Sleep Health 9 (2023) 283–287

Contents lists available at ScienceDirect

Sleep Health

Journal of the National Sleep Foundation

journal homepage: sleephealthjournal.org

Nightmare disorder in active-duty US military personnel

Brian A. Moore, PhD[a*], Allison Brager, PhD[b], Jason Judkins, DSc, PhD[c], Vincent Mysliwiec, MD[d]

[a] Department of Psychological Science, Kennesaw State University, Kennesaw, Georgia, USA
[b] Marketing & Engagement Brigade, United States Army Recruiting Command, Fort Knox, Kentucky
[c] Military Performance Division, United States Army Research Institute of Environmental Medicine, Natick, Massachusetts
[d] Department of Psychiatry and Behavioral Health, University of Texas Health Science Center at San Antonio, San Antonio, Texas

ARTICLE INFO

Article History:
Received 24 February 2022
Revised 29 November 2022
Accepted 22 December 2022

Keywords:
Military personnel
Nightmare disorder
Epidemiology
Clinical diagnoses

ABSTRACT

Study objectives: Military personnel experience high rates of traumatic experiences. Despite this, few studies have examined the presence of nightmare disorder in military personnel. The primary aim of this study was to examine diagnoses of nightmare disorder across the 4 largest branches of the active-duty US military.
Design & participants: Data and service branch densities used to derive the expected rates of diagnoses of nightmare disorder were drawn from the Defense Medical Epidemiology Database. The branches examined included all active-duty services members in the US Army, Navy, Marine Corps, and Air Force, who served between 2016 and 2021. Single-sample chi-square goodness of fit tests were conducted to examine within-variable differences for military relevant variables.
Results: Between 2016 and 2019, the incidence rates of nightmare disorder (per 10,000 service members) in the US Department of Defense ranged from 11.3 in 2016 to a low of 6.9 in 2018. Service members who were classified as non-white, female, over the age of 35, married, in the Army, and/or a noncommissioned officer, were diagnosed at greater rates relative to their representation in the military population ($p < .001$).
Conclusion: Our findings of higher than expected rates of nightmare disorder in older, senior service members as well as those in the Army align with the known precipitant of nightmares, and trauma. However, the reason for the finding that female and Black service members have higher than expected rates is not readily apparent.

© 2022 National Sleep Foundation. Published by Elsevier Inc. All rights reserved.

Nightmares are parasomnias related to rapid eye movement (REM) sleep that consist of repeated episodes of dysphoric, well-remembered dreams that result in clinical distress or impaired social functioning or occupational performance.[1] Although nightmares are a relatively common problem impacting between 1% and 7% of the general adult population,[2-6] Nightmare disorder is estimated to impact only 4% of the general US population.[7]

Nightmares themselves can be idiopathic and/or result from traumatic experiences, associated with psychiatric disorders such as post-traumatic stress disorder (PTSD), or manifest secondary to medications or substance abuse. Nightmares, especially trauma-related nightmares, have long been considered a hallmark of PTSD,[8,9] a disorder commonly reported in military personnel.[10] This may be one reason contributing to the absence of literature regarding nightmares as a distinct clinical disorder in military personnel.

Military personnel are exposed to stressful and traumatic experiences in training and during both combat and non-combat deployments. Further, they frequently have insufficient and disturbed sleep (reviewed in Good et al; Moore et al).[11,12] These occupational hazards are increasingly recognized as contributing to increasing rates of sleep disorders,[13] with insomnia and obstructive sleep apnea as the 2 most frequent clinically diagnosed sleep disorders.[14] Over the past 2 decades, there has been substantial and increasing research regarding the association of insomnia and OSA in military personnel with the 2 signature illnesses of post-9/11 operations (ie, conflicts in Iraq, Afghanistan, and the Middle East at large; Moore & Peterson, 2018),[15] PTSD and traumatic brain injuries.[10,16,17] However, given the frequent and severe nature of traumatic experiences and their high rates of sleep disturbances, there has been a relative lack of research regarding nightmares in military personnel.[18]

