

INTRODUCTION

Military service members with posttraumatic stress disorder (PTSD) frequently experience persistent nightmares and insomnia.^{1,2} Many evidence-based PTSD treatments are trauma focused, however, not all patients respond well to trauma activation.^{3,4}



This pilot randomized clinical trial compares Nightmare Deconstruction and Reprocessing (NDR), an exposure-based psychotherapy, and NightWare (NW), a non-exposure intervention. We are investigating how biomarkers of in-session stress may relate to change in sleep disturbance.

METHODS

Heart rate (HR), collected 24/7 via a wristband, tracked psychological distress during therapy and wakefulness during sleep. Nightmare occurrence was verified through participant self-report measures and matched to wearable-derived physiological stress classifiers.



We conducted ELISA assays of serum cortisol levels from pre- and post-session samples taken at Visit 2 and Visit 7. We converted plate reader-derived absorbance values to cortisol concentrations using MyAssays.com. Statistical analyses included frequencies of and correlations between biomarkers of physiological activation and sleep outcomes.



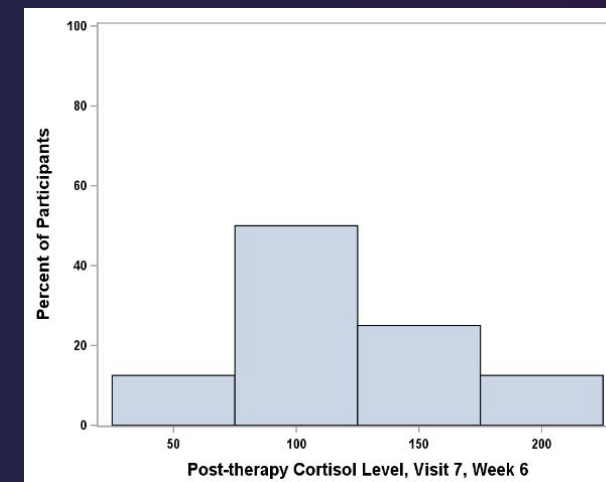
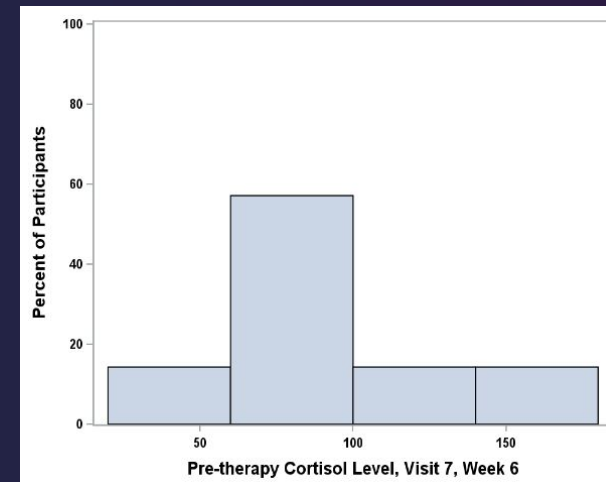
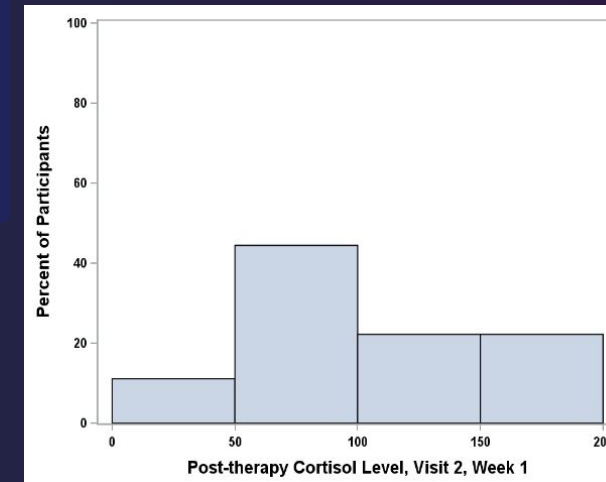
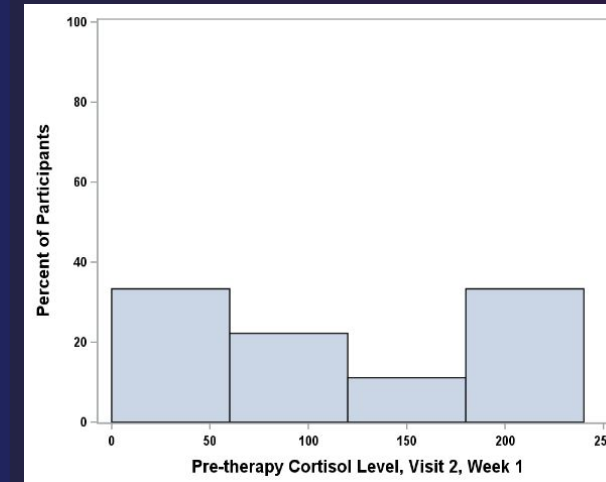
RESULTS

