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DELIVERING CBT-I IN MILITARY PERSONNEL AND VETERANS

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INTRODUCTION

Insomnia is one of the two most commonly diagnosed sleep disorders among military servicemembers and veterans, and both the Department of Defense (DOD) and Veterans Administration (VA) have embraced cognitive-behavioral therapy for insomnia (CBT-I) as a valuable first-line approach to treatment, conducting large-scale provider training initiatives to meet the needs of individuals served by these two large healthcare systems.¹

Insomnia disorder seldom occurs on its own in servicemembers and veterans; rather, it is typically seen in the context of other physical and mental health conditions. It is also more common among women servicemembers and veterans compared to men, although treatment studies with military populations have included a predominance of men (typically 80–90%) with some studies including exclusively men.^{2,3} Results of randomized controlled trials and clinical implementation of CBT-I show that it retains its effectiveness when delivered to servicemembers and veterans in “real world” clinical practice, even in the context of comorbid conditions.^{1,4}

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MENTAL HEALTH COMORBIDITIES

In servicemembers and veterans, insomnia disorder commonly co-occurs with mental health conditions, an association which has adverse consequences for functioning. Disrupted sleep is also a risk factor for mental health disorders including posttraumatic stress disorder (PTSD) and depression. A recent study of active duty Army personnel found insomnia is highly comorbid with major depressive disorder (85%), generalized anxiety disorder (83%), and PTSD (70%).⁵ The relationship between insomnia and mental health symptoms is bidirectional and chronic in nature. Insomnia symptoms prior to deployment are predictive of a greater risk for development of depression, anxiety and PTSD,⁶ while sleep difficulties are also core diagnostic criteria of PTSD and depression.⁷ Younger veterans deployed during Operation Iraqi Freedom/Operation Enduring Freedom/Operation New Dawn (OEF/OIF/OND) with premorbid psychiatric disorders are more likely to suffer from insufficient and poor quality compared to those without premorbid psychiatric conditions further supporting a bidirectional relationship between sleep and psychiatric illness.⁸

Posttraumatic stress disorder (PTSD)

Insomnia is the most frequently endorsed symptom of PTSD in servicemembers postdeployment,⁹ and evidence suggests CBT-I is highly effective in improving sleep and reducing trauma symptoms in veterans with PTSD. Nearly half of Vietnam-era veterans with combat-related PTSD endorse regular difficulties with sleep onset and fragmentation.¹⁰ Furthermore, insomnia is the most commonly reported enduring symptom following PTSD treatment in active duty servicemembers¹¹ and in individuals exposed to trauma at night.¹² Insomnia is also a predictor of poor response to exposure therapy for PTSD.¹³ These findings suggest veterans meeting criteria for insomnia disorder and PTSD may benefit from sleep-focused interventions in multiple ways.

Some sleep symptoms present differently for individuals with military-related PTSD, particularly symptoms of hyperarousal at night. Veterans with PTSD show greater night-to-night and person-to-person variability in sleep symptoms¹⁴ and distinctive maladaptive cognitions such as fear of reexperiencing nocturnal traumatic events or losing the ability to maintain vigilance during sleep.¹⁵ These hypervigilance-related features may be related to the context of the trauma (i.e. sexual assault in bed, nighttime combat), and manifest behaviorally through actions such as trying to avoid falling sleep, checking behaviors, and keeping weapons at the bedside. A theoretical model describing factors that predispose, precipitate, and perpetuate insomnia (the “3 P’s” model of insomnia)¹⁶ can be applied in the case of PTSD (see Table 1). Utilizing this conceptualization within insomnia treatment, it may be helpful to highlight factors such as regularity in sleep scheduling, addressing unhelpful thoughts with cognitive therapy, and employing coping strategies (e.g. relaxation, grounding, distraction) for distress and arousal at night.

CBT-I confers significant benefit for veterans with PTSD in terms of reducing insomnia severity across subjective sleep measures, general functioning, nightmares and sleep-related fear.^{17,18} Similar reductions in symptoms of insomnia severity have also been demonstrated for veterans with comorbid PTSD and insomnia in residential programs,¹⁹ and when CBT-I is delivered via telehealth.²⁰ CBT-I is a robust treatment for individuals with co-occurring

insomnia and PTSD even when delivered to patient populations that may not be able to easily access outpatient mental health services.

