Sleep Trends of Active-Duty Service Members Referred for Psychiatric Care: A Descriptive Study

R. Gregory Lande, DO
Cynthia Gragnani, PhD

From the Psychiatric Continuity Service at Walter Reed National Military Medical Center in Bethesda, Maryland.

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Address correspondence to R. Gregory Lande, DO, Psychiatry Continuity Service, Walter Reed National Military Medical Center, 8901 Wisconsin Ave, Bethesda, MD 20814-0004

E-mail: rglande@gmail.com

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Context: Military service members have unique experiences that may contribute to sleep problems in this patient population.

Objective: To gather sleep habits and chronic sleep complaints among active-duty service members to identify common characteristics.

Methods: The investigators administered a detailed sleep log, the Pittsburgh Insomnia Rating Scale, the Zung Self-Rating Depression Scale, the Epworth Sleepiness Scale, and the Pre-Sleep Arousal Scale to consenting service members referred to a military psychiatric partial hospitalization program.

Results: A total of 57 service members participated in this study. Participants reported a mean of less than 5 total hours of sleep and sleep latencies of 30 minutes or more. Tobacco users (n=22) reported nearly a full hour less of total time slept. Service members with combat experience (n=26) reported qualitatively poorer sleep with less total sleep time (P=.05), greater presleep arousal (P=.01), and a substantially greater number of troubling dreams (P=.06) compared with service members without combat experience.

Conclusion: Chronic sleep issues are common complaints among military personnel, an anecdotal finding confirmed by the results of this study. These results lend support for more detailed sleep assessments, particularly among combat veterans.

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A good night's sleep can be elusive. Instead of drifting off into a relaxing repose, many people are tortured by a nightly drama when the day's distractions give way to an unending loop of distressing doubts and dilemmas. This circular thinking endlessly recycles worries and consequences with ever-mounting anxiety as solutions fade into fatalism. Some people count the proverbial sheep, hoping to swap their anxieties with the stuff of nonsense. Others, like Lewis Carroll of *Alice in Wonderland* fame, held the mental flagellations in check through singular distractions. Carroll, in addition to his literary creativity, was a brilliant mathematician. In a book subtitled *Pillow Problems*,[1] the author explained his restless nights as a choice "between two courses ... either to submit to the fruitless self-torture of going through some worrying topic, over and over again, or else to dictate to myself some topic sufficiently absorbing to keep the worry at bay. A mathematical problem is, for me, such a topic." Carroll published 72 extremely complicated problems from this inspiration, perhaps hoping readers could benefit from his sleep-inducing tonic.[1]

Unlike Carroll, however, military service members face unique sleep-fracturing activities. Combat deployments, frequent travel, remote geographic assignments, and all too common family farewells contribute to insomnia. Perhaps the chief instigator nowadays is service members' deployments to the Iraq or Afghanistan war zones. The operational tempo of these 2 battlefields ensured varying degrees of danger, exposure to traumatic events, and mission-related sleep deprivation.

Service members can turn to all manner of nonprescription nostrums to relieve minor bouts of insomnia. As the problems grow in magnitude and become more persistent, some service members will seek medical assistance. For these individuals, physicians may consider various sleep medications, including benzodiazepines, nonbenzodiazepines, and antidepressants. A detailed sleep history may uncover complications, such as a co-occurring depression, posttraumatic stress disorder (PTSD), or alcohol misuse.

Accumulating evidence suggests important independent links between sleep disorders and the development of—and delayed recovery from—PTSD, depression, and alcohol abuse. For example, prolonged bouts of sleeplessness preceding traumatic events increase the likely onset of PTSD.[2] Persistent insomnia among combat veterans predicts the development of additional psychological symptoms.[3,4] Combat veterans with PTSD also have poorer sleep quality with frequent nighttime arousals.[5]

The military has an interest in identifying risk factors that might help predict suicidal ideation. Unrelenting insomnia is an important but sometimes forgotten factor contributing to suicidal ideation.[6] Total time asleep has been correlated with suicidal ideation in adults, teens, and women.[7-9]

From a purely anecdotal point of view, chronic insomnia bedevils service members. The present descriptive study is an empirical step to identify more precisely the nature of service members' sleep. To that end, we documented the sleep habits and characteristics of active-duty service members referred to a military partial hospitalization program for psychiatric treatment.

