impacting sleep. The environment, one's medical conditions, diet, and medication usage all play a positive or negative role in sleep.

02 The Stages of Sleep

This chapter provides in depth detail about the stages of sleep. It explains the phases and how each impacts your body. The four phases include N1, N2 (light sleep), N3 (deep sleep), and REM (vivid dreaming. Understanding the complex nature of these phase will help students understand the importance of getting enough sleep to complete each phase.

03 Sleep Statistics and Facts

This chapter provides the reader with important statistics about sleep health in college students and individuals worldwide. It also includes some fun facts to keep the reader engaged. For example, lack of sleep is likely to cause increased hunger because of imbalanced hormones.

04 How Sleep Impacts Your Health

This chapter talks about how sleep impacts your health and the consequences of sleep deprivation. Inadequate sleep can weaken your immune system, imbalance your hormones, causes chronic issues, have mental health consequences, and impact academic and cognitive performance. This chapter also goes into the stages of sleep including deep and REM sleep. This helps the reader understand how important a full sleep cycle is.

05 Benefits of Getting Enough Sleep

This chapter outlines the benefits of getting enough sleep. Some benefits include regulated blood sugar, increased lifespan, increased productivity, improved cognitive function, lower risk of stress and burnout, and better emotional regulation. At the end of the chapter all of these benefits are related back to the importance of sleep for the individual.

06 Supplements an Practices to Improve Sleep

This chapter talks about melatonin, ashwagandha, chamomile tea, and lavender tea. It outlines the benefits of these teas, helping the reader understand if they are right for them. It also talks about practices that can improve sleep quality. Some of these practices include exercising daily, limiting screen time and caffeine intake, limiting naps, developing a bedtime routine, and creating a relaxing environment for bedtime.

CONCLUSION

Closing Statement

Sleep is one of the human body's most powerful resources. By exploring the multifaceted nature of sleep, this manual hopes to inspire and teach college students how to take control of their health. From the science of sleep to the stages that are experienced, readers will gain a deeper understanding of the role sleep plays in their health. This manual outlines the long-term health benefits of sleep connecting the dots between simple habits and improved health. Lastly, this guide introduced practical habits and supplements that provide a hands on approach for students wanting to improve their sleep habits.

ADDITIONAL RESOURCES

For more information regarding sleep health, visit:

- **National Sleep Foundation: https://www.thensf.org/sleep-health-topics/**
- **American Academy of Sleep Medicine: https://aasm.org/clinical-resources/patient-info/**
- **National Center on Sleep Disorders Research: https://www.nhlbi.nih.gov/health-topics/education-and-awareness/sleep-health**
- **Sleep Research Society: https://sleepresearchsociety.org/resources-page/**

Universities often have pages dedicated to sleep health for their students. For this more individualized information, visit your universities' sleep health pages for information about their resources available.

Some examples of these university pages include:

- **University of Georgia: https://healthpromotion.uga.edu/sleep/]**
- **Harvard University: https://sleep.hms.harvard.edu/education-training/public-education/sleep-and-health-education-program**
- **Cornell University: https://health.cornell.edu/resources/health-topics/sleep**
- **University of Rochester: https://www.rochester.edu/uhs/healthpromotion/focus-areas/sleep/**
- **University of South Florida: https://www.usf.edu/student-affairs/wellbeing/health-topics/sleep.aspx**

When to Seek Professional Help

If sleep problems persist for more than three months and are affecting your daily life, consider consulting with a doctor or a sleep specialist.

Sleep Education, a web page run by the American Academy of Sleep Medicine, is a useful resource that can help you find sleep healthcare services within your zip code: https://sleepeducation.org/