# Are you Tired? Treating Fatigue With Pain Neuroscience Education

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## Introduction

- Fatigue is a prevalent and debilitating symptom among individuals with chronic disease.
- Centralized fatigue (central sensitization)
  - Severe, persistent, and resistant to conventional recovery strategies.
  - Originates from dysregulation within the central nervous system (CNS) rather than from peripheral mechanisms.
- Central sensitization is a well-established mechanism in chronic pain where the CNS becomes hypersensitive to sensory input.
- Fatigue and pain share similar neurophysiological mechanisms, both potentially resulting from heightened CNS responsiveness.
  - Emerging research supports that interventions that target central processes may provide benefit for fatigue symptoms.
  - Recent research suggests that as pain decreases, fatigue decreases.
- Educational interventions, like pain neuroscience education (PNE), which targets central mechanisms may represent a promising non-pharmacological intervention for centralized fatigue.
- By exploring the relationship between centralized fatigue, chronic disease, and PNE, the study aims to contribute to the development of more consistent, evidence-based recommendations for fatigue management in clinical practice.
- Given that centralized fatigue shares mechanisms with centralized pain, a deeper understanding of the role of education and cognitive reframing could offer new, accessible strategies for individuals experiencing persistent fatigue, particularly those with chronic conditions for whom traditional treatments have been ineffective.

## Methods

Design
- Prospective, single group pre/post study
- Duation: 8 weeks

Participants
- Initial interest: n=29
- Completed study: n=8
- All participants were female

Outcome Measures
- Chalder Fatigue Scale (CFS)
- Central Sensitization Inventory (CSI)

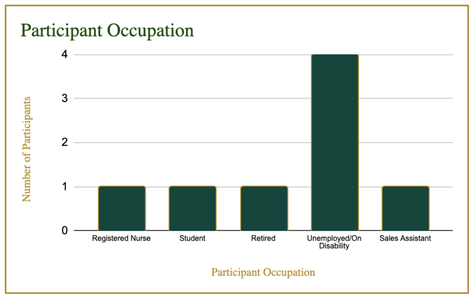
Procedure

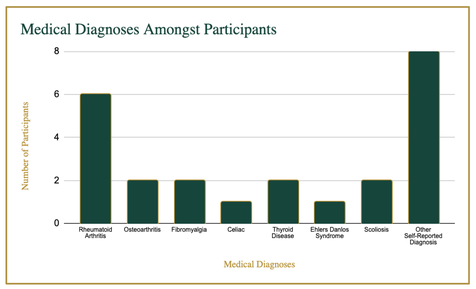
*Baseline Measures*
- Demographics and medical history
- CFS and CSI

*Intervention*
- 1-hour virtual education session covering:
  - Fatigue Physiology
  - Chronic Disease and Fatigue
  - Central Sensitization Definition and Impact on Fatigue
  - Pain Neuroscience Education
  - Fatigue Management Strategies
- Each session included a Q&A period

*Week 4*
- Follow-up survey addressing participant questions and progress

*Week 8 Measures*
- CFS and CSI

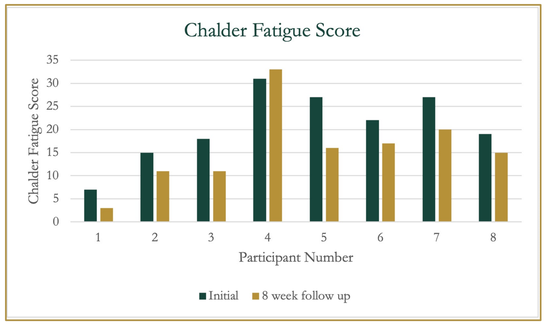


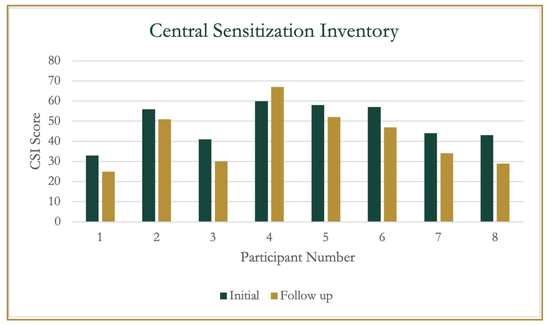




## Purpose

- The purpose of the present study is to determine whether PNE can improve symptoms of fatigue in those with chronic disease.

## Results




- There was a statistically significant decrease in both the CSI (p=0.007) and CFS (p=0.016) scores 8 weeks following pain science education session.

## References

Barrenengoa-Cuadra, M. J., Muñoa-Capron-Manieux, M., Fernández-Luco, M., Angón-Puras, L. Á., Román-Gómez, A. J., Azkuenaga, M., Etxebarria, A., Orrantia, G., Pikaza, A., Uribe-Etxebarria, L., Zorrilla, A., Larrinaga, G., Arana-Arri, E., & Gracia-Ballarín, R. (2021). Effectiveness of a structured group intervention based on pain neuroscience education for patients with fibromyalgia in primary care: A multicentre randomized open-label controlled trial. *European Journal of Pain*, *25*(5), 1137–1149. https://doi.org/10.1002/ejp.1738

Druce KL, Jones GT, Macfarlane GJ, Basu N. (2016) Examining changes in central and peripheral pain as mediates of fatigue improvement: Results from the British Society for Rheumatology Biologics Register for RA. *Arthritis Care and Research 68*:922 - 6.

Staud R. (2012) Peripheral and Central Mechanisms of Fatigue in Inflammatory and Non-Inflammatory Rheumatic Disease. *Current Rheumatology. 14* (6): 539 - 548. doi: 10.1007/s11926-012-0277-z

Vermaak, V., Briffa, N. K., Langlands, B., et al. (2015). Evaluation of a disease-specific rheumatoid arthritis self-management education program: A single-group repeated-measures study. *BMC Musculoskeletal Disorders*, *16*, Article 214. https://doi.org/10.1186/s12891-015-0663-6

## Discussion

- Participants who received PNE on centralized fatigue showed improvements in fatigue scores compared to baseline.
- Improvements may be related to participants gaining a better understanding of fatigue mechanisms and having increased motivation to use self-management strategies.
- Findings are consistent with prior research showing that PNE can reduce pain and fatigue by improving coping strategies and symptom interpretation.
- Education may help patients reduce maladaptive behaviors and increase positive strategies such as sleep hygiene, energy conservation, healthy diet, and regular activity.
- Educational interventions on fatigue management could be integrated into clinical practice for individuals with chronic disease.
- Limitations: small sample size, incomplete participation (8 out of 20 participants completed follow-up), low statistical power (0.09), and lack of a control group.

## Conclusion/Recommendations

Conclusion
- PNE shows potential as a strategy to help patients with chronic disease to improve their centralized fatigue.

Recommendations
- Incorporate PNE into physical therapy intervention to support fatigue management.
- Provide education to help improve understanding and symptom interpretation in relations to fatigue and pain.
- Emphasize self management strategies that include pacing, energy conservation, sleep hygiene, and activity management to reduce fatigue exacerbation.
- Utilize outcome measures such as the CFS and CSI to monitor changes in fatigue and further guide management.
- Encourage patient adherence and use of educational strategies to enhance outcomes.