

## Abstract

Breast cancer affects a significant portion of the female population in the United States, with approximately 1 in 8 women receiving a diagnosis at some stage of their lives. Following breast cancer treatment, around 20-80% of survivors report cognitive deficits, encompassing memory, attention, and executive function, a phenomenon commonly known as "chemobrain." Despite its recognition as a critical area of research, the existing literature on the cognitive effects of chemotherapy presents inconsistencies attributed to various methodological challenges. In this exploratory study, we aimed to assess the efficacy of experimental cognitive paradigms, specifically the Dot Pattern Expectancy (DPX) task, in detecting subtle differences in cognition across key domains, including processing speed, sustained and selective attention, working memory, and response inhibition. We recruited a cohort of 20 early-stage (I-IIIa) breast cancer survivors who had recently completed chemotherapy, alongside 20 age and education-matched healthy controls. Alongside a battery of neuropsychological assessments, we administered the DPX task. While statistical significance was only observed in a working memory measure of the DPX task among breast cancer survivors, trends suggesting poorer performance within the cohort emerged across other cognitive domains. Effect sizes, as indicated by Cohen's *d*, consistently favored DPX measures over neuropsychological assessments, indicating the DPX's superior sensitivity to subtle differences in task performance. However, limitations inherent to our cross-sectional design, including a small sample size and lack of statistical power, underscore the need for future research to further elucidate observed trends.

**Key Words:** *chemobrain, Dot Pattern Expectancy (DPX) task, cognitive deficits, methods, Trail Making Test (TMT), d2 Test of Attention, Color-Word Interference Test.*