

The Mental Note

FROM THE HARVARD AGING BRAIN STUDY STAFF

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Exercise, Sleep, and Cognition

There are numerous factors that influence individual health, including genetics, environment, and lifestyle. Researchers from the Harvard Aging Brain Study (HABS) are interested in identifying health factors related to Alzheimer's disease (AD), with special attention to potentially modifiable factors that may protect against cognitive decline. While scientists continue working to develop treatments aimed at reducing the build-up of certain proteins (amyloid and tau) in the brain, it is important to target other factors that may contribute to cognitive decline. These factors include vascular risk (including blood pressure, hypertension, and body mass index), diet, mood, physical activity, and sleep.

Exercise is widely recognized as a healthy habit. Regular physical activity can lower risk of heart attacks, help maintain a healthy body weight, and generally improve both physical and mental health. One of the questions that Dr. Jasmeer Chhatwal, neurologist and a HABS investigator, seeks to address in his research is, whether exercise can offset some of the risk associated with having more amyloid in the brain. His recent work suggests that the answer may be "yes." As part of HABS, participants are given hip-mounted pedometers in the first year of the study to measure total number of steps per day for one week. HABS researchers, including Dr Jenny Rabin and Dr Chhatwal, analyzed the data and observed that even modestly elevated levels of physical activity (about 8000 steps per day) were associated with less cognitive decline and less

brain tissue loss over time in people with elevated brain amyloid. This finding suggests that engaging in moderate physical activity may be particularly beneficial for individuals at higher risk of developing cognitive symptoms due to elevated amyloid burden. Intriguingly, the effects of higher physical activity and lower vascular risk were additive and fairly independent, meaning that individuals who were both physically active and heart-healthy maintained their cognitive function, even when amyloid was already present in the brain (Rabin & Klein et al, JAMA Neurology, 2019). While additional research is needed to confirm these findings, it appears that staying physically active in late life may help prevent or delay some of the cognitive changes associated with AD. This study has been extensively featured in the media, including Newsweek, NPR, and Science Daily.

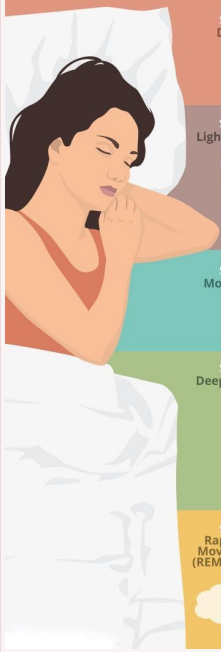
Sleep is another important health factor that affects lifelong physical and mental health. Even though humans spend nearly a third of their lives sleeping, scientists still do not fully understand the purpose of sleep or how it relates to later life brain changes. As part of HABS, a new study called SONNET, lead by Dr. Chhatwal's team is using a combination of sleep-tracking watches, at-home sleep studies, and sleep diaries to better understand how individual variations in sleep relate to variations in age-related memory change. Learn more about these important health factors at the next Food for Thought lecture (see back for details).

Featured Staff: Jasmeer Chhatwal, MD, PhD

Jasmeer Chhatwal is an attending neurologist and scientist at Massachusetts General Hospital and Brigham and Women's Hospital. He is an Assistant Professor of Neurology at Harvard Medical School. He completed undergraduate degrees in biology and philosophy at Yale University, doctoral (neuroscience) and medical degrees at Emory University, and a master's degree in clinical and translational investigation from Harvard Medical School. Dr. Chhatwal joined MGH and BWH in 2009 as a resident in Adult Neurology then stayed for fellowship in the Memory Disorders Unit at MGH.



The Five Stages of Sleep



STAGE 1
Drowsy
First 5-10 minutes of sleep cycle. This is the transition between wakefulness and sleep where the brain produces theta waves.

STAGE 2
Light Sleep
Lasts about 20 minutes and your brain starts to produce rhythmic brain waves known as sleep spindles. Body temperature starts to decrease and heart rate slows down.

STAGE 3
Moderate Sleep
Brain starts to produce deep and slower brain waves called delta waves.

STAGE 4
Deep Sleep
A very deep sleep that lasts about 30 minutes. If prone to sleepwalking, it would occur during the end of this stage.

STAGE 5
Rapid Eye Movement (REM) Sleep
Muscles become more relaxed while brain system is more active. Dreaming occurs during stage five because of the increase in brain activity and the temporary paralysis of voluntary muscles.

Research on Sleep, Memory, and Brain Aging

Changes to sleep patterns are a normal part of the aging process. As people age, they tend to have a harder time falling asleep and staying asleep compared to when they were younger. Sleep occurs in multiple stages, including stages 1 and 2 (lighter sleep), 3 and 4 (deeper sleep), and stage 5, (REM sleep), a period in which dreaming occurs. Changes in sleep patterns, including time spent in each stage, tend to occur in later life and this may contribute to sleep difficulty. While research suggests that total sleep time remains constant in adulthood, older adults tend to spend more time in the lighter stages of sleep, less time in deep sleep, and report that sleep is less satisfying.

Researchers from the Massachusetts General Hospital are interested in studying the effects of sleep disruption on the aging brain. For more information, join us at our upcoming Food for Thought talk!

Come learn about potential modifiable factors, including sleep and physical activity, that may protect against cognitive decline during our next Food for Thought lecture



presented by:

Jasmeer Chhatwal, M.D., Ph.D.

Tuesday, January 21st, 2020

10:00 - 11:00 a.m.

Open to our wonderful participants and their study partners!
Reserve your seat at (617) 643-5200

Refreshments will be provided.
Parking will not be provided.



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