There is one study that evaluated nightmare disorder in a clinical cohort of military personnel with sleep disturbances.[18] In this study, 31.2% of those evaluated for sleep disturbance/nightmares had at least weekly nightmares. Overall, 60% of the nightmares were trauma related. Further, participants with nightmares had worse subjective and objective sleep and higher rates of anxiety, depression, insomnia, and PTSD. More recently, Pruiksma et al examined 4119 active-duty service members before deployment and found that 40% reported having current nightmares.[19] In a separate but related sample, a

*Corresponding author: Brian A. Moore, Department of Psychological Science, Kennesaw State University, 1000 Chastain Road NW, Kennesaw, GA 30144, USA.
E-mail address: brian.moore@kennesaw.edu (B.A. Moore).

https://doi.org/10.1016/j.sleh.2022.12.001
2352-7218/© 2022 National Sleep Foundation. Published by Elsevier Inc. All rights reserved.

Downloaded for Anonymous User (n/a) at Walter Reed National Military Medical Center from ClinicalKey.com by Elsevier on January 05, 2024. For personal use only. No other uses without permission. Copyright ©2024. Elsevier Inc. All rights reserved.

study of 841 National Guard troops, reported that 32% reported nightmares and 12% reported both nightmares and insomnia, which were associated with reductions in mental and physical health.[20]

Sleep disorders are common in the active force,[14] can vary by assigned duty station,[21] and have been shown to dynamically reduce service member performance.[22] Although point prevalence of nightmares in small military samples of the Army has been reported, to our knowledge there are no previous studies that examine the incidence rates (eg, total new cases of those at risk during a certain period) of nightmare disorder across the major branches of the US military. To gain a better understanding of the incidence rates of nightmares in active-duty service members, we performed a retrospective analysis of the Defense Medical Epidemiology Database (DMED) to determine nightmare disorder incidence rates between 2016 and 2021. The present paper aims to identify differences in nightmare disorder between demographic variables (eg, the branch of service, pay grade [enlisted vs. officer], age, sex, marital status, and race) and present areas for future research and clinical interventions.

Materials and methods

Incidence rates of nightmares in active-duty US military service members were calculated based on count and diagnostic data drawn from the DMED. The DMED records individual instances of medical diagnoses wherein an ICD code is entered in an active-duty service member's electronic medical record during any visit to a military medical facility. Each diagnosis of nightmare disorder utilized for this study was available in de-identified form and provided as grouped counts by standard military classifications (Table 1). To avoid potential overestimation of incidence, only initial diagnoses of nightmare disorder data (ICD-10: F51.5 were analyzed). The analysis included all 6 available military classifications (ie, the branch of service, military pay grade, age, sex, marital status, and race). Data were accessed on January 26, 2022. All data are publicly available from the DMED and for research purposes, the collection and reporting of data do not involve human subjects.

Single-sample chi-square goodness of fit tests were conducted to assess which demographic subgroups were over-or under-represented with nightmare disorder diagnoses relative to their respective representation across the various demographics available with the DMED. Where appropriate, assessments of residuals were conducted to elaborate on the individual demographic subcategory contributions to the chi-square values (Table 1).[23] The expected counts of diagnosis by each demographic variable were provided by the DMED database at the time of data extraction (Table 1). They are not based on known clinical distribution but rather represent the average percentage of service members represented within each variable (or category) between 2016 and 2021. For instance, when extracting data, we found that 84% of all service members in the active force were males between 2016 and 2021. Therefore, we expected male service members to account for 84% of all nightmare disorder diagnoses throughout this study. All military classification variables were analyzed and are reported based on the cohort groupings by which they are available within the DMED database (ie, for military pay grade, [enlisted]: E-1 to E-4, E-5 to E-9; [commissioned officers]: O-1 to O-3, O-4 to O-6, etc.).

