

Walking Improves Sleep in Individuals With Cancer: A Meta-Analysis of Randomized, Controlled Trials

Hsiao-Yean Chiu, RN, PhD, Hui-Chuan Huang, RN, PhD, Pin-Yuan Chen, MD, PhD, Wen-Hsuan Hou, MD, PhD, and Pei-Shan Tsai, RN, PhD

Early cancer diagnosis and treatment programs can prolong the lives of individuals with cancer. However, disturbed sleep is common among people with cancer, and many frequently report experiencing daily sleep disturbance following primary treatment (Davidson, MacLean, Brundage, & Schulze, 2002; Mercadante, Girelli, & Casuccio, 2004; Sela, Watanabe, & Nekolai-chuk, 2005). Disturbed sleep may affect mental health, physical functioning, and health-related quality of life (Koopman et al., 2002; Le Guen et al., 2007; Romito et al., 2014).

Pharmacologic treatments and cognitive behavioral therapy for insomnia (CBT-I) are commonly used to treat sleep problems in survivors (Espie et al., 2008; Savard, Simard, Ivers, & Morin, 2005; Vena, Parker, Cunningham, Clark, & McMillan, 2004). However, because of the adverse effects of medications (Kripke, 2000) and the problem of accessibility to CBT-I (Unbehaun, Spiegelhalder, Hirscher, & Riemann, 2010), many survivors may seek alternative sleep-management approaches that have minimal adverse effects and easy access.

Exercise has been shown to improve sleep through physiologic mechanisms that include the regulation of immune-inflammatory response (Besedovsky, Lange, & Born, 2012; Lorton et al., 2006), core body temperature (Kunstetter et al., 2014; Nybo, 2012), autonomic function (Sandercock, Bromley, & Brodie, 2005), and endocrine function (Reis et al., 2011), as well as through psychological pathways, such as the improvement of mood status (Paluska & Schwenk, 2000; Taso et al., 2014). Walking has great potential to be an accessible, cost-effective, and feasible approach for managing sleep problems in individuals with cancer, particularly when compared to other forms of exercise (e.g., aquatic exercise, yoga, tai chi, Pilates-based exercises). Although some randomized, controlled trials (RCTs) have shown that walking improves sleep in people with cancer (Cheville et al., 2013; Coleman et al., 2012;

Purpose/Objectives: To evaluate the effectiveness of walking exercise on sleep in people with cancer.

Data Sources: Databases searched included China Knowledge Resource Integrated Database, CINAHL®, Cochrane Central Register of Controlled Trials, EMBASE, PsycINFO®, PubMed, Wanfang Data, and Web of Science.

Data Synthesis: Nine randomized, controlled trials involving 599 patients were included. Most of the studies used moderate-intensity walking exercise. Overall, walking exercise significantly improved sleep in people with cancer (Hedges' $g = -0.52$). Moderator analyses showed that walking exercise alone and walking exercise combined with other forms of interventions yielded comparable effects on sleep improvement, and that the effect size did not differ among participants who were at different stages of cancer. The effect sizes for studies involving individuals with breast cancer and for studies including individuals with other types of cancer were similar.

Conclusions: Moderate-intensity walking exercise is effective in improving sleep in individuals with cancer.

Implications for Nursing: The authors' findings support the inclusion of walking exercise into the multimodal approaches to managing sleep in people with cancer. Healthcare providers must convey the benefits of walking exercise to individuals with cancer who are suffering from sleep problems.

Key Words: cancer; meta-analysis; sleep; walking exercise
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Donnelly et al., 2011; Mock et al., 1997; Payne, Held, Thorpe, & Shaw, 2008; Tang, Liou, & Lin, 2010; Wang, Boehmke, Wu, Dickerson, & Fisher, 2011), other studies have produced dissimilar findings (Rogers et al., 2014; Sprod et al., 2010). Two meta-analyses (Mishra, Scherer, Geigle, et al., 2012; Mishra, Scherer, Snyder, et al., 2012) investigating the influence of exercise on sleep in survivors and in patients undergoing active cancer-related treatments, respectively, showed that exercise improved sleep in individuals with cancer. However, a close examination of the reviews revealed that the pooled effect-size calculation was based on