Biomarker and Self-Report Assessment of In-session Distress During Exposure and Non-Exposure Treatment for Post-Trauma Nightmares

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INTRODUCTION

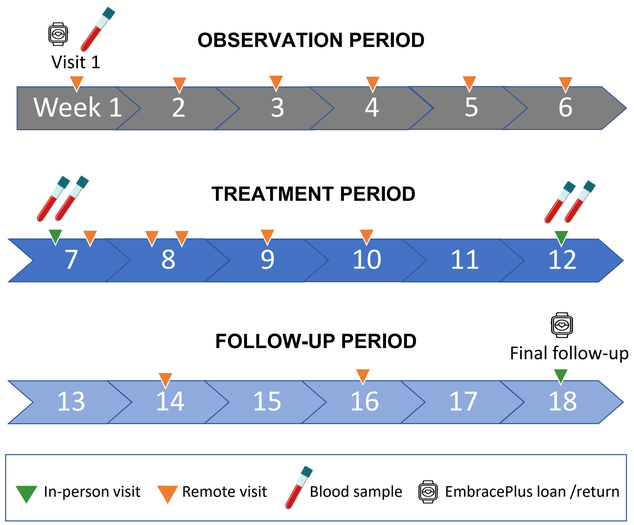
- Trauma-related nightmares (TRNs) and insomnia are common among military service members and often persist despite evidence-based PTSD treatment.
- Although effective treatments exist, objective indicators of treatment engagement and response remain limited.
- Physiological biomarkers may improve understanding of how individuals respond to nightmare-focused interventions.
- This pilot randomized clinical trial compares two nightmare treatments:
  - **Nightmare Deconstruction and Reprocessing (NDR)** - *exposure-based* therapy

  - **NightWare (NW)** - *non-exposure* intervention

- This analysis examines whether physiological indicators of stress correlate with subjective distress during treatment for TRNs.

METHODS

- Sample: Up to N=20 military personnel and veterans with TRNs and insomnia.
- Timeline: 6 weeks observation + 6 weeks treatment with either NDR or NW + 6 weeks follow-up
- Weekly psychometric assessment during observation and active treatment periods and every 2 weeks during follow up.
- All participants wear Empatica Embrace Plus wristband 23 hrs/ day to collect heart rate (HR), electrodermal activity (EDA), and actigraphic data.
- Blood samples are taken before and after Visit 2 (initial exposure to nightmare content for NDR group) and before and after Visit 7 (final exposure to nightmare content).



RESULTS

Table 1. Correlation Matrix of Session Physiologic, Neuroendocrine, and Subjective Measure of Stress with Physiologic Sleep Outcomes (N=10)

Biomarker	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
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. Max SUDS, Treatment Visit 2, Wk 1	0.56	0.24	-0.01	0.36	1													
6. Max SUDS, Treatment Visit 7, Wk 6	0.03	0.02	-0.33	0.56	-0.10	1												
7. Cortisol, Pre-Visit 2, Wk 1	-0.61	-0.28	0.10	-0.14	-0.15	0.25	1											
8. Cortisol, Post-Visit 2, Wk 1	-0.52	-0.73	-0.25	-0.43	-0.01	0.06	0.37	1										
9. Change in Cortisol, Visit 2, Wk 1	-0.30	0.40	0.27	0.25	-0.14	0.20	0.80	-0.27	1									
10. Cortisol, Pre-Visit 7, Wk 6	-0.19	0.36	-0.05	0.28	-0.39	0.59	0.67	-0.26	0.70	1								
11. Cortisol, Post-Visit 7, Wk 6	-0.59	-0.55	-0.74	-0.19	-0.41	0.41	-0.14	0.53	-0.47	0.03	1							
12. Change in Cortisol, Visit 7, Wk 6	0.28	0.55	0.57	0.29	0.23	0.07	0.64	-0.18	0.71	0.61	-0.74	1						
13. Mean sleep ratio, Wk 1	-0.30	-0.05	0.12	0.13	-0.66	0.31	-0.02	-0.41	0.24	0.18	0.23	-0.33	1					
14. Mean sleep ratio, Wk 6	-0.19	-0.52	-0.42	-0.30	0.42	-0.34	-0.35	0.16	-0.41	-0.77	0.22	-0.66	-0.10	1				
15. Mean sleep disturbances, Wk 1	0.09	-0.36	-0.27	-0.15	0.59	0.26	0.21	0.52	-0.11	0.15	0.22	0.12	-0.72	0.15	1			
16. Mean sleep disturbances, Wk 6	0.71	0.23	-0.23	0.59	0.61	-0.07	-0.69	0.00	-0.68	-0.65	0.14	-0.46	-0.40	0.36	0.34	1		
17. Mean sleep fragmentation, Wk 1	0.30	0.05	-0.12	-0.13	0.66	-0.31	0.02	0.41	-0.24	-0.18	-0.23	0.33	-1.00	0.10	0.72	0.40	1	
18. Mean sleep fragmentation, Wk 6	0.19	0.52	0.42	0.30	-0.42	0.34	0.35	-0.16	0.41	0.77	-0.22	0.66	0.10	-1.00	-0.15	-0.36	-0.10	1

