



Soldiers sleep on the floor of a C-17 Globemaster III in transport to an undisclosed location, 17 August 2019. Soldiers experience sleep deficiency at over twice the rate of civilians, often because of operational requirements. (Photo by Staff Sgt. Alex Manne, U.S. Army)

Sleep and Performance

Why the Army Must Change Its Sleepless Culture

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The Army hates sleep, even though the health benefits are well established. People who suffer from a chronic lack of sleep or low sleep efficiency are at greater risk of mental health problems, obesity, higher mortality rates, and decreased mental and physical capacity. The Army has tried to address this via incorporating sleep into the “Performance Triad” along with activity and nutrition, which briefs well. However, the Army continues to suffer from chronic sleep deficiency with 76 percent of service members sleeping fewer than seven hours a night compared to 37 percent of the U.S. population.¹ In our experience, the Army fosters a culture where sleep is viewed as a privilege rather than a right. Army physical readiness training routines, staff duty, and training events all minimize the rest soldiers need. This article aims to better explain the mental and physical risks and benefits of sleep and recommend ways the Army can change the force’s way of thinking related to sleep.

Why Sleep Is Important

Not all sleep is made equal, especially as it relates to holistic health. The body needs specifically Stage 3 (deep sleep) and rapid eye movement (REM) sleep to promote mental and physical recovery. During sleep, the body transitions through sleep stages (1, 2, 3, REM) in cycles, with each cycle taking approximately 90–120 minutes. Later in the night, more time is spent in the vital

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REM sleep stages. Adults should average four to six sleep cycles with around ninety minutes of Stage 3 and two hours of REM sleep a night.²

During Stage 3, the brain releases anabolic hormones to help repair muscles and bones and improve immune system function. Additionally, the brain evaluates, consolidates, and stores memories. This “downloading” of information allows the brain to clear itself of data in preparation for the following day. People who cannot get enough deep sleep often have lower cognitive function and trouble recalling memories. Furthermore, information that should be stored is forgotten due to brain oversaturation. Like a computer, there is only so much memory for storage. As that storage gets filled, the brain slows down until it is ultimately unable to store any additional data. Unless the brain is allowed to download memories, it will result in lower cognitive function.³

REM sleep is separate from deep sleep and has different functions. During REM, brain activity is similar to when a person is awake. Unlike other stages, heart rate varies and the eyes move rapidly (hence the name “rapid eye movement”). An important aspect of REM sleep is emotional processing to build emotional resiliency. The portion of the brain that regulates emotions is activated usually during dreams. Learning also occurs during REM. The important information sifted through during deep sleep is committed to memory during REM. Like a lack of deep sleep, a lack of REM sleep can result in difficulty processing one’s emotions and poor memory.⁴

Sleep and Mental Health

Sleep has a foundational connection with cognitive and emotional health as well as brain development. Throughout each day, the brain manages vital bodily processes, reacts to stimuli, and cognitively engages with tasks. This workload comes at a price—much like muscles need to recover after a workout, the brain needs recovery time to preserve memories, replenish energy, and simply rest. After a long day, it can be difficult to mentally engage with family, remember important information, and regulate emotions. This effect gets compounded the less sleep a person is getting.

Sleep deficit is a condition that occurs when a person fails to get the appropriate amount of sleep for several days in a row. As the sleep deficit increases, the health risks and the loss of cognitive function also increase.



