The purpose of this waitlist randomized controlled pilot study was to test a 3-session heart rate variability (HRV) biofeedback protocol that included mindfulness training (HRVBm) and a mobile app for home practice. We hypothesized that the mobile app-adapter version of HRVBm would:

- reduce postsymptomatic stress disorder (PTSD) and depression symptoms
- improve time and frequency domain indicators of HRV,
- be feasible and acceptable to veterans with a PTSD diagnosis

**Background**

Many veterans continue to struggle with PTSD and depressive symptoms, even after completing a full course of treatment (Larsen et al. 2019). HRVB interventions using cardiorespiratory training and physiological feedback to increase HRV, have proven efficacious in treating PTSD (small effects) and depression (medium effects; Lehrer et al., 2003). Although there are few studies that include this population, correlation coefficients have been significant (Kizakevich et al., 2019; Pyne et al., 2019; Lehrer et al., 2020). However, these studies have not yet been systematically reviewed. Further research is needed to determine the effectiveness of HRVBm in treating PTSD and depression symptoms.

**Method**

Veterans, 18-75, with clinically-defined military-related PTSD were recruited from a local VA medical center. Participants in the intervention group were instructed to practice twice daily, five minutes each time. All measures were assessed at the beginning (Time 1: T1) and after 3 clinical sessions (Time 2; T2), and at 8-week follow-up (Time 3; T3). The protocol was feasible and acceptable to patients, and veterans with PTSD based on the 70% completion rate for study visits. Results suggest that a 3-session HRVBm protocol, augmented by twice-daily home practice using a mobile health device, may improve autonomic functioning and address comorbid depression in veterans with PTSD.

**Findings**

Findings included a 3-session protocol marginally improved PTSD Cluster B intrusion symptoms and significantly improved depression symptom severity (large effects) and SDNN (medium effects) in the HRVBm group, but not the waitlist control. SDNN was positively correlated with minutes of home practice. The protocol was feasible and acceptable to patients, and veterans with PTSD based on the 70% completion rate for study visits. Results suggest that a 3-session HRVBm protocol, augmented by twice-daily home practice using a mobile health device, may improve autonomic functioning and address comorbid depression in veterans with PTSD.

**Conclusion**

Although a significant group x time interaction effect was not found for the PTSD symptom score, there was a marginally significant group x time interaction effect for Cluster B (intrusion), F(2, 66) = 2.847, p = .065, n²p = .079. Table 1. Post hoc tests with Bonferroni correction showed a significant increase in PTSD symptoms for the HRVBm group from T1 to T2 (p = .020; Cohen’s d = .618) and T3 to T3 (p = .012; Cohen’s d = .817). Controlling for age, the HRVBm group saw a significant effect x time interaction on SDNN, F(2, 66) = 4.75, p = .012, n²p = .129. To see Table 2. Post hoc tests with Bonferroni correction showed a significant increase in depression symptoms for the HRVBm group from T1 to T2 (p = .036; Cohen’s d = .533). Waitlist group results were not significant. Results of a Pearson correlation indicated a significant positive association between total number of minutes of verified use and change in natural log-transformed SDNN from T1 to T3, r (2, 66) = 0.626, p < .05; Cohen’s d = .39, 95% CI [.042, .081]). Over 70% completed the clinical trainings and returned for follow-up. Home practice was verified for only 12. Of these, only 27% completed at least 70% of the recommended number of minutes of home practice.