Fatigue is associated with enhanced retrospective report of pain, but not enhanced spinal nociception, in a study of experimental pain and the menstrual cycle

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Introduction

Correlational and experimental evidence suggest that sleep disturbance can enhance pain. The present study examined the relationship between daytime fatigue and experimental pain sensitivity in 54 healthy, pain-free, normally-cycling women. Pain sensitivity was assessed from electrocutaneous pain threshold/tolerance, nociceptive flexion reflex (NFR) threshold (a physiological measure of spinal nociception), and retrospective reports of sensory and affective pain in response to electrocutaneous stimulations (assessed from McGill Pain Questionnaire—Short Form). Daytime fatigue was assessed from the Fatigue Severity Scale at the beginning of each testing session.

Objective

To examine the relationship between self-reported levels of fatigue and pain sensitivity (e.g., electrocutaneous pain threshold/tolerance, NFR threshold, sensory and affective pain) across the menstrual cycle.

Participants

- Healthy Female Participants: N = 54
- Participant Characteristics: White, non-Hispanic (75%), single (45%), employed (63%), average age = 29.06 years (SD = 8.21), average years of education = 15.14 (SD = 2.51), average menstrual cycle length = 29 days (SD = 3.92)
- Exclusion Criteria:
  - <18 yrs of age
  - Failure to regularly cycle within 2 months of study inclusion
  - Use of hormone preparations within past 6 months
  - Menstrual cycle abnormalities
  - Pre-existing neurological conditions
  - Cardiovascular, neurological, circulatory problems
  - Failure to regularly cycle within 2 months of study inclusion
  - Recent use of analgesic medication
  - Recent use of anxiolytic medication
  - Current use of contraceptive medication
  - History of pain conditions

Procedure

- Tested during three phases: mid-follicular (days 3-7 following onset of menses), ovulatory (the two days following a positive luteinizing hormone surge), and luteal (days 6 preceding onset of menses)
- Testing order was counterbalanced
- Participants completed a battery of psychological and biological assessments
- Prior to the study, participants underwent a baseline assessment of pain sensitivity and fatigue
- During each testing session:
  - Self-report measures of fatigue and pain
  - McGill Pain Questionnaire (MPQ): Self-report measure used to assess pain during and after testing
  - MFPS Sensory-reflects sensory aspect of pain experience (e.g., throbbing, burning)
  - MFPS Affective-reflects affective aspect of pain experience (e.g., tingling, fearfulness)
  - Questionnaire administered following each pain tolerance procedure

Conclusion

Our results suggest that fatigue may enhance retrospective reports of electric pain, but not spinal nociception. Experimental evidence has suggested that sleep deprivation and disruption lead to hyperalgesia in multiple pain modalities (e.g., thermal, cold). Our evidence suggests that this is the case for electric pain as well, although experimental studies are needed to validate this claim.

The consistency of the association of fatigue and MPQ sensory and affective pain ratings across all phases of the menstrual cycle suggests that this finding is not influenced by the menstrual cycle.

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