A soldier demonstrates how sleep study suites are used at the Center for Military Psychiatry and Neuroscience of the Walter Reed Army Institute of Research (WRAIR), Silver Spring, Maryland, 26 October 2021. WRAIR conducts sleep restriction and deprivation studies and evaluates countermeasures to develop knowledge products and materiel solutions to enhance soldier alertness, decision-making, and performance. (Photo by Arlen Caplan, U.S. Army)

Since the Global War on Terrorism began, multiple medical studies have been conducted on veterans showing the causal link between sleep deficit and mental health problems. In a 2013 study by the Veterans Health Administration for over 1,600 recent combat veterans, over 49 percent slept fewer than five hours, 23 percent slept fewer than seven hours, and 72 percent reported poor sleep quality (inability to properly cycle through sleep stages or achieve enough deep and REM sleep).⁵ In this study, veterans sleeping fewer than five hours a night had three times increased odds of diagnosed posttraumatic stress disorder (PTSD) and major depressive disorder.⁶ Of the 72 percent of participants who reported poor sleep quality, they had a dramatic risk for PTSD (five times higher rate), major depressive disorder (nine times higher rate), and suicidal ideation (six times higher rate).⁷ Finally, this study recognized that while service members may require less sleep during operations, there is no attention to “retraining these individuals to sleep once they have return, which may leave them susceptible to both medical and medical health issues.”⁸

A similar study conducted in 2015 of over 1,200 veterans of Iraq and Afghanistan compared the sleep and habits of service members with and without diagnosed mental health disorders.⁹ For those suffering with a mental health disorder, 92 percent used nicotine products and 37 percent abused alcohol.¹⁰ For those familiar with the Army’s culture, the fact that poor sleep quality is connected to substance use like alcohol and nicotine should come as no surprise. Humans find ways to cope with their circumstances, and many choose alcohol and nicotine as coping mechanisms. The study also found that even veterans without a diagnosed mental health disorder had significantly shorter sleep duration, poor sleep quality, insomnia, and distressing nightmares compared to the general population.¹¹

As stated earlier, REM sleep is linked to learning and building emotional processing and resiliency. Another study of over 1,100 Operations Enduring Freedom and Iraqi Freedom veterans attempted to link sleep quality with psychological distress. None of the participants met the criteria for a current mental

health disorder. The study found that 85 percent had poor sleep efficiency, with over 35 percent sleeping fewer than five hours a night. The findings found that worse sleep contributed to greater psychological distress. This psychological distress caused a reduction in the participant's resiliency to manage stress. "Low resiliency may leave Veterans vulnerable to the negative effects of stress, thereby exacerbating sleep problems and increasing risk of resulting psychological distress."¹²

The Army spends millions of dollars each year attempting to build a more mentally resilient force. Twice a year, soldiers are required to conduct resiliency training to address mental health issues plaguing the force. The literature is clear: you cannot train your way out of chronic sleep deficit. Sleep is not a part of resiliency training, but it has a proven connection to mental health.

In addition to mental health, soldier suicide remains a constant problem within the force. Death by suicide has exceeded combat losses for many years. Many different methods have been used to lower the suicide rate but without significant results. However, a 2011 study by the Veterans Health Administration of 423 veteran suicides found that veterans with documented sleep disturbances died sooner after their last visit with Veterans Affairs than those without a documented sleep disturbance.¹³ Compared with the last study showing a decrease in mental resilience and an increase in psychological distress due to poor sleep quality, the correlation between sleep disturbances and greater chance of suicide becomes even more profound.

There are many other studies that could be cited showing the causal link between mental health and sleep. However, the Army has already acknowledged this connection. The Army Medical Department published an article in September 2022 acknowledging that "from 2000 to 2009, the diagnosis of insomnia in active-duty Army personnel increased 19-fold. This is important because insomnia is associated with anxiety, depression, PTSD, chronic pain, alcohol abuse, and even with suicide."¹⁴ The article continues to show that soldiers who sleep fewer than seven hours per night perform like a "person who is legally drunk ... Put simply, accidents increase as the total amount of sleep you get each night decreases."¹⁵ Finally, the article attributes the lack of sleep to the Army's culture. "Purposely going without enough

sleep is sometimes considered a sign of strength (and needing sleep a sign of weakness)."¹⁶ Much like the negative stigma for seeking mental health support, the Army needs to combat the stigma against sleep if it wants to address the mental health and suicide epidemic within the force.