Table 1
Demographics of US military service members diagnosed with nightmare disorder between 2016 and 2021

Demographic	Military composition (density)	Nightmare representation	Rates		Residuals		Average change in diagnoses from 2016 to 2021
			Observed	Expected	Raw	Standardized	
Sex							
Female	16%	21%	1332	1038	293.6	**9.11**	−1%
Male	84%	79%	5158	5451	−293.6	**−3.97**	−6%
Age, years							
<20	7%	4%	244	514	−270.1	**−11.91**	−4%
20-24	32%	26%	1672	2056	−384.2	**−8.47**	−4%
25-29	23%	20%	1287	1477	−190.9	**−4.96**	−1%
30-34	16%	12%	810	1028	−218.1	**−6.8**	−5%
35-39	12%	16%	1057	771	285.9	**10.29**	−9%
40+	10%	22%	1420	642	777.4	**30.66**	−3%
Marital status							
Married	51%	64%	4416	3309	836.7	19.24	−7%
Non-married	49%	36%	2344	3180	−836.7	-14.82	−6%
Race							
White	69%	57%	3724	4478	−754.1	**−11.26**	−3%
Black	17%	27%	1767	1103	663.7	**19.98**	−8%
Other	14%	15%	999	908	90.4	2.99	−5%
Service branch							
Army	36%	68%	4419	2336	2082.6	**43.08**	−9%
Navy	25%	10%	671	1622	−951.5	**−23.62**	16%
Air Force	25%	13%	834	1622	−788.5	**−19.57**	4%
Marine Corps	14%	9%	566	908	−342.6	**−11.36**	−2%
Military pay grade							
Junior enlisted	43%	37%	2412	2790	−378.7	**−7.16**	−6%
Noncommissioned officers	39%	51%	3311	2531	779.9	**15.5**	−5%
Junior commissioned officers	11%	7%	458	713	−255.9	**−9.57**	−4%
Senior commissioned officers	7%	5%	309	454	−145.3	**−6.18**	12%

DMED, Defense Medical Epidemiology Database.
Note: Military composition percentages provided by the DMED. Bolded standardized residuals are those that exceed a conservative +/− 3 and are highlighted as they represent areas that may be of interest for future research/interventions. In the DMED, marital status is provided as Married, Single, or Other. As there is no way to meaningfully discriminate between "single" or "other," this variable was dichotomized to improve interpretation. "Junior Enlisted" includes E-1 to E-4; "Noncommissioned Officers" include pay grades E-5 to E-9; "Junior commissioned officers" include pay grades O-1/WO1 to O-3/CW3; "Senior commissioned officers" include pay grades O-4/CW4 to O-6/CW5. Raw counts of diagnoses: Nightmare disorder diagnoses = 6490.

Downloaded for Anonymous User (n/a) at Walter Reed National Military Medical Center from ClinicalKey.com by Elsevier on January 05, 2024. For personal use only. No other uses without permission. Copyright ©2024. Elsevier Inc. All rights reserved.

Results

Between 2016 and 2019, the incidence rates of nightmare disorder (per 10,000 service members) in the US Department of Defense (DoD) ranged from 11.3 in 2016 to a low of 6.9 in 2018 (Fig. 1). The single-sample Chi-square tests showed the observed and expected frequencies significantly differed across all 6 military classification variables for both disorders (Table 1). Raw diagnostic rates of service members most often diagnosed with nightmare disorder were: (a) males (79%); (b) in the Army (68%); (c) married (64%); (d) white (57%); (e) senior enlisted pay grades of E-5 to E-9 (51%); and (f) over the age of 35 (38%). The average change in diagnoses over time for nightmare disorder diagnoses is listed in Table 1.

Race

Statistically significant differences were noted among service members by race (X^2 (2, N = 6490) = 535.23, $p < .001$). Minority service members presented with higher rates of diagnoses for black and other non-white races respectively than expected based on known densities. Conversely, white service members, presented with fewer observed cases than expected.

Sex

Statistically significant differences were noted between males and females (X^2 (1, N = 6490) = 98.82, $p < .001$). Male service members presented with fewer observed cases than expected. Conversely, female service members were diagnosed at higher rates, presenting with fewer observed cases than expected.

Age

Statistically significant differences were noted by age groups (X^2 (5, N = 6490) = 1331.20, $p < .001$). Among active-duty service members, those aged < 20 years old, 20-24 years old, 25-29 years old, and 30-34 years old presented with fewer observed cases than expected. Service members aged 35 or older (groups: 35-39 and 40+) presented with more observed cases than expected.

