

# A Meta-Analysis of the Sensitivity of Various Neuropsychological Tests Used to Detect Chemotherapy-Induced Cognitive Impairment in Patients With Breast Cancer

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**Purpose/Objectives:** To identify which neuropsychological tests have been used to evaluate chemotherapy-induced impairment in various domains of cognitive function in patients with breast cancer and to determine the sensitivity of each of the tests through estimation of effect size.

**Data Sources:** Original studies published from 1966–June 2006.

**Data Synthesis:** Although an array of neuropsychological tests are available to measure the various domains of cognitive function, information is lacking regarding the sensitivity and specificity of the tests to detect changes in cognitive function from chemotherapy.

**Conclusions:** This meta-analysis provides initial data on the sensitivity of some neuropsychological tests to determine chemotherapy-induced changes in cognitive function in patients with breast cancer.

**Implications for Nursing:** The identification of sensitive neuropsychological tests is crucial to further understanding of chemotherapy-induced cognitive impairments.

## Key Points . . .

- Chemotherapy-induced impairments in cognitive function occur in some women with breast cancer.
- Meta-analysis is a quantitative approach that pools findings across studies to increase the power to detect significant effects if they exist.
- Detection of cognitive impairments requires neuropsychological tests that are valid, reliable, feasible, sensitive, and specific.
- Further studies are needed to determine the optimal neuropsychological tests to detect chemotherapy-induced cognitive impairments.

Impairment in cognitive function as a side effect of chemotherapy is a growing area of research as the numbers of patients with cancer who complain of difficulties in their abilities to remember, think, and concentrate increases (Brezden, Phillips, Abdoell, Bunston, & Tannock, 2000; Cole, Scialla, & Bednarz, 2000; Cull et al., 1996). Impairment in cognitive function may adversely affect patients' return to normal life when treatment is completed. Survivors have complained about difficulties with multitasking at home and decreased performance at work. Increased awareness among cancer survivors and clinicians about chemotherapy's acute and chronic effects on cognitive function has resulted in a limited number of studies and points to the need for additional research.

An array of neuropsychological tests is available to measure the various domains of cognitive function. Healthcare professionals should consider numerous factors when selecting tests to measure each domain of cognitive function: (a) the specific cognitive domain to be measured, (b) the appropriateness of the test for the domain being studied, (c) the reliability and validity of the test and the availability of normative data for comparison, (d) the sensitivity and specificity of the test for a particular condition, (e) the availability of parallel forms when

repeated measures are used, and (f) the feasibility of the instrument for clinical use (Lezak, Howieson, & Loring, 2004).

Although 13 studies that evaluated chemotherapy-induced cognitive impairments in patients with breast cancer were identified, how the specific neuropsychological tests used in the studies were chosen is not clear. Most studies stated that tests were chosen for their ability to measure a specific domain, evidence of reliability and validity, availability of parallel forms for longitudinal studies, or feasibility. However, a great deal of variability exists in the tests that were chosen to measure various domains of cognitive function. In addition,

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