0.5 < |corr| < 0.7

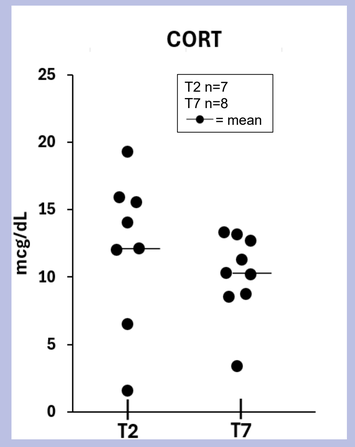


Figure 1a. Individual participant mean cortisol concentrations at Treatment Session 2 (Week 1) and Treatment Session 7 (Week 6).

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Figure 1b. Individual participant SUDS scores at Treatment Session 2 (Week 1) and Treatment Session 7 (Week 6).

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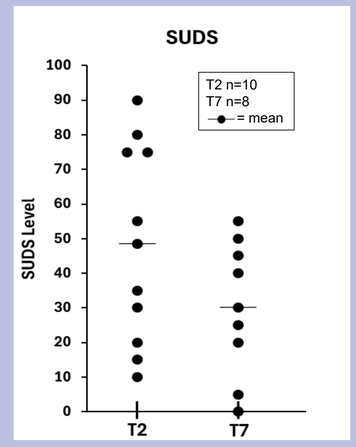

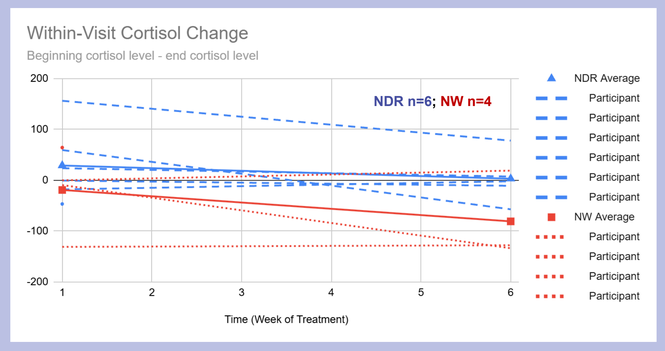

Figure 2a. Individual trajectories of change in cortisol levels from T2 to T7.

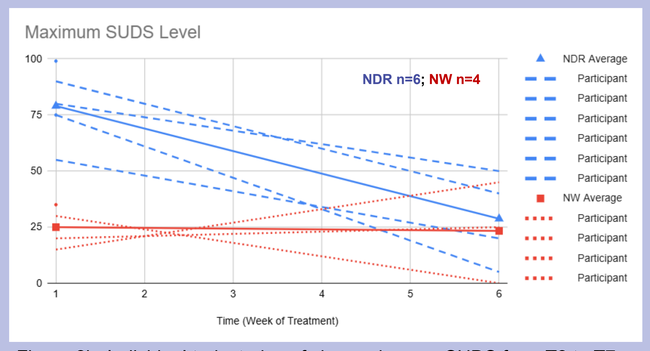

Figure 2b. Individual trajectories of change in max. SUDS from T2 to T7.

PRELIMINARY FINDINGS

Preliminary results indicate significant correlations between HR and EDA within and between time points and no significant correlations with SUDS and biomarker data. Independent samples t-test results showed a significant difference in maximum SUDS at T2 between NDR (M = 64.17, SD = 28.88) and NW (M = 25, SD = 9.13), t(8) = 2.58, p = 0.03.There were no significant between-group differences on sleep ratio, sleep disturbance, or sleep fragmentation at Week 1 or Week 6. Dot plot graphs for cortisol and SUDS illustrate a trend of decreases in both. Individual trajectory graphs for maximum SUDS illustrate between group differences in self-reported in-session distress.

CONCLUSIONS

The finding that maximum SUDS in NDR and NW were significantly different at T2 was expected, given that this is when nightmare exposure first occurs in NDR, with no exposure for NW. The lack of other significant between-group differences may be due to limitations of small N. The lack of significant correlation between self-reported distress on the SUDS and any biomarker of distress is interesting in that it may point to differences in awareness of or ability to identify distress levels. These will be further examined in the complete sample.

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References are available on a separate handout.