Service branch

Statistically significant differences were noted between the military service branches (X^2 (3, N = 6490) = 2926.74, $p <.001$). Service members in the Air Force, Navy, and Marine Corps, presented with fewer observed cases than expected. Alternatively, service members in the Army, presented with more observed cases than expected.

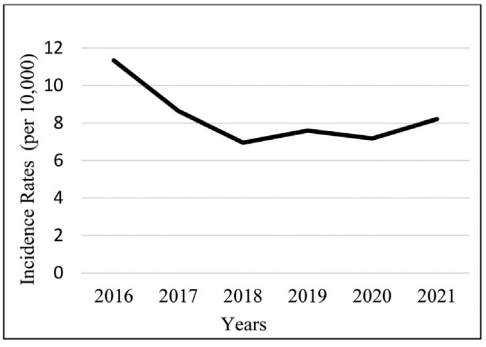

Fig. 1. Incidence rates of nightmare disorder in active-duty military personnel from 2016 to 2021.

Military pay grade

Statistically significant differences were also observed amongst military pay grades (X^2 (3, N = 6490) = 429.89, $p < .001$). Junior enlisted (E-1 to E-4) and all commissioned officers (O-1/WO1 to O-3/CW3 and O-4/CW4 to O-6/CW5 respectively) presented with fewer nightmare disorder diagnoses than expected. Conversely, senior enlisted personnel (noncommissioned officers [E-5 to E-9]) presented with more observed cases than expected.

Marital status

Statistically significant differences were noted between married and nonmarried military personnel (X^2 (1, N = 6490) = 431.68, $p <$ .001). Married service members presented with more observed cases of nightmare disorder than expected. Conversely, non-married service members, presented with fewer observed cases than expected.

Discussion

The present study reports on diagnosed rates of nightmare disorder across the active force of 4 primary military branches in the United States from 2016 to 2021. Herein, we identified that raw diagnostic rates of nightmare disorders from a centralized DoD medical database were made primarily in (a) males (79%); (b) the Army (68%); (c) married (64%); (d) white (57%); (e) senior enlisted pay grades of E-5 to E-9 (51%); and (f) service members over the age of 35 (38%). In this study, we also found that incidence rates of nightmares stayed relatively stable over time but were significantly lower than previously reported diagnoses of insomnia or OSA.[14] Further, we observed that service members who were classified as non-white, female, over the age of 35, married, in the Army, and/or a noncommissioned officer, were diagnosed at greater rates relative to their representation in the military population. Overall, the incidence rates of nightmare disorder in the active force were low. Considering the rates of correlate disorders (eg, PTSD),[10] it is likely that nightmares/diagnoses of nightmare disorder as a primary complaint are masked by another condition.

Herein we corroborate our previous work reported for PTSD,[12] insomnia, and OSA. Specifically, previous studies have identified Army personnel and Black service members to be over-diagnosed (relative to representativeness) for PTSD, obstructive sleep apnea, and insomnia.[10,14] In contrast to findings on OSA and insomnia diagnoses,[14] females were diagnosed with higher rates of nightmare disorder than males. Considering that patients with nightmares and mental disorders have worsened mental health, sleep quality, and increased suicidality;[24] these discrepant findings warrant additional research in the active force. We find it interesting that females are under-represented in terms of insomnia diagnoses yet diagnosed with higher rates of nightmare disorder compared to males in the present study. Life stressors and traumatic events are presumed to underlie nightmare disorder diagnoses (similar to PTSD) and may be a factor. For example, there were a reported 7816 cases of female sexual assault in the fiscal year 2020[25], and cases have risen in recent years, with military females being disproportionately impacted.[26] Sexual assault predicts the onset of sleep disturbances, and the extent of sleep disturbances is mediated by nightmares.[27] It seems probable that female service members who have experienced sexual assault and sought medical care could have nightmare disorder diagnosed after this traumatic event.

