

# Computer-Based Cognitive Training for Chemotherapy-Related Cognitive Impairment in Breast Cancer Survivors

Jennifer Bail, BSN, RN, and Karen Meneses, PhD, RN, FAAN



© Cathy Yeulet/Stock/Thinkstock

**Background:** Advancements in chemotherapy have greatly increased breast cancer survival, leading to an increased focus on the management of long-term effects of treatment. Chemotherapy-related cognitive impairment, one such long-term effect, is experienced by as many as 90% of breast cancer survivors (BCS) and negatively affects employment, daily function, and quality of life. Chemotherapy-related cognitive impairment is a top research and clinical practice priority.

**Objectives:** The aim of this article is to review computer-based cognitive training intervention studies tested in BCS, present implications for practice and directions for future research, and discuss neuroplasticity and cognitive reserve, the mechanisms by which computer-based cognitive training produces physiologic changes in the brain.

**Methods:** A search of PubMed, CINAHL®, and PsycINFO® databases yielded two computer-based cognitive training intervention studies in BCS.

**Findings:** This review suggests that computer-based cognitive training may enhance cognitive function in BCS with chemotherapy-related cognitive impairment. Oncology nurses are in a unique position to support BCS experiencing chemotherapy-related cognitive impairment. In addition to acknowledging BCS' concerns, screening for other potential factors, and providing education on healthy living, nurses may suggest computer-based cognitive training as an approach to managing chemotherapy-related cognitive impairment. Future research should use imaging and larger populations.

Jennifer Bail, BSN, RN, is a doctoral student and research assistant, and Karen Meneses, PhD, RN, FAAN, is a professor and associate dean for research, both in the School of Nursing at the University of Alabama at Birmingham. The authors take full responsibility for the content of the article. Bail was supported by the Komen Graduate Training in Disparities Research award. The content of this article has been reviewed by independent peer reviewers to ensure that it is balanced, objective, and free from commercial bias. No financial relationships relevant to the content of this article have been disclosed by the independent peer reviewers or editorial staff. Bail can be reached at [jbail@uab.edu](mailto:jbail@uab.edu), with copy to editor at [CJONEditor@ons.org](mailto:CJONEditor@ons.org). (Submitted August 2015. Revision submitted November 2015. Accepted for publication December 11, 2015.)

Key words: breast cancer survivor; chemotherapy; cognition; cognitive intervention; cognitive training

Digital Object Identifier: 10.1188/16.CJON.504-509

Advancements in screening, early detection, treatment, and symptom management have increased five-year breast cancer survival to 89% (American Cancer Society, 2016), leaving survivors experiencing long-term effects of treatment. One such long-term effect is cognitive impairment. Cognitive impairment can be defined as a disruption in executing mental processes (Frank, Vance, Triebel, & Meneses, 2015; Von Ah & Tallman, 2015). Cognitive impairment in speed of processing, attention, memory, and executive function have been reported in breast cancer survivors (BCS) (Boykoff, Moieni, & Subramanian, 2009; Frank, Vance, Jukkala, & Meneses,

2014; Jansen, Cooper, Dodd, & Miaskowski, 2011; Wefel, Saleeba, Buzdar, & Meyers, 2010). Studies indicate that a broad range of about 21%–90% of BCS experience cognitive impairment (Bower, 2008; Frank et al., 2014; Pullens, De Vries, & Roukema, 2010).

Cognitive impairment associated with having received chemotherapy is commonly called “chemobrain.” However, evidence and reviews suggest that other cancer treatments, such as endocrine therapy and radiation therapy, also may be associated with cognitive impairment (Ahles et al., 2010; Ahles, Root, & Ryan, 2012; Frank et al., 2015; Hodgson, Hutchinson, Wilson, & Nettelbeck, 2013; Phillips et al., 2012).