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## Increasing Resilience through Promotion of Healthy Sleep among Service Members

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Since 2001, over 2.5 million U.S. service members have been deployed to combat areas in Iraq and Afghanistan. Given the recent military drawdown, there is increasing concern regarding the enduring effects of deployment on service members' psychological and physical health, as well as on operational readiness in the post-deployment period. Sleep problems, in particular, are the most commonly reported health symptoms in the post-deployment period<sup>1–3</sup> and are associated with numerous indicators of health and readiness. For instance, approximately three-quarters of service members report less than 7 hours of sleep per night and nearly 9 in 10 service members and veterans are classified as poor sleepers during the time period since deployment.<sup>4,5</sup> Research with post-deployed service members further suggests that sleep problems are not only a key symptom of many mental and physical health conditions, but can also predict the onset of chronic health conditions, including diabetes, depression, posttraumatic stress disorder (PTSD) and suicidal thoughts and behaviors.<sup>6–8</sup>

While increasing attention from both the research community and the media has focused on the consequences of sleep problems, research has generally neglected the flip side of this issue: *healthy sleep* and its role in promoting physical and psychological health, operational readiness, and overall resilience to stress after deployment. Resilience is of utmost importance to the military and its returning service members and it is defined operationally as the ability to withstand, recover, and grow in the face of stressors and changing demands<sup>9</sup> and as the process of coping with or overcoming exposure to adversity or stress.<sup>10</sup> As sleep disturbances have strong implications for concurrent and future psychological, physical, and

operational consequences,<sup>11</sup> it is suggested that the converse may also be true: healthy sleep behaviors may have implications for enhancing resilience to current and future stressors and adversities. To date, however, there are very few studies within military or civilian samples which have considered the connections between sleep and resilience.

Shifting the research focus from the consequences of sleep disorders and sleep deficiency to the value of maintaining sleep health has recently been articulated as an important heuristic framework for future sleep research in civilian studies.<sup>12</sup> Similarly, we propose that a research agenda focused on promoting sleep health offers opportunities to identify: 1) strategies to preserve sleep even in the context of operational demands of the military; 2) practices and programs to help service members recover during post-deployment periods from prolonged sleep loss in situations (e.g., combat) when it may be unavoidable; 3) opportunities for military leaders and policymakers to raise awareness and recognition of the benefits of sleep health for promoting service member resilience and population health. To help shift the focus of sleep research to establish these proposed benefits to policymakers and service members themselves, we recommend the following research areas:

- 1. *Examine the benefits of preserving or “banking” sleep and learn how allowing adequate sleep recovery after a period of prolonged poor sleep (e.g., deployment) promotes future resilience to psychological, physical, and operational stress.***

Studies of civilians suggest that sleep extension (e.g., sleeping over 8 hours in a night), “banking sleep” in terms of having longer periods of time dedicated to sleep in bed, and napping after periods of sleep deprivation can decrease daytime sleepiness, improve mood and cognitive functioning, sharpen reaction times, and improve physical performance.<sup>13–17</sup> The research suggests lengthy sleep one night establishes a sleep reserve in case sleep is lost one night in the future.<sup>11</sup> Longitudinal studies with military samples are needed to understand how to preserve healthy sleep patterns by banking sleep or establishing healthy patterns pre-deployment, as well as how recovery after deployments can strengthen resilience.
- 2. *Evaluate how current military policies and programs to promote healthy sleep during deployment and post-deployment are effective in addressing current and future sleep problems.***

The military is making concerted efforts to prioritize sleep and promote sleep health through programs such as the Army’s Performance Triad,<sup>18</sup> innovative operational strategies (e.g., changing shift schedules for shipboard NAVY sailors)<sup>19</sup> and by promoting post-deployment programs that address poor sleep as a natural consequence of deployments warranting attention upon return home.<sup>20</sup> However, to date, there remains scant research on the development and evaluation of programs, policies, and experimental studies to promote healthy sleep patterns among post-deployed service members.
- 3. *Understand the role of personal and public stigma on help seeking for sleep problems and how engagement in early treatment for sleep disturbances may have implications for prevention of long-term (more stigmatized) psychological disorders.***

There is stigma in the military around seeking care for many psychological health problems, yet it is unknown how service members would view

behavioral or pharmacological treatments for sleep problems. In addition, research with civilians and veterans suggests that targeting sleep disorders such as insomnia or nightmares may also reduce PTSD and depressive symptoms.<sup>21–23</sup> Given the stigma related to seeking help for psychological concerns,<sup>24</sup> promotion of sleep treatments ostensibly targeted toward improving a health behavior (i.e., sleep) that may indirectly improve resilience to PTSD, depression, or suicidality may be more acceptable for the military population (e.g., seeking help for nightmares instead of PTSD specifically).