Similarly, our findings that nightmare disorder was diagnosed at higher rates in females and older individuals is consistent with the largest study (to our knowledge) which assessed the prevalence of nightmares. In nearly 70,000 Finnish adults, the prevalence of nightmares was highest in those who had survived World War II and were

Downloaded for Anonymous User (n/a) at Walter Reed National Military Medical Center from ClinicalKey.com by Elsevier on January 05, 2024. For personal use only. No other uses without permission. Copyright ©2024. Elsevier Inc. All rights reserved.

of older age.[28] These findings provide a basis that prior traumatic experiences as well as increasing age are likely contributing factors to nightmare disorder, noting that nightmare disorder does not require prior traumatic exposure and can be idiopathic in origin. Considering the presence of PTSD in the military population, as well as data presented by Sandman et al,[28] identifying nightmare disorder as more frequently diagnosed in those with combat exposure, it is possible that PTSD and associated trauma-related nightmares were coded as nightmare disorder, thereby conflating the present results.

The distinction between nightmare disorder vs. PTSD and nightmares in patients with traumatic experiences can be clinically challenging. From a diagnostic perspective, the 2 disorders may be differentiated by when they occur during a patient's sleep period. For example, nightmares related to PTSD can occur early in an individual's sleep period, occurring during both NREM and REM sleep, whereas nightmare disorder occurs later in the sleep cycle, exclusively in REM sleep. [1] Regarding the diagnosis of nightmare disorder in patients with PTSD, nightmare disorder should be diagnosed when patients (a) have nightmares that warrant independent clinical attention and a specific nightmare treatment plan, (b) when nightmares manifest before traumatization and PTSD, or (c) persist when other PTSD symptoms have resolved. These distinctions might then establish when nightmares are a distinct clinical disorder and warrant independent therapy.

When examining nightmare disorder, individuals typically report repeated nightmares about threats to their safety or security that are remembered after waking and that impact daily functioning.[1] These recurring nightmares are of specific concern to the military population as associated mood disturbances, cognitive impairments, excessive daytime sleepiness, and behavioral problems can reduce mission execution and effectiveness, reducing safety and endangering the lives of the service member, their unit, and their missions at large.

Regarding the chronological rate of incidences of nightmare disorder from 2016 to 2021 (Fig. 1), the extent of severity of combat-related trauma experienced during post-9/11 operations is of salience. Specifically, in the early years of the post-9/11 conflicts service members faced high rates of deployments that were often characterized by catastrophic rates of violence, death, and injury. Thus, it seems possible that when compared with the findings that service members >35 years of age are most over-diagnosed, relative to density, that nightmare disorder in senior enlisted service members is likely to be related to combat trauma. In addition to this, when viewed through a dose-response lens, it is important to highlight that these factors may also be compounded by military position, combat experiences, and other life experiences. This has been shown to be the case in a treatment-seeking sample of military personnel with disordered sleep.[13]

Although this study addresses diagnostic rates and highlights areas where additional consideration is warranted, we acknowledge that we could not control for the type of trauma experienced (ie, combat, or sexual assault) and that nightmares in service members could be idiopathic and not related to trauma. Despite this limitation, medical records data is typically more extensive than a simple self-report on a survey but is also potentially limited by user error when data is input into the system. Additionally, as some of these data were collected during a pandemic, it could be that the social isolation,[29] stress, and burnout[30] associated with coronavirus disease 2019 was an underlying factor of nightmare disorder etiology and not necessarily combat-related trauma.

Our study provides novel insight into nightmare disorder in the US military. Overall, the findings of higher than expected rates of nightmare disorder in older service members, who were more likely to serve during periods of active conflict, and those in the Army, who have higher rates of deployment, align with the known precipitant of trauma exposure for nightmares. However, the finding that Black and female service members have higher than expected rates of nightmare disorder is not as readily apparent. Further, as the incidence rate of nightmare disorder is significantly lower than the high rate of PTSD in the military population, it seems that nightmare disorder is potentially underreported or underdiagnosed in service members. These findings suggest the need for further study regarding this sleep disorder which has substantial morbidity, including suicidality, associated with it. To limit the potential for retrospective bias, future prospective studies should include diary studies and control for age differences while more closely examining the between groups differences observed across the service branches.

