

# Computer-Based Exercise Program

## Effects of a 12-week intervention on mood and fatigue in pediatric patients with cancer

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**BACKGROUND:** Increasing rates of survival present a new set of physical and psychological challenges for children dealing with side effects during cancer treatment. Physical activity has been shown to be an effective strategy to reduce several side effects.

**OBJECTIVES:** The purpose of this pilot study was to determine the benefits of a 12-week computer-based exercise intervention on perceived physical, motivational, and fatigue syndrome and psychological state.

**METHODS:** Nine inpatient and outpatient pediatric patients with cancer participated in a 12-week intervention consisting of supervised computer-based exercise sessions. Participants completed measures assessing mood and fatigue pre- and postintervention.

**FINDINGS:** The intervention was feasible and provided preliminary evidence for the benefits on mood and fatigue in pediatric patients with cancer. The results promote the effectiveness of physical activity in pediatric oncology and call for continuing research in pediatric patients with cancer where sedentary behavior and the associated side effects are a growing concern.

### KEYWORDS

pediatric oncology; physical activity; exercise; mood

### DIGITAL OBJECT IDENTIFIER

10.1188/17.CJON.E280-E286

**TREATMENT OF CHILDHOOD CANCER IS AGGRESSIVE** and associated with several side and late effects, including sickness, cardiopulmonary compromises, musculoskeletal sequelae, fatigue, mood fluctuations, and motoric and cognitive dysfunction (Costa, 2010; McCulloch, Hemsley, & Kelly, 2014; Miller et al., 2016). As a result of long-term hospitalization, some of these side effects are a consequence of reduced activity behavior (Götte, Taraks, & Boos, 2014). Impaired physical fitness and its consequences, such as reduced cardiopulmonary function, decreased muscle strength, and fatigue, have been reported during childhood cancer treatment (Braam et al., 2016; Fuemmeler et al., 2013).

Therapeutic treatment and scientific interest increasingly focuses on quality of survival. Although regular physical activity is primarily recommended for its beneficial effects on cardiorespiratory health and fitness, a growing body of evidence supports the positive psychological effects of exercise (Wegner et al., 2014). Evidence shows that exercise improves mental health by reducing anxiety, depression, and negative mood and by improving self-esteem and cognitive function (Ahn & Fedewa, 2011). Although the number of reports of the effects of physical activity on mental health is steadily increasing, particularly in the general public (Reed & Ones, 2006) and gradually in adult patients with cancer (Yang, Tsai, Huang, & Lin, 2011), no literature focuses on the beneficial effects of exercise on mood in pediatric patients with cancer.

Cancer-related fatigue (CRF) is one of the most frequent and severe symptoms experienced by pediatric patients with cancer during treatment (Spathis et al., 2015) and can continue even after treatment has ended (Hamre et al., 2013). CRF is multidimensional, with the most distressing symptoms affecting quality of life. CRF is generally characterized by feelings of overwhelming exhaustion and lack of energy and enthusiasm (Berger et al., 2015). Research using physical activity has shown a reduction in fatigue in adults during and after cancer treatment (Cramp & Byron-Daniel, 2012). The results relating exercise and reduced fatigue syndrome in pediatric oncology are discussed controversially because several studies have shown a positive influence of exercise on fatigue (Keats & Culos-Reed, 2008; Rosenhagen et al., 2011; Yeh, Man Wai, Lin, & Chiang, 2011), and some have shown no influence (Hinds et al., 2007; Takken et al., 2009).

Computer-based exercise in the form of active video games has increasingly been used as an innovative approach to movement therapy (Staiano