4. ***Examine the role of healthy sleep on other areas of resilience beyond the individual, such as the family, the unit, and the community.*** For example, adequate sleep may support interpersonal functioning within the family and the unit, by influencing mood, cognitive flexibility, and frustration tolerance. It can also facilitate learning and the retention of new information (important for operational readiness) and help one function as a reliable and trustworthy asset to a team and community both during and outside military operations.
5. ***Better understand the role of leaders and peers in promotion of healthy sleep patterns and referral for treatment.*** Leaders are in a unique position to champion sleep health efforts, through modeling healthy sleep behaviors for others, modifying schedules to provide more opportunities for adequate sleep environments without noise, light, and disruption, promoting and supporting programs for those needing help with sleep disorders, and counteracting direct or incidental messages that “sticking it out” despite feeling tired is a sign of mental toughness. Little is known about how leaders and peers can be used to promote healthy sleep, help identify those at risk for current and prolonged consequences from lack of healthy sleep, and encourage help seeking among those indicating need for evidence-based approaches to preserve sleep and promote healthy sleep patterns.
6. ***Develop and validate assessment tools to facilitate self-identification of sleep problems.*** Development and validation of such tools, including electronic applications, could facilitate self-monitoring of healthy sleep behaviors and could identify sleep problems in their acute phases, when they may be more amenable to treatment. Early recognition of an issue is the necessary first step to seeking help and conversely, failure to recognize symptoms in self- or others likely delays action toward help-seeking. Acute sleep disturbances are common after significant life events and may be an adaptive part of the recovery process following traumatic experiences (e.g., combat-related deployments); however, maladaptive thoughts and behaviors that are used to compensate for acute sleep disturbances (e.g., use of alcohol or sedatives) may end up perpetuating the problem. Recognition of these cognitions and behaviors through self-assessment and education may assist with self-initiation of healthier sleep practices and reduced maladaptive behaviors prior to the onset of chronic problem development. There is also a need for research to demonstrate whether such electronic self-monitoring tools may also enhance treatment compliance and increase treatment response rates for sleep disorders treatments.

7. **Identify biomarkers associated with both sleep health and sleep problems.** It is important for researchers to learn about the environmental, genetic, epigenetic, and neural mechanisms that may predispose to poor sleep or facilitate healthy sleep patterns and that are also implicated in downstream health and functioning. For example, recent work with military samples has identified biomarkers to resilience in areas of mental health such as PTSD (e.g., C-reactive protein),<sup>25</sup> with experimental work demonstrating the negative impact of sleep deprivation on biomarkers for stress and cardiovascular morbidity.<sup>26</sup> This work has important implications for tailored prevention efforts for those identified at risk; with efforts focused on overcoming predisposing factors through behavioral or pharmacological intervention to prevent development of chronic sleep problems.
8. ***Evaluate implementation of research-informed practices and programs, as well as understand how promotion of programs is adopted and diffused throughout the military.*** It will be necessary to promote the results of research studies through leadership and among service members, their families, providers and leaders alike, so findings can be incorporated into policies and practices, and can ultimately promote cultural changes regarding sleep among service members and leadership.

## Conclusion

A focus on defining and measuring sleep health may enhance efforts to promote resilience in service members by: (1) providing education opportunities for line leaders so they may practice and educate their service members; (2) increasing self-identification through increased awareness at the individual level; (3) providing concrete and modifiable targets for education, health promotion, and prevention at the individual, unit, and population-level; (4) providing new opportunities for research which could help to identify biomarkers of resilience across the continua of sleep health; (5) informing the development and enhancement of policies that have a direct impact on sleep. Ultimately, this shift in focus from sleep deficiencies or disorders to the promotion of sleep health may help to overcome barriers such as stigma, or military cultural beliefs that have historically undermined the importance of sleep. Though military sleep research is generally focused on the post-deployment period due to implications of poor sleep on chronic sleep problems and downstream mental and physical health consequences, sleep health research, development of sleep health policies, and evaluation of sleep health programs should focus on promoting sleep health throughout the deployment cycle and in training environments to aid in prevention as well as intervention efforts.

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