Declaration of conflict of interest

The authors have no conflicts of interest.

Disclosures

Dr. Mysliwiec has served as a consultant for Armed Forces HST, CPAP Medical, Jazz Pharmaceuticals, Nightware, NOCTEM Health and Sleep Care Inc.

Funding

None.

References

1. American Academy of Sleep Medicine. *International Classification of Sleep Disorders*. Darien, IL: American Academy of Sleep Medicine; 2014.
2. Bixler EO, Kales A, Soldatos CR, Kales JD, Healey S. Prevalence of sleep disorders in the Los Angeles metropolitan area. *Am J Psychiatry*. 1979;136(10):1257–1262. https://doi.org/10.1176/ajp.136.10.1257.
3. Hublin C, Kaprio J, Partinen M, Koskenvuo M. Nightmares: Familial aggregation and association with psychiatric disorders in a nationwide twin cohort. *Am J Med Genetics*. 1999;88(4):329–336. https://doi.org/10.1002/(sici)1096-8628(19990820)88:4<329::aid-ajmg8>3.0.co;2-e.
4. Janson C, Gislason T, De Backer W, et al. Prevalence of sleep disturbances among young adults in three European countries. *Sleep*. 1995;18(7):589–597.
5. Li SX, Zhang B, Li AM, Wing YK. Prevalence and correlates of frequent nightmares: a community-based 2-phase study. *Sleep*. 2010;33(6):774–780. https://doi.org/10.1093/sleep/33.6.774.
6. Ohayon MM, Morselli PL, Guilleminault C. Prevalence of nightmares and their relationship to psychopathology and daytime functioning in insomnia subjects. *Sleep*. 1997;20(5):340–348. https://doi.org/10.1093/sleep/20.5.340.
7. Morgenthaler TI, Auerbach S, Casey KR, et al. Position paper for the treatment of nightmare disorder in adults: an American Academy of Sleep Medicine position paper. *J Clin Sleep Med*. 2018;14(6):1041–1055. https://doi.org/10.5664/jcsm.7178.
8. El-Solh AA. Management of nightmares in patients with posttraumatic stress disorder: current perspectives. *Nat Sci Sleep*. 2018;10:409.
9. Ross RJ, Ball WA, Sullivan KA, Caroff SN. Sleep disturbance as the hallmark of posttraumatic stress disorder. *Am J Psychiatry*. 1989;146(6):697–707. https://doi.org/10.1176/ajp.146.6.697.
10. Judkins JL, Moore BA, Collette TL, Hale JW, Peterson AL, Morissette SB. Incidence rates of posttraumatic stress disorder over a 17-year period in active duty military service members. *J Trauma Stress*. 2020;33(6):994–1006. https://doi.org/10.1002/jts.22558.
11. Good CH, Brager AJ, Capaldi VF, Mysliwiec V. Sleep in the United States military. *Neuropsychopharmacology*. 2020;45(1):176–191.
12. Moore BA, Brock M, Brager A, Collen J, LoPresti M, Mysliwiec M. Posttraumatic stress disorder, traumatic brain injury, sleep, and performance in military personnel. *Sleep Med Clin*. 2020;15(1):87–100. https://doi.org/10.1016/j.jsmc.2019.11.004.
13. Mysliwiec V, Pruiksma KE, Brock MS, Straud C, Taylor DJ, Hansen S, STRONG STAR Consortium. The Military Service Sleep Assessment: an instrument to assess factors precipitating sleep disturbances in US military personnel. *J Clin Sleep Med*. 2021;17:1401–1409. jcsm-9206.
14. Moore BA, Tison LM, Palacios JG, Peterson AL, Mysliwiec V. Incidence of insomnia and obstructive sleep apnea in active duty United States military service members. *Sleep*. 2021;44(7). https://doi.org/10.1093/sleep/zsab024. zsab024..
15. Moore BA, Peterson AL. *OEF/OIF/OI Give Up: Making Sense of U.S. Military Operations*. International Society for Traumatic Stress Studies (Stress Points: Military Matters); 2018.
16. Collen J, Orr N, Lettieri CJ, Carter K, Holley AB. Sleep disturbances among soldiers with combat-related traumatic brain injury. *Chest*. 2012;142(3):622–630.