Over 70% of patients with PTSD have chronic nightmares,²¹ and combining nightmare-focused treatments with CBT-I is supported by several studies. Imagery Rehearsal Therapy (IRT) and Exposure, Rescripting and Relaxation Therapy (ERRT) have demonstrated positive results for veterans with PTSD and insomnia, when combined with CBT-I.²² Combining CBT-I with IRT improved subjective sleep, insomnia severity, nightmare frequency and overall PTSD symptoms.^{23,24} Sleep measured objectively by actigraphy also improved in one study.²⁵ Cognitive Behavioral Social Rhythm Therapy (CBSRT) utilized techniques from Social Rhythm Therapy, CBT-I and IRT and is associated with improved sleep-related and PTSD-related symptoms.²⁴ Combining CBT-I with ERRT may also be beneficial for general sleep outcomes, nightmare frequency and nightmare-related distress.²⁶ Addressing nightmares and insomnia together therefore has significant advantages.

Depression

Depression is a common mental health condition among military personnel and veterans with insomnia. Sleep difficulties are both prodromal to and diagnostic of depression,²⁷ and insomnia is a risk factor for suboptimal depression treatment response,²⁸ chronicity²⁹ and relapse after depression treatment.³⁰ Even following successful depression treatment, insomnia symptoms frequently remain, even among individuals considered in remission.³¹ In military populations, depression is often comorbid with other mental health diagnoses such as PTSD,³² further complicating the clinical picture.^{33,34,35} Additionally, in military personnel, poor sleep is related to increased suicidality and history of suicide attempts³⁶ over and above other risk factors.³⁷

Patients with comorbid insomnia and depression may present with symptoms that complicate CBT-I delivery. For example, depressed individuals may have low motivation and may find it more difficult to adhere to treatment recommendations.³⁸ Similarly, depressed individuals may have difficulty with components of CBT-I that require them to get out of bed when not sleeping. Patients with comorbid depression may benefit from better understanding and addressing common symptoms of depression, such as low mood and anhedonia, that are not considered core insomnia symptoms but can interfere with treatment progress. Behavioral activation through working together with the patient to identify previously enjoyable or mastery-oriented activities could address depression-related difficulty rising at a prescribed time as well as using the bed as coping strategy. Other modifications to CBT-I may be helpful, such as motivational interviewing to enhance adherence, early morning bright light exposure to improve mood and stabilize sleep, scheduled worry time to address rumination, and relaxation techniques. Collaborating with prescribing physicians around pharmacotherapy for depression is also essential to ensure sleep is not adversely impacted by antidepressant therapy. Results of VA's CBT-I dissemination program shows that CBT-I reduces depression severity and suicidal ideation in the context of routine clinical care, suggesting CBT-I should be offered to individuals with comorbid depression and insomnia.³⁹

Substance Use Disorders (SUD)

Insomnia and substance use often co-occur, frequently in conjunction with other mental health difficulties. Veterans often report using substances such as alcohol and marijuana to cope with insomnia symptoms,^{40,41} and insomnia symptoms predict alcohol relapse for military personnel and veterans.⁴² While mental health conditions are risk factors for substance use disorders, the relationship between depression or PTSD symptoms and alcohol use is mediated by insomnia severity among veterans, suggesting complex relationships among psychiatric conditions, substance use, and sleep.⁴³ Importantly, sleep symptoms may not remit after PTSD treatment in dual-diagnosis substance use residential treatment programs,⁴⁴ but there is evidence CBT-I may reduce risk of substance use relapse among individuals with comorbid mental health condition. While substances such as alcohol and cannabis may induce drowsiness or relaxation, sleep fragmentation is increased as substances are metabolized, and tolerance to sedation develops with continued use.⁴⁵ CBT-I in substance users may require multi-model interventions for co-occurring diagnoses as problematic alcohol use is associated with reduced treatment adherence,⁴⁶ and treatment for insomnia typically is not initiated until the recovery phase of substance use disorders. CBT-I techniques are practical and effective interventions for sleep disturbance in individuals with a history of substance use disorders. Although alcohol use relapse rates may not be reduced by CBT-I,^{47,48} a pilot study of veterans with cannabis use disorder found the CBT-I Coach mobile app was effective in reducing cannabis use and improving sleep.⁴⁹ Despite evidence for the interrelationship between sleep disturbance and substance use, limited studies exist investigating the effectiveness of CBT-I for military populations with problematic substance use patterns.

