Sleep-Focused Therapy is Associated with Trophic Factor Changes in Sleep Disturbed Military Service Members with and without Posttraumatic Stress Disorder: A Pilot Study

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Introduction

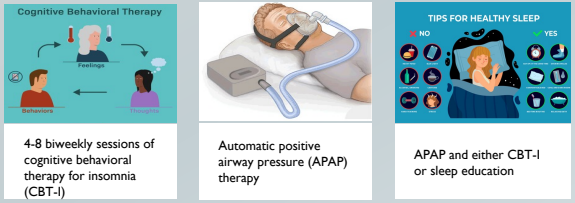
- Disturbed sleep is one of the most common residual symptoms following treatment for posttraumatic stress disorder (PTSD), and if left untreated, may lead to PTSD relapse.[1,2]
- Sleep disturbance and PTSD are associated with changes in inflammatory markers and trophic factors.[3-6]
- Prior studies led us to question whether treatments that improve sleep may be useful in managing PTSD and altering blood-based biomarker levels.[7,8]

Aims

To examine the association between sleep-focused therapy and changes in sleep quality, inflammatory biomarkers, and trophic factors (primary aim), as well as posttraumatic stress and depression symptoms (secondary aim) in sleep disturbed military service members with varying degrees of symptoms.

Methods

- 100 military service members [age in years, mean (SD); 34.79 (8.04)] diagnosed with insomnia and/or obstructive sleep apnea (OSA) received a sleep intervention (**Figure 1**).
- Self-report measures of sleep quality (PSQI), posttraumatic stress (PCL-M), and depression (QIDS), along with plasma-derived biomarkers (CRP, IL-6, BDNF, and IGF-1) were assessed pre and 12-weeks posttreatment.
- Participants were categorized into three groups according to baseline PTSD scores: PTSD (PCL-M ≥ 50), Subclinical PTSD (PCL-M > 30 and < 50), and No PTSD (PCL-M ≤ 30) groups.
- Repeated measures ANOVA and paired t-tests were conducted to examine changes in outcome variables from pre to posttreatment.



4-8 biweekly sessions of cognitive behavioral therapy for insomnia (CBT-I)

Automatic positive airway pressure (APAP) therapy

APAP and either CBT-I or sleep education

Figure 1. Participants with insomnia received CBT-I, those with OSA received APAP, and those with comorbid OSA and insomnia received APAP and either CBT-I or sleep education.

Results

Figure 2. Pre and posttreatment mean score change in **sleep quality** in the PTSD, Subclinical PTSD, and No PTSD groups. Error bars represent the SD.

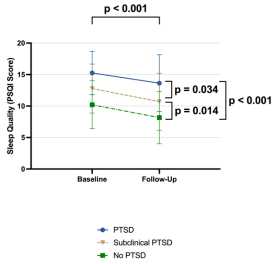


Figure 3. Pre and posttreatment **biomarker** mean score changes to (a) CRP, (b) IL-6, (c) BDNF, and (d) IGF-1 in PTSD, Subclinical PTSD, and No PTSD groups. Error bars represent the SD.

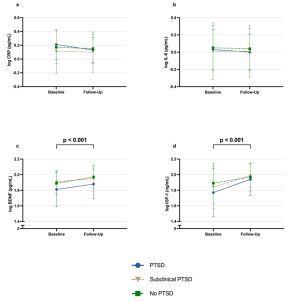
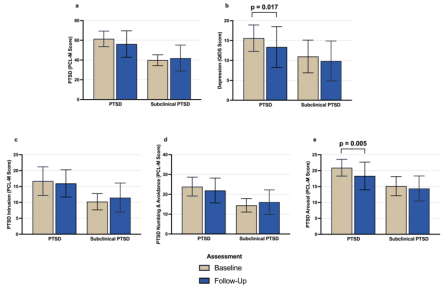


Figure 4. Pre and posttreatment mean score changes to **posttraumatic stress and depression** in the PTSD and Subclinical PTSD groups. Error bars represent the SD.



Conclusion

- We found that sleep-focused treatments in military service members with disordered sleep and PTSD significantly altered trophic factors (BDNF, IGF-1), PTSD arousal symptoms, and depression symptoms.
- Results suggest that trophic factors may be potential treatment targets for individuals with comorbid sleep disorders and posttraumatic stress symptoms .
- Sleep-focused interventions may be a promising adjunct to trauma-focused therapies in military service members with varying degrees of PTSD symptoms.
- **Strengths** of this study include the longitudinal design and inclusion of both self-reported psychological measures and objective biological measures of wellbeing.
- **Limitations** include an uncontrolled study design, small sample size, lack of diversity in sample size, and lack of long-term follow-up data.

Future Directions

- Conduct a randomized controlled trial to elucidate causal relations between intervention and outcome measures (e.g., biomarker changes).
- Recruit a larger and more diverse participant cohort.
- Conduct follow-up data to map a long-term course of recovery.

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