Methods

We conducted the present study from March 2010 through January 2012 among active-duty service members referred to the Psychiatry Continuity Service at Walter Reed National Military Medical Center in Bethesda, Maryland. The center's institutional review board approved this study. The Psychiatry Continuity Service provides multidisciplinary care consisting of individual and group psychotherapies, medication management, complementary and alternative therapies, and expressive therapies. The predominant clinical diagnoses that service members receive after a comprehensive assessment include combat-related PTSD and depression.

Eligible participants for the present study included any active-duty service member, regardless of age, rank, or sex, who was willing to provide written research consent. Noneligible candidates for this study included service members who were acutely suicidal or actively psychotic. Because these conditions precluded ongoing treatment at the Psychiatry Continuity Service, the net effect of the exclusion criteria on potential enrollment was minimal.

We intended to gather sleep habits and chronic sleep complaints among active-duty service members through the use of a variety of self-report instruments. To accomplish that goal, study participants completed a detailed sleep log at their initial Psychiatry Continuity Service evaluation as well as the following 4 survey-based scales: the Pittsburgh Insomnia Rating Scale (PIRS),[10] the Zung Self-Rating Depression Scale,[11] the Epworth Sleepiness Scale,[12] and a Pre-Sleep Arousal Scale.[13]

The PIRS is a 20-item self-report instrument assessing sleep over the preceding 7-day period. The range of scores on the PIRS is from 0 to 60, with scores above 20 suggesting insomnia. Typical questions on the PIRS include "From the time you tried to go to sleep, how long did it take to fall asleep on most nights?" and "If you woke up during the night, how long did it take to fall back to sleep on most nights?"

The Zung Self-Rating Depression Scale is a 20-item self-report instrument in which respondents choose among 4 descriptions (ie, "a little of the time," "some of the time," "a good part of the time," and "most of the time") in answering questions regarding depression. Typical statements include "I feel down-hearted and blue," and "Morning is when I feel the best." The range of scores is from 25 to 100, with scores from 50 to 59 suggesting mild depression, 60 to 69 suggesting moderate depression, and 70 or greater suggesting severe depression.

The Epworth Sleepiness Scale assesses the likelihood of falling asleep on a scale from 0 to 3 for 8 different environments, such as "sitting and reading" or "watching TV." The range of scores is from 0 to 24, with scores of less than 10 considered normal and scores exceeding 10 suggesting excessive sleepiness.

The Pre-Sleep Arousal Scale contains 16 questions, which are answered by respondents on a 5-point scale ranging from 1 ("not at all") to 5 ("extremely"). Half of the items focus on somatic symptoms, such as "a jittery, nervous feeling in your body." The remaining elements focus on cognitive items such as "worry about falling asleep." The Pre-Sleep Arousal Scale's 2 subscales, somatic and cognitive, can each total anywhere from 8 to 40. Although there are no threshold scores for the Pre-Sleep Arousal Scale, higher scores indicate greater arousal before falling asleep. The clinician or researcher simply correlates higher scores with increasing somatic or cognitive factors that interfere with sleep initiation.[14]

The authors constructed the detailed sleep log, which asked participants to report on such items as time in bed, time out of bed, number of awakenings, time to sleep, number and type of dreams, use of nighttime tobacco, use of nighttime caffeine, and presence of physical symptoms such as teeth grinding, sleep walking, sleep talking, and nasal obstruction.

Using SPSS statistical software, version 18 (IBM Corporation, Chicago, Illinois), we explored the data through descriptive and frequency statistics along with χ^2 analyses. We considered $P \leq .05$ to be statistically significant.

Results

Fifty-seven service members participated in the present study; however, some participants did not answer every question, which accounts for the variation in the number of responses for each item. As might be expected, most of the participants were young, male, and enlisted service members (*Table 1*).

