Energy Through Motion©: An Evidence-Based Exercise Program to Reduce Cancer-Related Fatigue and Improve Quality of Life

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Background: Evidence supports addressing cancer-related fatigue (CRF) with activity. Activity promotion is feasible during and following cancer treatment and improves patient outcomes.

Objectives: This project provided an evidence-based activity program for adult cancer survivors after treatment to reduce CRF and improve quality of life.

Methods: The Iowa Model of Evidence-Based Practice to Promote Quality Care guided development of the activity promotion evidence-based practice project. This included evidence review, creation of an evidence-based activity intervention, and evaluation of the practice change. Two groups participated in the project; one group, the usual care group, provided baseline data and received “usual” instructions for activity, fatigue, and sleep, whereas the Energy Through Motion© (ETM) activity group received a three-month activity intervention with prepackaged ETM kits and follow-up phone calls.

Findings: Patients in the ETM activity group had increased activity levels, whereas those in the usual care group had decreased activity levels. Fatigue levels in the ETM activity group decreased, and quality of life improved. This project supports nurse-led activity promotion as useful in addressing CRF and feasible for use in a busy clinical setting.

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Background:

Fatigue is a significant side effect of cancer, affecting 75%–100% of people living with and after a diagnosis of cancer (Berger, Mooney, et al., 2015; National Cancer Institute, 2014). Fatigue management includes assessing the level of fatigue and impact on the patient (Nail, 2002). Individuals with cancer-related fatigue (CRF) can be affected physically, socially, spiritually, psychologically, and cognitively (Mitchell, Beck, Hood, Moore, & Tanner, 2007), which consequently influences patients’ adherence to cancer treatment, ability to work, and physical and psychosocial functioning (Mitchell et al., 2007). Quality of life (QOL) can decrease, with loss of engagement in meaningful life activities (Dagnelie et al., 2007; Groeneveld, de Boer, & Frings-Dresen, 2013; Gupta, Lis, & Grutsch, 2007; Mustian, Sprod, Janelins, Peppone, & Mohile, 2012; Persoon et al., 2013). CRF is most prevalent during active cancer therapy, but fatigue may be so debilitating that cancer survivors often cannot work or regain their previous lifestyle for years (Berger, Mooney, et al., 2015; Braun, Greenberg, & Pirl, 2008; Jacobsen et al., 2007; Liavaag, Dorum, Fosså, Tropé, & Dahl, 2007; Meeske et al., 2007).

Background:

The Oncology Nursing Society (ONS) and the National Comprehensive Cancer Network (NCCN) synthesize and disseminate evidence with tools designed to support easy application.
in busy clinical practices. Although clinician access to evidence has improved over the years, methods for translating evidence and sustaining changes are needed. When evidence-based practices (EBPs) are effectively implemented, patient outcomes improve (Berger, Mooney, et al., 2015).

However, although interventions to educate patients and caregivers about CRF were implemented at a large comprehensive cancer center—the Holden Comprehensive Cancer Center at the University of Iowa Hospitals and Clinics in Iowa City—beginning in 1995, these activities and educational programs did little to change practice. Implementing and sustaining practice changes require more than knowledge of the evidence (Cullen & Adams, 2012). Many clinicians believe CRF is inevitable and untreatable (Nail, 2002), despite advances in knowledge. When providers do not know what to recommend for a particular side effect, they are inclined not to ask about that side effect (Piper et al., 2008). This can result in inconsistent and inadequate management.

Human nature is to rest when sick and experiencing fatigue. Acute fatigue associated with illness is therapeutic, telling individuals to take it easy to allow energy use for healing and repair. Acute fatigue usually improves with rest and recovery from illness, so energy conservation is appropriate (Berger, Mitchell, Jacobsen, & Pirl, 2015; Mitchell et al., 2014; NCCN, 2016). However, chronic fatigue is not therapeutic and can actually become toxic if allowed to go unchecked. Fatigue experienced by people living with or after a diagnosis of cancer is usually chronic, with episodes of acute fatigue resulting from acute illness and/or treatment. When people living with cancer rest too much, they become deconditioned and may have increased morbidity and mortality (Nail, 2002).