MEDICAL ISSUES

Pain

There exists a bidirectional relationship between insomnia and chronic pain, suggesting that symptoms of both must be addressed to improve functioning. Among individuals with chronic pain, 50%–70% report significantly disrupted sleep.⁵⁰ Chronic pain may cause patients to remain in lighter stages of sleep,⁵¹ and interrupted sleep can, in turn, decrease pain thresholds.^{52,53} Insomnia is a risk factor for chronic pain after acute injury,⁵⁴ and experimentally induced pain disrupts sleep.⁵⁵ In older veterans, poor sleep is associated with worse next-day subjective pain ratings.⁵⁶ Sleep difficulties are endorsed by 90% of Operation Iraqi Freedom/Operation Enduring Freedom (OIF/OEF) veterans who present with the “polytrauma clinical triad” of chronic pain, TBI, and PTSD.^{57,58} PTSD-related hyperarousal can disrupt sleep^{59,60} and lower pain thresholds as well⁶¹ (see Figure 1). This underscores the complexity of sleep in relation to polytrauma and overall health.

Multiple factors complicate insomnia treatment in the context of chronic pain. Assessing medication use and working with prescribers is important as pain medications may lead to disruptions in sleep,^{62,61} worsen sleep apnea,⁶³ and impair cognition.⁵⁰ Dysfunctional beliefs about the pain-sleep relationship, and behaviors such as extended time in bed for “rest” may be linked to poorly managed pain and contribute to insomnia symptoms. Providing psychoeducation about sleep and pain, making pain-specific behavioral

recommendations (i.e., separate “sleep” and “rest” locations), using cognitive therapy techniques to challenge unhelpful beliefs, employing behavioral activation with activity pacing, and providing relaxation strategies may be helpful for chronic pain patients with insomnia.

There is a positive effect of CBT-I on sleep and mood outcomes in chronic pain patients; ^{64–66} however, despite improvements in sleep, differences in pain ratings from pre-to post-intervention are not always achieved.⁶⁷ Among OIF/OEF veterans with polytrauma, modified CBT-I in combination with prazosin reduced headache intensity and frequency, reduced daytime sleepiness, and improved cognitive performance.⁶⁸ Overall, improvements from CBT-I in sleep indices for comorbid insomnia and pain suggests CBT-I is a viable treatment option for patients with comorbid chronic pain and may improve their overall function.

Aging

Approximately one half of older veterans endorse disturbed sleep,⁶⁹ and chronic, untreated sleep disturbances are associated with increased risk for negative physical,⁷⁰ psychological,⁷¹ cognitive,^{72–74} and social⁷⁵ outcomes. CBT-I is effective first-line treatment for insomnia in older adults,^{76–78} and hypnotic medications are not recommended due to risk for adverse effects.⁷⁹ The likelihood of taking sedative-hypnotic medications to treat sleep difficulties is higher in older adults, although they increase risk for falls,^{80,81} fractures,⁸² strokes,⁸³ and mortality.⁸⁴ Studies of older veterans show benefit of CBT-I,^{4,69} although older veterans underutilize behavioral health services, posing unique challenges in delivering CBT-I to older veterans.^{4,78,85}

Adaptations to CBT-I can be made to accommodate the physical and cognitive changes associated with advanced age.⁸⁶ Older adults may adopt unhelpful expectations regarding sleep and aging,⁸⁷ and psychoeducation is important to address these maladaptive thoughts. In addition, engagement in stimulating evening activities and eliminating activities that increase risk of evening dozing are important tools in implementing CBT-I. To accommodate physical limitations and maintain safety from falls at night, modification to stimulus control instructions may be required. A recent study showed that CBT-I, delivered by trained non-mental health providers, produced significant improvements in sleep initiation and maintenance in older veterans and that benefits were sustained over a 12-month follow-up.⁶⁹ A second study explored benefits of an adapted version of CBT-I for older veterans in and Adult Day Health Care program and found benefits for this population in which mild cognitive impairment, functional limitations and limited social milieu are all commonplace.⁸⁶

Sleep Apnea

Insomnia and obstructive sleep apnea (OSA) frequently co-occur⁸⁸ and contribute to impairments in functioning and quality of life, over and above either disorder in isolation.⁸⁹ Risk factors for OSA include obesity, use of central nervous system depressants (i.e., opioids, alcohol), older age, male gender, and smoking.⁹⁰ Data from active duty military personnel indicate increases in medical encounters for both insomnia and OSA.⁹¹ Over 65%

of active duty personnel with PTSD have comorbid OSA,⁹² and OSA is the most commonly-diagnosed sleep disorder among VA users.² OSA is typically comorbid with medical conditions such as hypertension, cardiovascular diseases, diabetes, and is associated with increased mortality,^{93,94} and psychiatric disorders including depression, anxiety and PTSD.^{90,95} While the first line treatment for OSA, positive airway pressure (PAP) therapy,⁹⁶ can improve sleep-related symptoms and health,⁹⁷ comorbid insomnia is associated with lower PAP adherence.⁹⁸ This suggests CBT-I is an appropriate adjunctive treatment for OSA patients with insomnia.

