

# Effects of Exercise on Fatigue, Sleep, and Performance: A Randomized Trial

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**P**atients with multiple myeloma (MM) often receive intensive multidisciplinary treatment and experience multiorgan complications as a result of their disease and treatment (Coleman, Coon, et al., 2003; Coleman, Hall-Barrow, Coon, & Stewart, 2003). At least 60% of patients with MM are anemic (hemoglobin [Hb] < 12 g/dl) at diagnosis (International Myeloma Foundation, 2011), and almost all become anemic during treatment, often requiring red blood cell (RBC) transfusions (Knight, Wade, & Balducci, 2004). In patients with MM, epoetin alfa has been shown to reduce transfusions and increase Hb during chemotherapy (Barlogie & Beck, 1993). Anemia contributes to fatigue, the most common and distressing symptom for patients with cancer, and is reported in 80% of patients receiving chemotherapy for cancer (Brizel, Dodge, Clough, & Dewhirst, 1999; Glaspy et al., 2001; Silber et al., 1998).

Cancer-related fatigue is multidimensional, subjective, perceived as abnormal and distressing, and inadequately relieved by rest. Fatigue may lead patients to abandon treatment and can be so overwhelming that some patients say they would rather die (Curt et al., 2000). Insomnia frequently is related to fatigue in patients with cancer (Berger & Farr, 1999; Bower et al., 2000). The increase in daytime sleep and fatigue decreases daytime physical activity, leading to physiologic deconditioning and diminished activity tolerance (Winningham et al., 1994). Aerobic exercise improves sleep for healthy individuals (Petruzzello, Landers, Hatfield, Kubitz, & Salazar, 1991) and decreases fatigue for individuals with cancer (Dimeo, 2001). Therefore, exercise is recommended as an intervention for fatigue (Berger et al., 2010). A systematic review and meta-analysis reported that a set of 14 controlled trials of exercise after treatment had a

**Purpose/Objectives:** To compare usual care with a home-based individualized exercise program (HBIEP) in patients receiving intensive treatment for multiple myeloma (MM) and epoetin alfa therapy.

**Design:** Randomized trial with repeated measures of two groups (one experimental and one control) and an approximate 15-week experimental period.

**Setting:** Outpatient setting of the Myeloma Institute for Research and Therapy at the Rockfellow Cancer Center at the University of Arkansas for Medical Sciences.

**Sample:** 187 patients with newly diagnosed MM enrolled in a separate study evaluating effectiveness of the Total Therapy regimen, with or without thalidomide.

**Methods:** Measurements included the Profile of Mood States fatigue scale, Functional Assessment of Cancer Therapy–Fatigue, ActiGraph<sup>®</sup> recordings, 6-Minute Walk Test, and hemoglobin levels at baseline and before and after stem cell collection. Descriptive statistics were used to compare demographics and treatment effects, and repeated measures analysis of variance was used to determine effects of HBIEP.

**Main Research Variables:** Fatigue, nighttime sleep, performance (aerobic capacity) as dependent or outcome measures, and HBIEP combining strength building and aerobic exercise as the independent variable.

**Findings:** Both groups were equivalent for age, gender, race, receipt of thalidomide, hemoglobin levels, and type of treatment regimen for MM. No statistically significant differences existed among the experimental and control groups for fatigue, sleep, or performance (aerobic capacity). Statistically significant differences ( $p < 0.05$ ) were found in each of the study outcomes for all patients as treatment progressed and patients experienced more fatigue and poorer nighttime sleep and performance (aerobic capacity).

**Conclusions:** The effect of exercise seemed to be minimal on decreasing fatigue, improving sleep, and improving performance (aerobic capacity).

**Implications for Nursing:** Exercise is safe and has physiologic benefits for patients undergoing MM treatment; exercise combined with epoetin alfa helped alleviate anemia.