Sleep and Physical Performance

Many factors influence a soldier's physical performance, including activity, nutrition, sleep, and genetics. Adequate sleep is essential for optimal physical and mental function, and insufficient sleep can impair athletic performance and increase the risk of injuries.¹⁷ In contrast, sleep extension can substantially enhance physical performance.¹⁸ Additionally, unnecessary sleep debt and caffeine overuse can adversely affect a soldier's physical performance and general health.¹⁹

Numerous studies have shown that extending sleep can significantly improve a person's physical performance. In one study, college basketball players, who are the same age as the majority of the Army, increased their sleep from an average of 6.5 hours to nine hours per night for five to seven weeks and saw significant improvements in their sprint times, shooting accuracy, and overall athletic performance with no additional nutritional or training modifications.²⁰ Another study found that increasing sleep from 6.5 to eight hours per night for two weeks led to improved sprint times, reaction times, and shooting accuracy in male college soccer players, with no nutritional or training adjustments for the study participants.²¹ In 2020, the Army reported that 37 percent of soldiers sleep seven or more hours per duty night.²² These studies suggest that the Army could enhance the physical performance of the force without requiring nutritional or training modifications if they could reduce or eliminate chronic sleep deficiency.

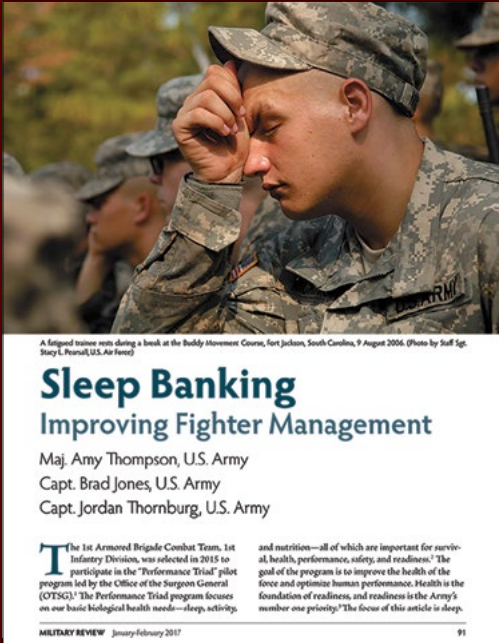
Extended sleep can enhance muscle recovery and reduce the risk of injuries. In a study of young male soccer players, those who slept more than eight hours per night had a significantly lower risk of injuries than those who slept less than seven hours per night.²³ According to the Army Public Health Center, roughly 50 percent of soldiers experience one or more musculoskeletal injuries annually, resulting in 90–120 days of restricted work or lost duty time for affected soldiers.²⁴ A study of Swiss army trainees found that an extension of trainee sleep from 6.5 hours per night to eight hours



Army paratroopers assigned to the 54th Brigade Engineer Battalion, 173rd Airborne Brigade, perform a ruck march during a Ranger or Sapper candidate assessment course on Caserma Del Din, Italy, 13 January 2019. Early morning physical readiness training can lead to inadequate sleep time for soldiers. (Photo by Spc. Ryan Lucas, U.S. Army)

Military Review

We Recommend



In this January-February 2017 *Military Review* article, a unit demonstrates the positive impact adequate sleep has on individual and team performance, health, safety, and readiness during an experiment in “sleep banking.” To read this article online, visit <https://www.armyupress.army.mil/Journals/Military-Review/English-Edition-Archives/January-February-2017/ART-014/>.

