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Protective Neurocognitive Effects of High-intensity Interval Training (HIIT) among Women with Breast Cancer Receiving Chemotherapy: interim analysis results from the CLARITY Trial

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Background: Cognitive impairment, including memory and attention problems (“chemo-brain”), following chemotherapy is present in as many as 70% of patients treated with chemotherapy. High-intensity Interval Training (HIIT) has shown to be more effective than moderate continuous intensity aerobic exercise for improving cognitive function among adults. Therefore, the CLARITY Trial sought to examine the preliminary efficacy of a supervised HIIT exercise intervention on cognitive function in breast cancer patients receiving chemotherapy.

Study Design and Methods: This ongoing pilot randomized controlled trial will randomize 50 breast cancer patients receiving chemotherapy to HIIT or attention control (AC). This analysis included 20 women (HIIT, n=12; AC, n=8) who completed the trial as of October 2025. The HIIT group performed a supervised 16-week, thrice-weekly intervention, with each session including 10 sets of alternating intervals: 1-minute high-intensity (90% maximal power output [POmax]) and 1-minute recovery (10% POmax). The AC group received a stretching program for 16 weeks. Cognitive function was assessed using NIH Toolbox tests: picture sequence memory, oral reading recognition, list sort working memory, pattern comparison processing speed, oral symbol digit, and auditory verbal learning, and the Montral Cognitive Assessment (MoCA). Within- and between-group mean differences were calculated using paired sample t-tests or Wilcoxon, or ANCOVA, adjusting for baseline cognitive performance, respectively.

Results: From baseline to post-intervention, the HIIT group improved performance on the pattern comparison processing speed test (within-group: 3.92 ± 3.60, p=0.003) and relative to the AC group (between-group: 5.69 ± 11.48, p=0.01). No significant effects were detected for remaining cognitive assessments (p>0.05).
Conclusions: This first-of-its-kind study incorporates a novel HIIT exercise intervention and comprehensive cognitive measures. Our preliminary evidence suggests a positive impact of HIIT on processing speed during chemotherapy. Trial completion and larger RCTs should assess neuroprotective effect of HIIT on cognitive health among adults receiving chemotherapy for cancer.

Keywords

high-intensity interval training, cognition, breast cancer

Conflict of Interest & Ethical Approval

yes

Abstract submitters declaration

yes

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