The vast majority of respondents (48 of 55 [87.3%]) reported sleep latencies of 30 minutes or longer. Fifty-four respondents estimated their total hours of sleep, which revealed a mean (standard deviation [SD]) sleep time of well below 6 hours (4.7 [1.4] hours). Short sleep duration, which is defined as less than 6 hours of sleep per night, predicts the likelihood

Table 1.
Sleep Trends of Service Members: Characteristics of Study Participants (N=57)

Characteristic	No. (%)[a]
Age, y	
18-20	3 (5.3)
21-25	21 (36.8)
26-30	9 (15.8)
31-35	4 (7.0)
36-40	7 (12.3)
>40	13 (22.8)
Sex	
Male	46 (80.7)
Female	11 (19.3)
Rank[b]	
E1-E4	25 (43.9)
E5-E9	22 (38.6)
O1-O3	3 (5.3)
O4-O6	7 (12.3)
Marital Status[c]	
Single	21 (36.8)
Married	22 (38.6)
Separated	6 (10.5)
Divorced	7 (12.3)
Service Branch	
Army	35 (61.4)
Air Force	8 (14.0)
Navy	7 (12.3)
Marines	2 (3.5)
Other	5 (8.8)
Combat Experience	
Yes	26 (45.6)
No	31 (54.4)

[a] Some percentages do not total 100 because of rounding.
[b] E1-E4, junior enlisted; E5-E9, senior enlisted; O1-O3, junior commissioned officer; O4-O6, senior commissioned officer.
[c] One participant did not respond to this survey question.

of persistent, chronic insomnia.[15] What little sleep the participants reported was further disrupted by most respondents (31 of 52 [59.6%]) experiencing at least 2 awakenings per sleep session.

The participants' self-rated sleep tests further documented a pattern of poor sleep (*Table 2*). A score of greater than 20 on the PIRS suggests insomnia, with the mean (SD) score among all participants easily exceeding that, at 35.7 (8.5). We calculated the total Pre-Sleep Arousal Scale score and its 2 subscales. The total mean (SD) score for the Pre-Sleep Arousal Scale was 38.1 (11.4), with the cognitive subscale score (23.4 [6.7]) exceeding the somatic subscale (14.7 [6.1]). Because the Pre-Sleep Arousal Scale lacks cut-off scores, we also examined our data in terms of the subscale scores that exceeded the average cognitive (23.4) and somatic (14.7) scores reported by our study participants. On the basis of this analysis, we found that respondents who reported cognitive scores exceeding the mean were significantly more likely to experience more arousals during the night (P=.05) and more difficulty falling back to sleep once awakened (P=.04). A similar analysis of Pre-Sleep somatic scores exceeding the group's mean found that these participants were significantly more likely to experience difficulty falling back to sleep once awakened (P=.01). For the Epworth Sleepiness Scale, scores less than 10 are considered normal; however, that was exceeded by a third (19 of 57 [33.3%]) of the study participants.

The sleep hygiene characteristics of the participants in the present study revealed several antithetical practices. As gathered from the participants' detailed sleep logs, such practices as the bedtime use of nicotine or caffeine (*Table 3*) are common. As might be expected, the stimulating effects of nicotine negatively impacted sleep. Tobacco users (n=22) reported nearly a full hour less total mean (SD) time slept than did nonsmokers (n=32) (4.1 [1.0] hours vs 5.1 [1.5] hours, respectively; P=.004). In addition, bedtime caffeine consumption predictably elevated the Pre-Sleep Arousal Scores. The 7 participants who consumed nighttime caffeine had a statisti-

Table 2.
Sleep Trends of Service Members: Survey Results of Study Participants (N=57)

Survey	n[a]	Mean (SD)
Pittsburgh Insomnia Rating Scale[b]	57	35.7 (8.5)
Zung Self-Rating Depression Scale[c]	57	46.8 (10.0)
Epworth Sleepiness Scale[d]	57	8.0 (5.8)
Pre-Sleep Arousal Scale[e]		
Total	56	38.1 (11.4)
Somatic	56	14.7 (6.1)
Cognitive	56	23.4 (6.7)

[a] One participant did not complete the Pre-sleep Arousal Scale.
[b] A score greater than 20 on the Pittsburgh Insomnia Rating Scale suggests insomnia.
[c] A score greater than 49 on the Zung Self-Rating Depression Scale suggests mild depression.
[d] A score less than 10 on the Epworth Sleepiness Scale is considered normal.
[e] Higher scores indicate greater arousal before falling asleep.

Table 3.
Sleep Trends of Service Members: Sleep Hygiene Among Study Participants (N=57)

Activity	n[a]	No. (%)
Daytime Naps	55	16 (29.1)
Bedtime		
Caffeine	56	7 (12.5)
Alcohol	56	2 (3.6)
Nicotine	56	17 (30.4)
Food	55	14 (25.5)
Exercise	55	3 (5.5)
Fluids	54	30 (55.6)

[a] Some respondents did not answer each question.