Special treatment considerations or modifications may be needed to address compliance with PAP in veterans with comorbid OSA and insomnia. Early PAP use is predictive of long-term PAP adherence;⁹⁹ therefore, to encourage long-term PAP use, early intervention for insomnia is important. A Cochrane review reported that behavioral and educational interventions effectively improve PAP adherence,¹⁰⁰ and this can easily be woven into CBT-I treatments. In fact, interventions targeting veterans with co-existing OSA and insomnia have demonstrated positive sleep and PAP adherence outcomes.^{101,102} Taken together, the literature provides support for using CBT-I in veterans with comorbid insomnia and OSA and significant sleep-related benefits can be achieved. The available literature is currently limited in terms of studies assessing the role of CBT-I in OSA for active duty populations where additional challenges to PAP use are present.

ACCESS TO CARE

Because insomnia is highly prevalent in the veteran population, and CBT-I has demonstrated effectiveness in patients with complex medical and mental health histories, a system-wide dissemination has been implemented by the VA and DOD.¹ The CBT-I dissemination program utilizes didactic and competency training components through lectures and telephone-based consultation about ongoing cases for mental health providers from a variety of disciplines. Outcomes demonstrate high success rates for provider competency¹ and self-efficacy,¹⁰³ in addition to large effects for improvement in insomnia symptoms for veterans.⁴

Despite these efforts, there are still barriers to engaging CBT-I for military populations such as the limited access to care and the stigma of mental health care. VA/DOD guidelines recommend CBT-I as a first-line treatment for insomnia disorder in PTSD;¹⁰⁴ however, veterans with insomnia and PTSD remain likely to receive sedative-hypnotic medications instead.¹⁰⁵ It may be the case that providers are unaware of CBT-I or the service may not be readily available (e.g. limited to weekday sessions during standard work hours and larger, urban clinics). In addition to provider training initiatives described above, alternative delivery modalities have been explored as a means of increasing access to CBT-I. There is evidence that small-group CBT-I is as effective as individual CBT-I for veterans.¹⁰⁶ Telehealth interventions for veterans in rural areas are also effective and may enable trained providers to more easily reach veterans living in remote areas.²⁰ While internet-based delivery may further increase access, available evidence suggests it is inferior to face-to-face treatment for active duty military personnel.¹⁰⁷

Aside from systemic barriers to accessing CBT-I, there are also individual beliefs about mental health treatment, which are more prevalent in veterans who have been diagnosed with a mental health condition such as PTSD or depression, are younger, or identify as a racial/ethnic minority.¹⁰⁸ Nonetheless, one study of women veterans reported that patients actually prefer behavioral over pharmacological insomnia treatment.¹⁰⁹ Connecting active duty military personnel and veterans with CBT-I through primary care or non-mental health settings may be a means of reducing stigma and promoting engagement.

SUMMARY

Insomnia is commonly reported by military populations, especially those with comorbid mental and physical health conditions. Co-occurring conditions may result in an altered presentation of insomnia symptoms, and complicate provision of CBT-I, requiring supplementary assessment or modifications to traditional CBT-I techniques. CBT-I has consistently demonstrated positive outcomes for active duty military personnel and veterans, even in the context of significant comorbidities such as PTSD, depression, sleep apnea, and chronic pain. Despite its promise, studies of CBT-I in some military populations, including women active duty service members and active duty and veteran patients with substance use disorders, remain relatively lacking. Access to care remains a challenge, which is being addressed via provider training initiatives and exploration of alternative delivery modalities.

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SYNOPSIS:

Insomnia is commonly reported by military populations, especially those with comorbid mental and physical health conditions. Co-occurring conditions result in an altered presentation of insomnia symptoms, and complicate provision of Cognitive Behavioral Therapy for Insomnia (CBT-I), requiring supplementary assessment or modifications to traditional techniques. CBT-I has consistently demonstrated positive outcomes for active duty servicemembers and veterans, even in the context of significant comorbidities such as posttraumatic stress disorder, depression, sleep apnea, and chronic pain. Despite its promise, studies of CBT-I in some populations, including women and individuals with substance use disorders remain relatively understudied in active duty and veteran populations.

