

Advantages and Limitations of Wearable Activity Trackers: Considerations for Patients and Clinicians

Rachel K. Walker, PhD, RN, Amanda M. Hickey, MS, and Patty S. Freedson, PhD



© BsWei/iStock/Thinkstock

Background: Exercise, light physical activity, and decreased sedentary time all have been associated with health benefits following cancer diagnoses. Commercially available wearable activity trackers may help patients monitor and self-manage their behaviors to achieve these benefits.

Objectives: This article highlights some advantages and limitations clinicians should be aware of when discussing the use of activity trackers with cancer survivors.

Methods: Limited research has assessed the accuracy of commercially available activity trackers compared to research-grade devices. Because most devices use confidential, proprietary algorithms to convert accelerometry data to meaningful output like total steps, assessing whether these algorithms account for differences in gait abnormalities, functional limitations, and different body morphologies can be difficult. Quantification of sedentary behaviors and light physical activities present additional challenges.

Findings: The global market for activity trackers is growing, which presents clinicians with a tremendous opportunity to incorporate these devices into clinical practice as tools to promote activity. This article highlights important considerations about tracker accuracy and usage by cancer survivors.

Rachel K. Walker, PhD, RN, is an assistant professor in the College of Nursing, and Amanda M. Hickey, MS, is a PhD candidate and Patty S. Freedson, PhD, is a professor, both in the Department of Kinesiology, all at the University of Massachusetts Amherst. The authors take full responsibility for the content of the article. The authors did not receive honoraria for this work. The content of this article has been reviewed by independent peer reviewers to ensure that it is balanced, objective, and free from commercial bias. No financial relationships relevant to the content of this article have been disclosed by the authors, planners, independent peer reviewers, or editorial staff. Mention of specific products and opinions related to those products do not indicate or imply endorsement by the *Clinical Journal of Oncology Nursing* of the Oncology Nursing Society. Walker can be reached at r.walker@umass.edu, with copy to editor at CJONEditor@ons.org. (Submitted December 2015. Revision submitted March 2016. Accepted for publication March 10, 2016.)

Key words: physical activity and exercise; accelerometry; sedentary behaviors; self-management; wearable technology

Digital Object Identifier: 10.1188/16.CJON.606-610

The benefits of physical activity both prior to and following a cancer diagnosis have been well documented and include improvements in both overall and disease-free survival (Lynch, Dunstan, Vallance, & Owen, 2013). Exercise and light physical activity have been shown to improve management of symptoms such as pain, fatigue, anxiety, depression, and sleep-wake disturbances (Pinto & de Azambuja, 2011; Vallance, Boyle, Courneya, & Lynch, 2015; Weis, 2011). Physical activity also reduces bone loss and deconditioning, and decreases the risks of metabolic syndromes and other noncancer chronic conditions post-treatment (Lynch, 2010; Wiseman, Lynch, Cameron, & Dunstan, 2014). A growing body of research suggests that reducing and breaking up sedentary time decreases the risk of an initial cancer diagnosis, comorbidities associated with cancer, and cancer recurrence (Friedenreich & Lynch, 2012; Lynch, 2010; Wiseman et al., 2014). Large epidemiological studies indicate

that cancer survivors often engage in less overall physical activity and lighter intensity activity than those without a cancer diagnosis (Phillips, Petroski, & Markis, 2015). Although some cancer survivors may engage in greater amounts of moderate-to-vigorous physical activity (MVPA) than others, most still do not achieve the recommended levels of exercise (Kim et al., 2013). Cancer survivors also tend to be more sedentary (Kim et al., 2013; Phillips et al., 2015). These trends may be related to multiple factors, including ongoing symptoms of fatigue and other late effects of cancer therapies (Berger, Gerber, & Mayer, 2012; Fodeh et al., 2013; Gaskin et al., 2016; Wood, Nail, & Winters, 2009).

These findings have led to widespread practice initiatives, such as the Oncology Nursing Society's Get Up, Get Moving campaign, which encourages people with cancer diagnoses to be more active both during and following cancer treatment (Cannon, 2014). Activity trackers may be useful tools in