per night corresponded to a 14.3 percent reduction in trainee musculoskeletal injury.²⁵ According to the U.S. Army Recruiting Command, the Army sent 69,292 recruits through initial entry training in fiscal year 2021 at a cost of \$55,000–\$74,000 per recruit.²⁶ In fiscal year 2021, the Army reported an initial entry training attrition rate of ~15 percent with musculoskeletal injury being a significant causal factor; that attrition rate equates to 10,393 recruits at a cost of \$572,000 to \$769,000.²⁷ The results of the Milewski et al. and Wyss et al. studies indicate that the Army could reduce the recruiting burden and cost while also reducing existing soldier injury occurrence and improving unit readiness by focusing on sleep extension.²⁸

Excessive sleep debt, or the accumulation of a sleep deficit over time, can negatively impact a service member’s physical performance. Chronic sleep deprivation is associated with decreased muscle strength, impaired coordination, and increased fatigue. In addition, sleep deprivation can impair cognitive function, leading to reduced concentration, impaired decision-making, and increased risk-taking behavior.²⁹ In 2016, Shattuck et al. assessed watchstanding schedules in the U.S. Navy. They found that psychomotor vigilance performance (defined as reaction times responding to visual or auditory alarms and primary task distraction of greater than ten seconds) was significantly impaired in the participants with excessive sleep debt compared to the performance of participants on circadian-aligned schedules.³⁰ Accumulating undue sleep debt can negatively impact cognitive and physical performance while increasing the risk of injuries.

While caffeine can temporarily boost energy and alertness, overreliance on caffeine can negatively impact health and physical performance. Caffeine is a stimulant that can interfere with sleep and lead to sleep disturbances, mainly if consumed late in the day. Chronic caffeine use can also lead to physical dependence and withdrawal symptoms such as fatigue, irritability, and difficulty concentrating, which can impair athletic performance.³¹

Adequate sleep is essential for optimal performance and overall health. Extending sleep can significantly improve athletic performance, while excessive sleep debt and overreliance on caffeine can have negative impacts. The Army should prioritize allowing soldiers sufficient time to get adequate daily sleep rather than forcing them



Spc. Victoria Parker, 571st Military Police Company, lifts weights during a dead lift competition 30 June 2007 at Forward Operating Base Warhorse near Baqubah, Iraq. Adequate sleep can substantially enhance physical performance. (Photo by Spc. Benjamin Fox, U.S. Army)

to regularly rely on caffeine to improve cognitive and physical performance.

Sleep's Connection with Weight

The relationship between sleep and weight is complex and multifaceted, but inadequate sleep duration is a significant risk factor for developing obesity.³² Adequate sleep is essential for maintaining a healthy weight as it is crucial in regulating appetite and metabolism.³³ According to the Army's last three *Health of the Force* reports (2018–2020), the obesity rate in the Army's Active Component (AC) has remained constant at 17 percent, while an additional 50 percent of the AC is classified overweight and 33 percent of the AC is classified normal weight. (The Centers for Disease Control and Prevention [CDC] defines obesity as a body mass index of 30 or greater, overweight as 25–30, and normal as 18.5–25.)³⁴ Over that same time, only one-third of soldiers report sleeping seven or more hours on a duty night, while over 80 percent are meeting CDC guidelines for weekly resistance training, and over 85 percent

meet the guidelines for weekly aerobic training per the *Health of the Force* reports. The *Health of the Force* reports data indicates that lack of adequate sleep may be a more significant contributor to the Army's obesity and overweight issues than lack of exercise.³⁵

Several studies have found that inadequate sleep is associated with an increased risk of obesity and other weight-related health problems.³⁶ According to the CDC, the Department of Defense (DOD) spends about \$1.5 billion annually in obesity-related healthcare costs while losing 650,000 days of work a year for active-duty troops because of obesity-related health issues. The DOD reported that active-duty service men and women had more than 3.6 million musculoskeletal injuries between 2008 and 2017. Obese soldiers are 33 percent more likely to develop musculoskeletal injuries than their overweight and normal-weight counterparts.³⁷

One of the primary mechanisms by which sleep affects weight is its influence on the hormones that regulate appetite. When we do not get enough sleep, our bodies produce higher levels of ghrelin, a hormone