Table 4.
Sleep Trends of Service Members: Self-Reported Sleep Problems Among Study Participants (N=57)

Sleep Problem	n[a]	No. (%)
Jerking	45	13 (28.9)
Teeth grinding	45	15 (33.3)
Talking	45	5 (11.1)
Nasal congestion	45	8 (17.8)
Sleepwalking	45	1 (2.2)
Nightmares	47	9 (19.1)

[a] Some respondents did not answer each question.

cally significant elevation in mean (SD) arousal scores when compared with that of the 49 participants who did not consume nighttime caffeine (38.1 [1.6] vs 35.5 [7.6], respectively; *P*=.002).

Participants reported a range of sleep problems, the most common being teeth grinding (*Table 4*). Despite the prevalence of reported problems, only nighttime nasal congestion significantly affected the respondents' sleep. Participants who reported nasal congestion (n=8) scored significantly higher (mean [SD]) on the Pre-Sleep Arousal Scale compared with that of participants without nasal congestion (n=36) (42.8 [18.1] vs 37.9 [10.9]; *P*=.004).

When comparing groups, no differences by age, sex, rank, marital status, or branch of service emerged, but we did discover statistically significant differences in the sleep characteristics of service members with combat experience. Participants with combat experience reported significantly higher mean (SD) Pre-Sleep Arousal Scale scores than did those without combat experience (40.8 [13.3] vs 35.7 [9.0], respectively) (*Table 5*). Participants

Table 5.
Sleep Trends of Service Members: Outcome Measures of Study Participants by Combat Experience (N=57)

	Combat Experience		No Combat Experience		
Characteristic	n	Mean (SD)	n	Mean (SD)	*P* Value
Pittsburgh Insomnia Rating Scale[a]	26	38.5 (7.5)	31	33.3 (8.6)	.40
Zung Self-Rating Depression Scale[b]	26	47.0 (9.7)	31	46.6 (10.4)	.66
Epworth Sleepiness Scale[c]	26	8.0 (5.5)	31	8.1 (6.1)	.48
Pre-Sleep Arousal Scale[d]					
Total	26	40.8 (13.3)	30	35.7 (9.0)	.01
Somatic	26	15.5 (15.5)	30	13.9 (13.9)	.15
Cognitive	26	25.3 (7.4)	30	21.8 (5.6)	.05
Total Hours Slept	25	4.3 (1.2)	29	5.0 (1.5)	.05

[a] A score greater than 20 on the Pittsburgh Insomnia Rating Scale suggests insomnia.
[b] A score greater than 49 on the Zung Self-Rating Depression Scale suggests mild depression.
[c] A score less than 10 on the Epworth Sleepiness Scale is considered normal.
[d] Higher scores indicate greater arousal before falling asleep.

attributed most of the elevation in the Pre-Sleep Arousal Scale score to cognitive factors assessed by the instrument, such as worrying, racing thoughts, or an inability to shut down an overly active mind. Participants with combat experience also reported, on average, about 30 minutes less total sleep time when compared with that of participants without combat experience. Participants with combat experience rated their quality of sleep more poorly than did participants without combat experience (N=53; χ^2_3=8.0; *P*=.05). Interestingly, participants with combat experience reported significantly more nasal congestion and subsequent difficulties with sleep than did those without combat experience (N=45; χ^2_1=5.2; *P*=.02). Participants with combat experience reported more dreams than did those without combat experience (N=46; χ^2_3=7.3; *P*=.06), although this finding was not statistically significant.

Discussion

The service members who participated in the present study confirmed an anecdotal observation: sleep problems are a pervasive, unrelenting symptom seen in service members referred for psychiatric treatment. This commonly noted clinical observation is bolstered by the specificity of responses provided by the study participants.

Among the striking findings reported by the service members in the present study is their short sleep time. The typical respondent in this study reported, on average, less than 5 hours total time slept. Perhaps this would be marginally satisfying if uninterrupted, but the average respondent reported at least 2 disrupting awakenings per sleep session. Most service members also had sleep latencies of 30 minutes or longer, a void filled with thinking and worrying.

Many service members in this study aggravated their insomnia with poor sleep hygiene practices. The use of nicotine subtracted almost a full hour from tobacco users' sleep. In a similar fashion, caffeine consumers accomplished nothing more than increasing their presleep arousal and promoting longer sleep latencies. Both results offer clinicians more precise data to help convince service members struggling with sleeplessness to avoid the bedtime use of nicotine and caffeine.