KEY POINTS

- Insomnia is frequently reported by active duty military personnel and veterans
- There is a bidirectional relationship between insomnia and mental and physical health disorders that commonly occur in military populations
- Cognitive Behavioral Therapy for Insomnia (CBT-I) is efficacious to improve sleep and functioning in military populations from active duty service members to older veterans
- Military personnel and veterans with complex presentations including posttraumatic stress disorder, depression, sleep apnea, and chronic pain benefit from CBT-I
- Data evaluating CBT-I are limited in women servicemembers and veterans and among those with substance use disorders despite high prevalence and risk of sleep difficulties in these subgroups

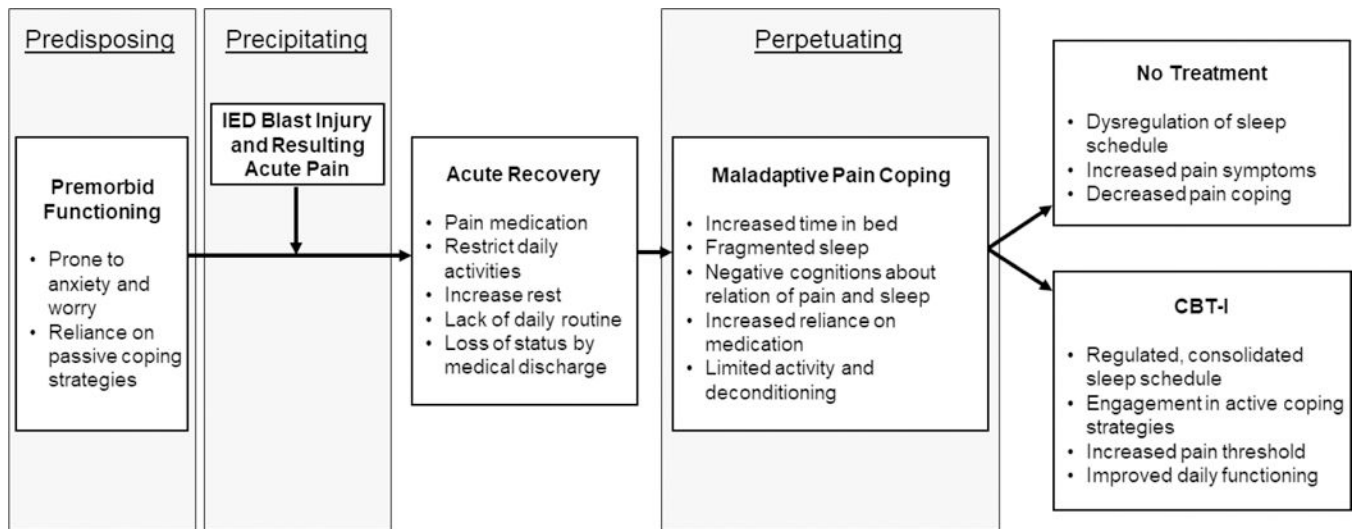


Figure 1: Sleep and pain interact and impact implementation of insomnia treatment.

Table 1.

3 P's Model of Insomnia and PTSD in Military Populations

Predisposing factors	Precipitating factors	Perpetuating factors
<i>Elevate risk for developing insomnia and PTSD</i>	<i>Trigger insomnia and PTSD</i>	<i>Maintain insomnia and PTSD</i>
Family history of sleep or anxiety problems	Military trauma exposure (e.g. combat, sexual or interpersonal assault)	Behaviors (e.g. irregular sleep/wake schedule, hypervigilance - checking locks)
Early-life trauma exposure	Change in military status (e.g. deployment, discharge)	Cognitions (e.g. fears of vulnerability or nightmares leading to sleep avoidance, distress regarding daytime consequences of sleep loss)
Mental health symptoms (e.g. high stress reactivity, anxiety, depression)	Social/interpersonal life stressors (e.g. divorce, childbirth)	Maladaptive coping strategies (e.g. napping, substance use including alcohol or caffeine)
Medical conditions (e.g. apnea, pain)	Economic/occupational stressors (e.g. job loss, shift work)	Environmental factors (e.g. light, temperature)

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