

Findings and Recommendations Protective and Risk Factors for Sleep Problems in U.S. Service Members



MILLENNIUM COHORT STUDY

Millennium Cohort Study Overview

The Millennium Cohort Study is a large-scale longitudinal cohort study of military personnel sponsored by the Defense Health Agency and the Department of Veterans Affairs. The overarching objective of this study is to evaluate the impact of military service, including deployments and other occupational exposures, on the long-term health of service members and veterans.¹ Participants of the Millennium Cohort Study are enrolled during their military service and complete surveys every 3 to 5 years, both during and after their service. The first panel of service members was enrolled in 2001, prior to the events of 9/11, with additional panels enrolled in 2004, 2007, 2011, and 2020. There are currently over 250,000 participants in the study, from all service branches and components, making it the largest and longest ongoing cohort study of U.S. military personnel in history. Over the past 20 years, the Millennium Cohort Study has played a pivotal role in evaluating the impact of the military service and deployments on service members and veterans.

Summary of Sleep Research

Short sleep duration, insomnia, and obstructive sleep apnea (OSA) negatively impact service member readiness through multiple mechanisms such as impaired cognitive processing and slowed reaction times, worse physical health (e.g., type 2 diabetes, weight gain), and worse mental health (e.g., PTSD, anxiety, depression).

In a 2021 study, we found that certain military-related factors (e.g., active component, Army or Marine Corps service, longer than average deployment lengths, and combat deployment) were associated with the new onset and reoccurrence of short sleep duration and/or insomnia symptoms. Time-in-service and separation from the military had differing relationships with sleep duration and insomnia symptoms; they lowered risk for those with ≤ 5 h sleep but increased risk for insomnia symptoms.²

Another 2021 study examined the prevalence of insomnia and sleep medication use and correlates of new-onset insomnia. Based on the clinically validated Insomnia Severity Index (ISI) administered in 2013 and 2016, the prevalence of insomnia was 16.3% in 2013 and 11.2% in 2016. More than 50% of those who screened positive for insomnia reported sleep medication use at both time points. Risk factors for new-onset insomnia (6% of cases) included Army service (versus Air Force), combat deployment experience, and separation from military service.³

KEY POINTS

Poor sleep has negative effects on service member readiness. The Millennium Cohort Study research team has investigated the varying effects of sleep health on readiness over the last decade. Key study findings indicate that poor sleep and sleep disorders increase risks for chronic health conditions and mental health issues.

Recently, we found that certain military factors are related to new onset and reoccurrence of short sleep duration and insomnia symptoms.² We also found that risk factors for new-onset insomnia included Army service, combat deployment experience, and separation from military service.³

Implications and Recommendations

Short sleep and insomnia symptoms may be indicative of clinically relevant insomnia. While evidence-based pharmacological and non-pharmacological treatments exist, they may have limited utility in deployment settings. Behavioral sleep interventions may be useful during periods when service members have more liberty with their daily activities and sleep schedules (e.g., when stationed within the United States or deployed to non-combat zones).

More than half of the sample who screened positive for insomnia reported using sleep medication. Study findings indicate that there may be an underlying systematic issue related to the inability to obtain adequate sleep in certain populations, such as military personnel with combat experience and individuals who have recently separated from the military.

Given the importance of sleep hygiene for service member readiness, military leadership can identify opportunities to disseminate sleep health best practices and help increase the importance of sleep prioritization within the military. In addition, assessments of sleep quality and quantity should be included as part of routine health screenings.



References

1. Ryan MA, Smith TC, Smith B, Amoroso P, Boyko EJ, Gray GC, Gackstetter GD, Riddle JR, Wells TS, Gumbs G, Corbeil TE, Hooper TI. Millennium Cohort: enrollment begins a 21-year contribution to understanding the impact of military service. *J Clin Epidemiol.* 2007 Feb;60(2):181-91. PMID: 17208125.
2. Cooper AD, Kolaja CA, Markwald RR, Jacobson IG, Chinoy ED. Longitudinal associations of military-related factors on self-reported sleep among U.S. service members. *Sleep.* 2021 Jul 3:zsab168. Epub ahead of print. PMID: 34216467.
3. Markwald RR, Carey, FR, Kolaja CA, Jacobson IG, Cooper AD, Chinoy ED. Prevalence and predictors of insomnia and sleep medication use in a large tri-service U.S. military sample. *Sleep Health*, 2021, ISSN 2352-7218, <https://doi.org/10.1016/j.sleh.2021.08.002>.

Disclaimer

Disclaimer I am a military service member or employee of the U.S. Government. This work was prepared as part of my official duties. Title 17, U.S.C. §105 provides that copyright protection under this title is not available for any work of the U.S. Government. Title 17, U.S.C. §101 defines a U.S. Government work as work prepared by a military service member or employee of the U.S. Government as part of that person's official duties. This report was supported by the Defense Health Program, Department of Veterans Affairs Office of Research and Development, and the Department of Veterans Affairs Office of Patient Care Services under work unit no. 60002. The views expressed in this article are those of the authors and do not necessarily reflect the official policy or position of the Department of the Navy, Department of Defense, nor the U.S. Government. The study protocol was approved by the Naval Health Research Center Institutional Review Board in compliance with all applicable Federal regulations governing the protection of human subjects. Research data were derived from an approved Naval Health Research Center Institutional Review Board protocol, number NHRC.2000.0007.



Millennium Cohort Study
Protecting Service Member and Veteran Health