Considerable evidence advocates for the clinician’s promotion of physical activity for people living with all stages of cancer, from pre- to post-treatment. The thought of exercise often elicits a negative response in patients if seen as a burden. For some, exercise means going to the gym and working alongside fitness enthusiasts, which is something they would not choose to do. For some people living with cancer, engaging in that level of activity actually would be inappropriate or impossible. Energy Through Motion® (ETM), a program developed at the project site, counters that belief and replaces it with understanding that activity can, in fact, be energy producing. The project title was selected by the project team to avoid potential negative associations with “exercise” and to focus attention on the benefits of staying as active as possible given individuals’ physical health and abilities. “Activity” may be perceived by patients as more reasonable to engage in and maintain than “exercise.”

Methods

In 2010, a staff nurse partnered with a cancer center clinical nurse specialist at the Holden Comprehensive Cancer Center to establish an intervention to combat CRF during active treatment. A small grant from the DAISY Foundation supported the purchase of supplies, including pedometers and resistance bands. The staff nurse, serving as faculty for a local nursing school, coordinated preliminary work by students. Student helpers engaged patients and families in the waiting area before their clinic appointments. At the end of the semester, when students were no longer available, a provider suggested that the program could be continued in the cancer survivor clinic run by nurse practitioners (NPs). In the summer of 2013, with the help of a doctor of nursing practice (DNP) student and two committed NPs, the project moved to two survivorship clinics within the project site.

Purpose and Objectives

The purpose of this EBP project was to implement and evaluate an evidence-based activity program/ETM for adults living with and/or after cancer. The outcomes of this project were to (a) reduce CRF, (b) improve QOL, (c) improve perceptions of the importance of being active, and (d) improve the individual’s perceived ability to become and remain active. The ETM project provided tools and supported interventions that are timely, efficient, and easy for staff to use in busy clinical settings.

Evidence-Based Practice Process

Project development followed the Iowa Model of Evidence-Based Practice to Promote Quality Care (Titler et al., 2001). The Iowa Model provides a systematic step-by-step approach to guide adoption of evidence into practice. The project trigger was a desire to address the common and trying consequences of CRF. Small grant funding provided additional support to continue efforts to implement an activity intervention. The literature on CRF and exercise was reviewed, and practice changes were designed and trialed at the project site to fit the local practice setting. An evaluation was designed to determine if the practice change worked as intended and if the implementation strategies promoted adoption. The Iowa Model provides guidance in the use of a scholarly approach to guide implementation of EBP and measure impact on care processes and patient outcomes. The final step in the EBP process is to disseminate findings as a way to share learning with the oncology nursing community.

Literature Review

Evidence on CRF is plentiful, so the literature search was limited to 2008–2013. The authors found 158 articles through PubMed and 61 through CINAHL®. Duplicates were eliminated, and the abstracts were screened for relevance. The final review included 67 relevant articles. Seventeen articles were synthesis reports, including systematic reviews, meta-analyses, and practice guidelines or reports with recommendations. Articles reporting on research included 12 randomized, controlled trials, 14 descriptive or correlational studies, and 1 qualitative study. Three reports have summarized the evidence on CRF with recommendations for practice (Berger, Mitchell, et al., 2015; Mitchell et al., 2014; NCCN, 2016). Exclusion criteria included studies on children, review articles, and brief reports. Because of the large volume of literature on physical activity for CRF, articles from before 2012 were not included in this select evidence summary (see Table 1).

