

# Association Between Physical Activity Levels and Chemotherapy-Induced Peripheral Neuropathy Severity in Cancer Survivors

Anna Wilcoxon, RN, MS, Kord M. Kober, PhD, Carol Viele, RN, MS, Kimberly Topp, PT, PhD, Betty Smoot, PT, DPTSc, Gary Abrams, MD, Margaret Chesney, PhD, Steven M. Paul, PhD, Yvette P. Conley, PhD, Jon D. Levine, MD, PhD, and Christine Miaskowski, RN, PhD

**OBJECTIVES:** To evaluate for differences in demographic and clinical characteristics, as well as subjective and objective measures of chemotherapy-induced peripheral neuropathy (CIPN), among different exercise groups.

**SAMPLE & SETTING:** Cancer survivors (N = 290) were recruited from throughout the San Francisco Bay Area.

**METHODS & VARIABLES:** Based on the recommended 150 minutes or more of exercise per week, survivors were classified into the no exercise (NoEx), less exercise (LessEx), or recommended exercise (RecEx) group. Survivors completed self-report questionnaires and underwent sensory and balance testing.

**RESULTS:** Compared to the RecEx group, survivors in the NoEx group had less education, were less likely to be married/partnered, had a lower household income, had a higher level of comorbidity, and had poorer functional status. No differences were found among the groups in CIPN duration; pain intensity scores; or changes in light touch, cold, and pain sensations.

**IMPLICATIONS FOR NURSING:** Clinicians can recommend walking as a therapeutic option for survivors with CIPN and refer them to physical therapy.

**KEYWORDS** chemotherapy-induced peripheral neuropathy; exercise; chemotherapy; gait; balance  
**ONF, 47(6), 703–719.**  
**DOI** 10.1188/20.ONF.703-719

Chemotherapy-induced peripheral neuropathy (CIPN) occurs in 30%–50% of cancer survivors (Kerckhove et al., 2017; Vollmers et al., 2018), has negative effects on patient outcomes (Chan et al., 2019; Kneis et al., 2019), and is associated with an increased risk of falls (Kneis et al., 2019). Although duloxetine is the only drug recommended to decrease CIPN pain (Hershman et al., 2014), a growing body of evidence suggests that regular physical activity is a safe and low-cost intervention to decrease the severity of CIPN symptoms (Andersen Hammond et al., 2019; Streckmann et al., 2014). The mechanisms that underlie the efficacy of exercise are not completely understood, but findings from preclinical studies suggest that physical exercise can decrease levels of proinflammatory cytokines and neurotrophins, increase GABAergic inhibition, increase the upregulation of analgesic factors, activate the descending serotonin inhibitory pathway, and increase the release of endogenous opioids (Andersen Hammond et al., 2019; Cooper et al., 2016; Kami et al., 2017).

In terms of clinical research, only three studies have evaluated the effects of exercise on CIPN symptoms in cancer survivors (Kneis et al., 2019; McCrary et al., 2019; Wonders et al., 2013). In one study (Wonders et al., 2013), breast cancer survivors with CIPN (n = 20) were asked to follow a 10-week home-based exercise program that included walking and resistance exercises. The number of survivors who reported unpleasant skin sensations, abnormal sensitivity to touch, and sudden bursts of pain decreased following the intervention. In the second 12-week