Table 1. Correlations Between Nightmare Treatment Biomarkers

| Biomarker | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|------------------------------------|---------------|---------------|---------------|-------|-------|-------|----------------|-------|-----------------|-----------------|-------|----|
| 1. Max HR, Treatment Visit 2, Wk 1 | 1 | | | | | | | | | | | |
| 2. Max HR, Treatment Visit 7, Wk 6 | 0.86** | 1 | | | | | | | | | | |
| 3. Max EDA Treatment Visit 2, Wk 1 | 0.22 | -0.06 | 1 | | | | | | | | | |
| 4. Max EDA Treatment Visit 7, Wk 6 | 0.72 | 0.78** | -0.25 | 1 | | | | | | | | |
| 5. Cortisol, Pre-Visit 2, Wk 1 | -0.61* | -0.28 | 0.10 | -0.14 | 1 | | | | | | | |
| 6. Cortisol, Post-Visit 2, Wk 1 | -0.52 | -0.73* | -0.25 | -0.43 | 0.37 | 1 | | | | | | |
| 7. Cortisol, Pre-Visit 7, Wk 6 | -0.19 | 0.36 | -0.05 | 0.28 | 0.67 | -0.26 | 1 | | | | | |
| 8. Cortisol, Post-Visit 7, Wk 6 | -0.59 | -0.55 | -0.74* | -0.19 | -0.14 | 0.53 | 0.03 | 1 | | | | |
| 9. Mean sleep ratio, Wk 1 | -0.30 | -0.05 | 0.11 | 0.13 | -0.02 | -0.41 | 0.18 | 0.23 | 1 | | | |
| 10. Mean sleep ratio, Wk 6 | -0.19 | -0.52 | -0.42 | -0.30 | -0.35 | 0.16 | -0.77** | 0.22 | -0.10 | 1 | | |
| 11. Mean sleep fragmentation, Wk 1 | 0.30 | 0.05 | -0.12 | -0.13 | 0.02 | 0.41 | -0.18 | 0.23 | -1.00*** | 0.10 | 1 | |
| 12. Mean sleep fragmentation, Wk 6 | 0.19 | 0.52 | 0.42 | 0.30 | 0.35 | -0.16 | 0.77** | -0.22 | 0.10 | -1.00*** | -0.10 | 1 |

*p < .10, **p < .05, ***p < .0001

Cortisol Results



- Correlation results indicate that Pre-Visit 7 Cortisol is directly related to sleep fragmentation (interruptions) at week 6, and that Cortisol is highly correlated with Max HR and Max EDA.
- Max heart rate results indicate lower average HR in Week 6 compared to Week 1.
- Sleep Interruption results show lower average sleep interruptions (percentage of sleep period interrupted) in Week 6 compared to Week 1.
- Cortisol levels were highly variable at all time points.

CONCLUSIONS

Preliminary results suggest:

- Improvement in sleep quality with treatment
- In-session stress, as measured by Max HR, was lower on average by the end of treatment
- Cortisol, as a biomarker of in-session stress is related to sleep outcome variables
- Further data collection will help to elucidate physiological mechanisms underlying treatment response and inform strategies to improve sleep outcomes

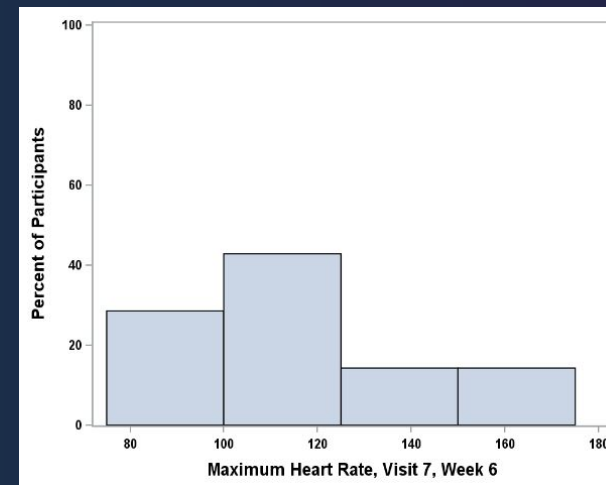
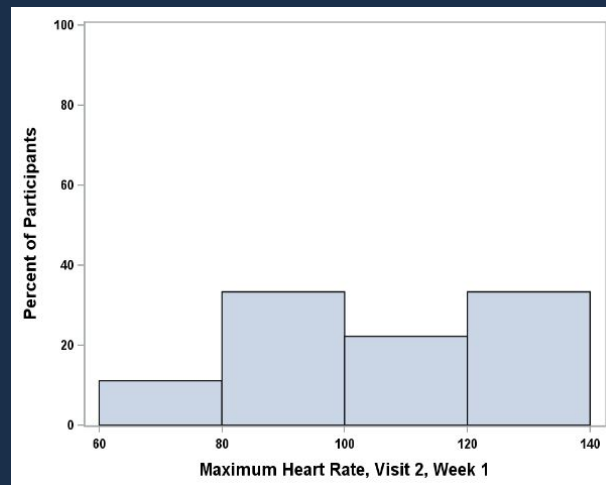
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Scan QR code for references



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Heart Rate Results



Sleep Interruption Results