Downloaded for Anonymous User (n/a) at Walter Reed National Military Medical Center from ClinicalKey.com by Elsevier on January 05, 2024. For personal use only. No other uses without permission. Copyright ©2024. Elsevier Inc. All rights reserved.

17. Mysliwiec V, Gill J, Lee H, et al. Sleep disorders in US military personnel: a high rate of comorbid insomnia and obstructive sleep apnea. *Chest*. 2013;144(2):549–557. https://doi.org/10.1378/chest.13-0088.
18. Creamer JL, Brock MS, Matsangas P, Motamedi V, Mysliwiec V. Nightmares in United States military personnel with sleep disturbances. *J Clin Sleep Med*. 2018;14 (3):419–426.
19. Pruiksma KE, Slavish D, Wardle S, et al. Prevalence and correlates of nightmares in active duty service members. *Sleep*. 2019;42:A267.
20. Pruiksma KE, Slavish DC, Taylor DJ, et al. Nightmares and insomnia in the US National Guard: Mental and physical health correlates. *Int J Behav Med*. 2021;28:238–249. https://doi.org/10.1007/s12529-020-09889-22.
21. Brager A, Hosamane N, Ritland B, Capaldi V, Simonelli G. Geographically based risk assessment of sleep disorders and disease states impacting medical readiness across active duty army installations from military medical databases in fiscal year 2017. *Sleep Health*. 2021;7(1):31–36. https://doi.org/10.1016/j.sleh.2020.07.006.
22. Erickson EA, Stahlam S, McNellis MG. Insomnia and motor vehicle accident-related injuries, active component, U.S. Armed Forces, 2007-2016. *MSMR*. 2017;24(12):2–11.
23. Sharpe D. Chi-square test is statistically significant: now what? *Pract Assess Res Eval*. 2015;20(8):1–10. https://doi.org/10.7275/tbfa-x148.
24. Lemyre A, Bastien C, Vallières A. Nightmares in mental disorders: a review. *Dreaming*. 2019;29(2):144.
25. Department of Defense annual report on sexual assault in the military fiscal year 2020. 2021. Available at: DOD_Annual_Report_on_Sexual_Assault_in_the_Military_FY2020.pdf (army.mil).
26. Collette TL, Esenwein SV, Sprague-Jones J, Moore KE, Sterling E. Incidence rates of emotional, sexual, and physical abuse in active duty military service members, 1997-2015. *Aggress Viol Behav*. 2022;66. https://doi.org/10.1016/j.avb.2021.101745.
27. Steine IM, Skogen JC, Hysing M, Puigvert L, Schønning V, Sivertsen B. Sexual harassment and assault predict sleep disturbances and is partly mediated by nightmares: findings from a national survey of all university students in Norway. *J Sleep Res*. 2021;30(6):e13338. https://doi.org/10.1111/jsr.13338.
28. Sandman N, Valli K, Kronholm E, et al. Nightmares: prevalence among the Finnish general adult population and war veterans during 1972-2007. *Sleep*. 2013;36 (7):1041–1050.
29. Boyraz G, Legros DN, Tigershtrom A. COVID-19 and traumatic stress: the role of perceived vulnerability, COVID-19-related worries, and social isolation. *J Anxiety Disord*. 2020;76: 102307. https://doi.org/10.1016/j.janxdis.2020.102307.
30. Hayes SW, Priestley JL, Moore BA, Ray HE. Perceived stress, work-related burnout, and working from home before and during COVID-19: an examination of workers in the United States. *SAGE Open*. 2021;11(4):1–12. https://doi.org/10.1177/21582440211058193.

Downloaded for Anonymous User (n/a) at Walter Reed National Military Medical Center from ClinicalKey.com by Elsevier on January 05, 2024. For personal use only. No other uses without permission. Copyright ©2024. Elsevier Inc. All rights reserved.