

# Associations Between Cholecalciferol Supplementation and Self-Reported Symptoms Among Women With Metastatic Breast Cancer and Vitamin D Deficiency: A Pilot Study

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**OBJECTIVES:** To assess the potential effect of cholecalciferol supplementation to reduce symptom burden for women with metastatic breast cancer (MBC).

**SAMPLE & SETTING:** 11 clinically stable women with estrogen receptor–positive MBC were recruited from a single cancer center for this phase 1, nonrandomized study (NCT02186015).

**METHODS & VARIABLES:** Women with insufficient serum 25-hydroxyvitamin D (25[OH]D) levels qualified to receive high-dose repletion therapy. Clinical and questionnaire data on common symptoms and quality of life were obtained prior to and following supplementation.

**RESULTS:** Serum 25(OH)D increased significantly pre- versus postintervention. Trends for improvements in endocrine symptoms, bone pain, and fatigue were observed following the intervention.

**IMPLICATIONS FOR NURSING:** Women achieved normal serum 25(OH)D levels after eight weeks of supplementation and reported reduced symptom burden. Vitamin D may be a low-cost supportive care therapy; however, future studies should be considered.

**KEYWORDS** vitamin D; metastatic breast cancer; cholecalciferol; pilot study

**ONF, 48(3), 352–360.**

**DOI** 10.1188/21.ONF.352-360

Vitamin D has long been known for its role in bone health, working with the parathyroid hormone to regulate calcium homeostasis (Holick, 2007). It is only naturally found in a limited number of foods in the human diet (e.g., tuna, salmon, egg yolk), necessitating fortification efforts since the 1930s to help decrease the occurrence of bone disease. Vitamin D is considered a prohormone, requiring ultraviolet radiation for conversion to its active forms (Holick, 2007). Because of concerns regarding melanoma or cutaneous hypersensitivity secondary to specific medications, healthcare professionals do not advocate treating or preventing vitamin D deficiency with sunlight exposure. Not surprisingly, the use of vitamin D supplementation among cancer survivors, particularly women with breast cancer, is highly prevalent (Marian, 2017).

Eighty percent of breast cancers are hormone sensitive (estrogen receptor–positive [ER+]) (American Cancer Society, 2020), necessitating the use of medications to decrease the production or absorption of estrogen (i.e., aromatase inhibitors). Arthralgias and myalgias are highly prevalent within weeks of estrogen blockade and may result in medication discontinuation (Castel et al., 2013). The etiology of these musculoskeletal disturbances is not well understood; however, the analgesic role of estrogen (Niravath, 2013), as well as heightened levels of inflammation (Bauml et al., 2015) and cytokines (interleukins [ILs] or tumor necrosis factor alpha [TNF- $\alpha$ ]) (Islander et al., 2011), may further contribute. In addition, the combination of efficient estrogen deprivation combined