Service members with combat experience reported qualitatively poorer sleep. Their sleep logs and self-rated tests provided part of the explanation. Service members with combat experience reported a higher degree of presleep arousal, principally mediated by unceasing mental flagellations. The cost was borne through a decrease in total time slept. A nearly significant increase in dreams, most often described as nightmares, surely contributed to a less than restful repose.

Although the patient population of psychiatric outpatients might prevent a broader generalization of our findings, we were specifically interested in studying this high-acuity population. The relatively small sample size also limits the findings.

Conclusion

The findings from the present study should encourage clinicians, particularly those working with combat veterans, to amplify their sleep assessments of military personnel. Osteopathic primary care physicians, who no doubt care for many veterans in their clinical practices, should also consider expanding their sleep assessments of patients. The instruments used in this study are easily administered and analyzed. In addition, the service members' focused sleep-related concerns revolve around total time slept, difficulties initiating sleep, and disturbing dreams. These results seem tailor made for nonpharmacologic clinical interventions such as reinforcing specific sleep hygiene practices and the use of cognitive behavioral sleep strategies.

(continued)

References

1. Carroll L. *Mathematical Recreations of Lewis Carroll: Pillow Problems and a Tangled Tale*. New York, NY: Dover Publications; 1958.
2. Bryant RA, Creamer M, O'Donnell M, Silove D, McFarlane AC. Sleep disturbance immediately prior to trauma predicts subsequent psychiatric disorder. *Sleep*. 2010;33(1):69-74.
3. Wright KM, Britt TW, Bliese PD, Adler AB, Picchioni D, Moore D. Insomnia as predictor versus outcome of PTSD and depression among Iraq combat veterans. *J Clin Psychol*. 2011;67(12):1240-1258.
4. McLay RN, Klam WP, Volkert SL. Insomnia is the most commonly reported symptom and predicts other symptoms of post-traumatic stress disorder in U.S. service members returning from military deployments. *Mil Med*. 2010;175(10):759-762.
5. Capaldi VF II, Guerrero ML, Killgore WD. Sleep disruptions among returning combat veterans from Iraq and Afghanistan. *Mil Med*. 2011;176(8):879-888.
6. McCall WV, Blocker JN, D'Agostino R Jr, et al. Insomnia severity is an indicator of suicidal ideation during a depression clinical trial. *Sleep Med*. 2010;11(9):822-827.
7. Goodwin RD, Marusic A. Association between short sleep and suicidal ideation and suicide attempt among adults in the general population. *Sleep*. 2008;31(8):1097-1101.
8. Fitzgerald CT, Messias E, Buysse DJ. Teen sleep and suicidality: results from the youth risk behavior surveys of 2007 and 2009. *J Clin Sleep Med*. 2011;7(4):351-356.
9. Blasco-Fontecilla H, Alegria AA, Lopez-Castroman J, et al. Short self-reported sleep duration and suicidal behavior: a cross-sectional study. *J Affect Disord*. 2011;133(1-2):239-246.
10. Moul DE, Pilkonis PA, Miewald JM, Carey TJ, Buysse DJ. Preliminary study of the test-retest reliability and concurrent validities of the Pittsburgh Insomnia Rating Scale. *Sleep*. 2002;25(abstract suppl):A246-A247.
11. Zung WW. A self-rating depression scale. *Arch Gen Psychiatry*. 1965;12:63-70.
12. Johns MW. A new method for measuring daytime sleepiness: the Epworth sleepiness scale. *Sleep*. 1991;14(6):540-545.
13. Nicassio PM, Mendlowitz DR, Fussell JJ, Petras L. The phenomenology of the pre-sleep state: the development of the pre-sleep arousal scale. *Behav Res Ther*. 1985;23(3):263-271.
14. Palermo TM, Toliver-Sokol M, Fonareva I, Koh JL. Objective and subjective assessment of sleep in adolescents with chronic pain compared to healthy adolescents. *Clin J Pain*. 2007;23(9):812-820.
15. Vgontzas AN, Fernandez-Mendoza J, Bixler EO, et al. Persistent insomnia: the role of objective short sleep duration and mental health. *Sleep*. 2012;35(1):61-68.