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Trajectories of Cognitive Function and Associated Phenotypic and Genotypic Factors in Breast Cancer

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OBJECTIVES: This study identified women with unique trajectories of executive function, concentration, and visual working memory before and during adjuvant therapy for breast cancer, and examined phenotypic and genotypic predictors associated with subgroups.

SAMPLE & SETTING: 399 postmenopausal women, of whom 288 were women with early-stage breast cancer and 111 were women without breast cancer, matched on age and years of education to the women with breast cancer, and all at an urban cancer center.

METHODS & VARIABLES: A repeated-measures design was used; assessments occurred before adjuvant therapy and every six months post-therapy initiation. Group-based trajectory modeling determined subgroups. Multinomial logistic regression identified phenotypic and genotypic characteristics.

RESULTS: Three executive function and concentration trajectory subgroups were identified: low, moderate, and high; two visual working memory subgroups were identified: low and high.

IMPLICATIONS FOR NURSING: Advancing age, greater pretherapy fatigue, and poorer pretherapy cognitive function are associated with the low subgroups. DNA repair and oxidative stress mechanisms may be involved in the cognitive changes that women experience.

KEYWORDS breast cancer; cognitive function; aromatase inhibitor; phenotypic; genotypic

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Breast cancer is the most common cancer in women in the United States. About 3.6 million female breast cancer survivors were living in the United States in 2016, and 93% of those survivors were aged 50 years or older (Miller et al., 2016). In addition, about 75%–80% of women with breast cancer are postmenopausal at the time of diagnosis (DeSantis et al., 2016). Of those, 75%–79% have hormone receptor–positive disease (Cheang et al., 2015; Clark, Osborne, & McGuire, 1984; Osborne, 1998), and a large portion will receive adjuvant aromatase inhibitor (AI) therapy. Use of endocrine therapy with an AI, such as anastrozole, letrozole, or exemestane, has improved the disease-free survival and overall survival of postmenopausal women with early-stage disease (Schiavon & Smith, 2014); however, negative sequelae associated with AI therapy may include changes in cognitive function.

An estimated 25%–75% of women with breast cancer experience changes in cognitive function with disease and treatment (Wefel et al., 2004). Cognitive decline compromises psychological well-being and interferes with work, decision making, the ability to perform daily activities efficiently, and adherence to cancer therapy (Bender et al., 2014; Bender & Thelen, 2013). Multiple factors likely contribute to changes in cognitive function, including mood, sleep problems, concomitant medications, disease-related factors, and cancer therapy (Bender & Thelen, 2013).

Most research in this area has focused on changes in cognitive function with chemotherapy (Myers, 2012). Deterioration in multiple cognitive domains has been observed in women receiving selective estrogen receptor modulators (SERMs), such as tamoxifen (Castellon et al., 2004; Chen et al., 2017;