CRF is a common and complex condition with physiologic, psychosocial, and environmental components. Cancer may alter patients’ physiology and sleep patterns, as well as affect their fatigue levels (Blaney, Lowe-Strong, Rankin-Watt, Campbell, &
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<tr>
<td>Berger, Mooney et al., 2015</td>
<td>–</td>
<td>2016 National Comprehensive Cancer Network guidelines and recommendations for CRF</td>
<td>Recommendations include monitoring for CRF, energy conservation, physical activity, physically based therapies, and psychosocial and nutrition interventions.</td>
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<td>Charlier et al., 2013</td>
<td>464 breast cancer survivors aged 18–65 years who were three weeks to six months post-treatment</td>
<td>A descriptive study was used to identify physical activity levels and various cancer-related symptoms three weeks to six months post-treatment.</td>
<td>Compared to the general population, breast cancer survivors’ self-efficacy and enjoyment of physical activity contribute to greater increases in physical activity. However, interventions should be tailored to the side effects and working status of the women.</td>
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<td>Cheville et al., 2013</td>
<td>56 adults with stage IV lung or colorectal cancer followed for eight weeks</td>
<td>A randomized clinical trial evaluated incremental walking and home-based strength training.</td>
<td>Home-based exercise can improve mobility, CRF, and sleep quality.</td>
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<tr>
<td>Cho et al., 2012</td>
<td>119 women were recruited from six outpatient oncology clinics. All participants were women who were 18 years or older with a confirmed diagnosis of breast, colorectal, or ovarian cancer from one week before treatment through one year after treatment.</td>
<td>Part of a longitudinal, randomized, controlled trial testing the effectiveness of a systematic exercise intervention on fatigue; repeated-measures evaluated exercise dose using self-report exercise questionnaires.</td>
<td>During and after cancer treatment, most patients achieved or maintained desired exercise levels. Exercisers in the first two evaluation points in this longitudinal study had less CRF and lower depression scores.</td>
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<tr>
<td>Coleman et al., 2012</td>
<td>187 patients newly diagnosed with multiple myeloma</td>
<td>Repeated-measures experimental design</td>
<td>The effect of exercise made no statistical nor clinically significant impact on CRF, sleep, or aerobic capacity. Exercise is safe for patients undergoing multiple myeloma treatment; exercise combined with erythropoietin stimulating factor helped to alleviate anemia.</td>
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<td>Cramp &amp; Byron-Daniel, 2012</td>
<td>56 studies with 4,068 patients, most with breast cancer</td>
<td>Systematic review with meta-analysis using Cochrane review standards, evaluating physical activity for CRF during and after treatment; looked at patient-reported fatigue, exercise maintenance on follow-up, time spent exercising, aerobic capacity, QOL, anxiety, depression, and self-efficacy</td>
<td>Aerobic exercise significantly reduced CRF in patients with breast and prostate cancer, but resistance training and alternative forms of exercise failed to reach significance. In addition, aerobic exercise was not found to be effective for patients with hematologic malignancies.</td>
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<td>Ergun et al., 2013</td>
<td>58 women with breast cancer followed for 12 weeks</td>
<td>Prospective, randomized, controlled study with three groups: supervised exercise, home exercise, and education; included measures of cytokine levels and QOL, CRF, and depression</td>
<td>Supervised and home-based exercise programs are safe and effective. A statistically significant decrease in cytokine levels was noted in the home exercise group. The functional and general health score improved for the supervised exercise group. Functional health improved, and depression scores decreased significantly for supervised and home exercise program groups. CRF was not different from before to after the 12-week program.</td>
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<tr>
<td>Fong et al., 2012</td>
<td>34 studies with 3,784 individuals, most with breast cancer</td>
<td>Meta-analysis evaluating physical activity in adults after cancer treatment; included aerobic exercise and resistance training at home or in gym for median duration of 13 weeks</td>
<td>Physical activity resulted in slightly reduced CRF and depression. Physical activity also has positive effects on body composition, physical functions, social function, mental health, and QOL in patients after treatment for breast cancer. When patients with cancer other than breast cancer were also included, physical activity was associated with reduced body mass index and body weight, increased peak oxygen consumption and peak power output, and improved QOL.</td>
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<td>Hoffman et al., 2013</td>
<td>Seven participants with early-stage non-small cell lung cancer were followed for 16 weeks after surgery.</td>
<td>Single-arm feasibility study on six-week home-based exercise intervention promoting light-intensity walking and balance exercise corresponding to usual activities of daily living</td>
<td>A postoperative home-based, light-intensity walking and balance exercise program was feasible, safe, well tolerated, and highly acceptable. The intervention positively affected CRF, fatigue self-management, walking, balance, and functional performance.</td>
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CRF—cancer-related fatigue; QOL—quality of life