Sgt. Daniel Ochoa, a wheeled vehicle mechanic assigned to 1916th Support Battalion, Fort Irwin, California, gets his height measured during a weigh-in for the U.S. Army Forces Command Best Squad Competition at Fort Hood, Texas, 13 August 2022. Adequate sleep is essential for maintaining a healthy weight as it is crucial in regulating appetite and metabolism. (Photo by Sgt. Raekwon Jenkins, U.S. Army)

that stimulates appetite, and lower levels of leptin, a hormone that suppresses appetite. This hormonal imbalance can lead to increased hunger and cravings for calorie-dense, high-carbohydrate foods, which can contribute to weight gain.³⁸ This effect could be worse for soldiers due to a culture that relies on sugar-filled energy drinks.

Conversely, sleep extension can reduce energy intake by more than 250 kcal per day in overweight individuals while having no significant impact on total daily energy expenditure, resulting in a net negative energy balance. Finally, these findings indicate that getting chronically sleep-deprived soldiers to sleep more than eight hours per night could result in weight loss of over eight pounds in a year.³⁹

In addition to its effects on appetite hormones, sleep also plays a role in metabolism. Sleep deprivation decreases the body's ability to metabolize glucose properly, which can lead to increased insulin resistance and weight gain.⁴⁰ Adequate sleep is also essential for

maintaining muscle mass; during sleep, the body produces human growth hormone, which is essential for muscle growth and repair.⁴¹

Furthermore, sleep and weight are related through their effects on physical activity. Poor sleep can lead to reduced energy and motivation, which can decrease a person's physical activity. Conversely, regular physical activity can improve sleep quality, making it a critical factor in the relationship between sleep and weight.⁴²

Adequate sleep can help regulate appetite, metabolism, and physical activity, which are essential for maintaining a healthy weight.⁴³ More research is needed to fully understand the complex relationship between sleep and weight, but getting enough quality sleep is a critical factor in maintaining a healthy weight.⁴⁴

Recommendations

Since the benefits of good sleep and the health risks of poor sleep are so well defined, why does the Army still foster a negative sleep culture? Part of the answer

is the Army's "train as you fight" and "mission first" mantras. Obviously, there are no time outs in combat to allow for a good night's sleep. Soldiers must be capable of performing their mission for extended periods of time with minimal rest. While it is necessary to create a realistic environment in training, this mindset has extended into daily activities while in garrison. As a result, sleep is sacrificed at the altars of morning physical training, staff duty, and late nights.

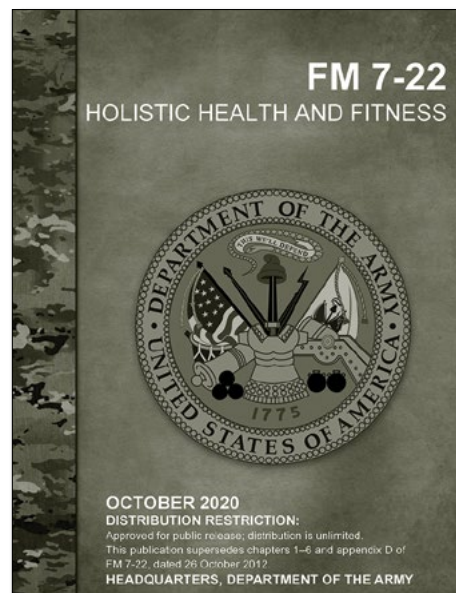
There is no doubt that the Army's sleep crisis is both well documented and widespread. According to the Army Medical Department's performance triad study in 2017 of nondeployed soldiers, less than 40 percent of soldiers get over seven hours of sleep during the work week, and less than 75 percent get over seven hours of sleep on the weekend. As shown in the above medical studies, this chronic sleep debt has dramatic implications on the mental health, obesity, musculoskeletal injuries, and suicide issues plaguing the Army today. While the Army cannot remove all the barriers to sleep for every service member, there are some variables that the Army can control to help improve sleep in the ranks.