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### TABLE 1. Select Evidence Supporting Activity Promotion for Patients With Cancer (Continued)

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<td>Keogh &amp; MacLeod, 2012</td>
<td>12 studies included; the number of participants with prostate cancer was not noted.</td>
<td>Systematic review evaluating impact of exercise on QOL and side effect reduction in men with prostate cancer; used Sackett's hierarchy of evidence to grade support for specific recommendations; included group and home-based exercise programs, along with resistance, aerobic, and combined programs</td>
<td>Regular exercise, two to three days per week, is recommended for prostate cancer survivors. Counseling and support from groups and providers can improve participation and adherence. Strong evidence supports group-based exercise and resistance training, improving muscle strength, muscular endurance, aerobic endurance, overall QOL, and CRF. Relatively strong evidence supports the positive impact of aerobic exercise with and without resistance training and home-based exercise on CRF, QOL, and a variety of functional performance measures.</td>
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<td>Kummer et al., 2013</td>
<td>Included 35 patients after surgery, chemotherapy, radiation therapy, or combination treatment participating in oncology inpatient rehabilitation</td>
<td>Descriptive study evaluating consecutive patients participating in a progressive, individualized three-week rehabilitation program with aerobic endurance exercises, resistance and relaxation training, and individual physiotherapy</td>
<td>Participants had a 100% completion rate. With the use of a structured activity program, CRF and physical activity improved during the course of the study.</td>
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<tr>
<td>Mishra et al., 2012</td>
<td>Included 40 trials with 3,694 participants randomized to exercise or comparison; patients had breast, colorectal, and head and neck cancers, among others, including lymphoma. Overall, 30 trials involved patients who had completed treatment and 10 involved patients during and after treatment.</td>
<td>Systematic review with meta-analysis, following Cochrane review standards, of the impact of exercise on health-related QOL for cancer survivors; included randomized, controlled trials and controlled clinical trials comparing usual care or nonexercise intervention with exercise intervention.</td>
<td>Exercise included strength and resistance training, walking, cycling, yoga, Qigong, and Tai Chi, and it was found to improve health-related QOL and subdomains, including cancer-specific concerns, body image and self-esteem, emotional well-being, sexuality, sleep, social functioning, anxiety, fatigue, and pain.</td>
</tr>
<tr>
<td>Mustian et al., 2012</td>
<td>—</td>
<td>Review article on the effects of exercise on cancer treatment side effects; exercises included aerobic, resistance training, combined programs, mindfulness-based exercise, and the provision of information during and after treatment.</td>
<td>Consistent support exists for the safety and benefit of exercise for CRF, sleep disturbance, depression, anxiety, and cardiopulmonary function, as well as the improvement of QOL in people during and after cancer treatment. Counseling, support, and encouragement by the patient's provider can improve participation in and adherence to regular physical activity.</td>
</tr>
<tr>
<td>Persoon et al., 2013</td>
<td>Eight studies with 472 patients, most with hematologic cancers</td>
<td>Systematic review and meta-analysis of randomized, controlled trials evaluating the impact of exercise on adults before, during, or after hematopoietic stem cell transplantation; interventions included physical exercise program or multimodal intervention to maintain or improve aerobic capacity and/or muscle strength.</td>
<td>Exercise has a beneficial effect on physical fitness, health-related QOL, and CRF in patients treated with a hematopoietic stem cell transplantation for a hematologic malignancy. Positive effects were found for upper extremity muscle strength, global QOL, and physical, emotional, and cognitive functioning.</td>
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<tr>
<td>Puetz &amp; Herring, 2012</td>
<td>70 studies involving 4,881 participants</td>
<td>Meta-analysis evaluating the impact of exercise on CRF during and after cancer treatment; followed PRISMA guidelines to estimate the impact across the time of treatment and recovery; included studies looking at individual or group therapy and pharmacotherapy on CRF</td>
<td>Exercise reduces CRF during and after cancer treatment; is beneficial and low risk; and may improve CRF and adherence when performed before treatment to improve fitness. Longer duration exercise programs had a better impact on CRF.</td>
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<tr>
<td>Spahn et al., 2013</td>
<td>55 women with CRF with stage I–III breast cancer after treatment; followed for three months</td>
<td>Randomized clinical trial comparing walking alone to walking plus a multimodal mind–body program including moderate physical activity</td>
<td>Patients had clinically relevant improvements in CRF from both interventions. The enhanced walking intervention, plus the mind–body intervention, showed improvement in pain. Both interventions also demonstrated improved QOL and functional well-being (not statistically significant). A home-based walking program was recommended as a cost-effective intervention. (Continued on the next page)</td>
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CRF—cancer-related fatigue; QOL—quality of life
TABLE 1. Select Evidence Supporting Activity Promotion for Patients With Cancer (Continued)