The Army should question the sacred cow that is morning physical training. Physical training is essential and provides benefits for sleep, but those benefits come independent of when the exercise happens. The concept is already within doctrine. Field Manual 7-22, *Holistic Health and Fitness*, has an entire chapter dedicated to sleep. In that chapter, the Army acknowledges that "most Soldiers need 7 to 9 hours of sleep," the concept of "sleep debt," and how insufficient sleep negatively effects "cognitive performance" and "emotional and social functioning."⁴⁵ The doctrine also places importance on leadership's role in promoting good sleep practices. One such role is "moving physical readiness training from mornings to afternoons or starting the duty day later, both of which allow Soldiers to sleep later."⁴⁶ If the concept of abolishing early morning physical readiness training is already in doctrine, why has the Army not done so? We suspect that this is largely due to the Army's negative culture toward sleep. As recognized by one of the studies highlighted earlier, the Army's culture treats sleep as an optional benefit rather than a necessity.⁴⁷

In addition to removing early morning physical training, the Army should remove the requirement for

staff duty. In an era where cell phones are the norm, all soldiers can easily be contacted in the event of an alert. As a result, staff duty personnel can be on call rather than forced to stay awake for twenty-four hours. The fact that the Army acknowledges that drowsy driving is as dangerous as drunk driving but still forces soldiers to do this every day is shameful. Units on heightened alert status could conduct staff duty as needed but allow for soldiers to sleep during that time. Of all the recommendations, this is the easiest to implement.

Finally, the Army should start incorporating sleep training into its physical and mental health mandatory training and field training exercises. Soldiers should be educated on ways to improve their sleep like maintaining a more regular sleep and wake schedule; avoiding



Field Manual 7-22, *Holistic Health and Fitness* (2020)

electronics and bright lights before bed; and avoiding the effects of substances like alcohol, nicotine, and caffeine on sleep. During field training when sleep deficit can become pronounced, units should end training exercises during the day and allow their unit to get a full night's sleep before returning from the field. This will increase each driver's and truck commander's cognitive ability and reaction time as well as decrease the likelihood of vehicle accidents during redeployment.

Conclusion

Many senior leaders have remarked that the Army is at an inflection point. Missed recruiting goals,

misconduct, and soldier suicides litter the headlines. While the Army's antisleep culture may not be the sole culprit, it is undoubtedly a contributor to many of the issues plaguing soldiers. By inculcating a healthier view

of sleep, leaders at all echelons can build a routine that enables proper sleep hygiene. Sleep is a documented health necessity—the question is, will the Army recognize this or continue to sleepwalk into the future. ■

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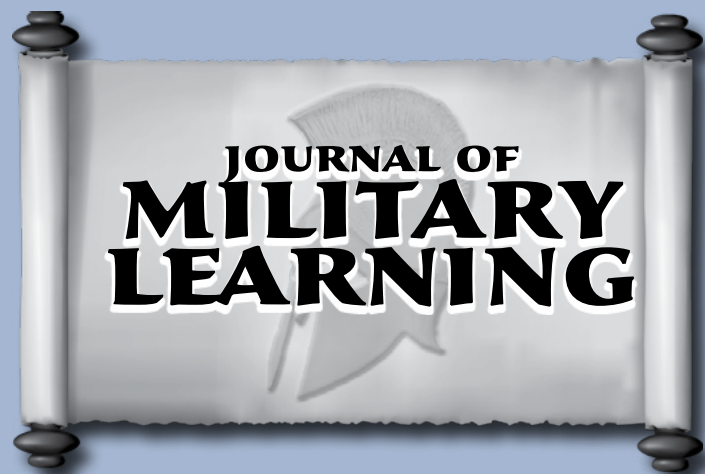
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