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<tr>
<td>Van Gerpen &amp; Becker, 2013</td>
<td>152 participants (63% with breast cancer, 89% with local or regional disease); 91% were women.</td>
<td>Evidence-based practice project including a 12-week program that featured biweekly 40- to 60-minute aerobic and resistance exercise sessions and weekly education session for people during (38%) or after (62%) cancer treatment</td>
<td>Exercise, including aerobic and resistance exercises, is beneficial during and after cancer treatment to reduce CRF. Participation remained high, and, with the program, participants reported improvement in CRF, pain, depression, sleep, and QOL.</td>
</tr>
<tr>
<td>van Haren et al., 2013</td>
<td>11 studies with 734 patients with hematologic malignancy</td>
<td>Systematic review with meta-analysis, following Cochrane review standards, to evaluate impact of exercise before, during, and after hematopoietic stem cell transplantation; physical exercise was endurance, resistance, or activities of daily living training, as well as progressive relaxation and stretching.</td>
<td>Exercise interventions were well tolerated and safe for patients undergoing hematopoietic stem cell transplantation. Starting exercise intervention before or just after transplantation may be beneficial. Aerobic or resistance training is feasible and may be beneficial for patients undergoing hematopoietic stem cell transplantation.</td>
</tr>
<tr>
<td>Vermaete et al., 2013</td>
<td>13 articles included 2,179 patients with lymphoma</td>
<td>Systematic review evaluating physical activity and physical fitness impact on CRF in adults with lymphoma before, during, and after cancer treatment; included articles focused on quantitative description of physical activity or physical fitness or included studies examining the effect of exercise.</td>
<td>Lower levels of physical activity and lower physical fitness are associated with more symptoms of CRF. Aerobic exercise training is feasible and safe and had positive effects on cardiorespiratory fitness, CRF, and self-reported physical functioning. Patients with early disease did better than those with advanced disease. More physical activity was associated with less anxiety and depression.</td>
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<tr>
<td>Wenzel et al., 2013</td>
<td>126 participants with prostate, breast, or other solid tumor followed for 5–35 weeks depending on length of treatment</td>
<td>A randomized clinical trial evaluated an individualized exercise prescription. Intervention and usual care groups had an initial physical status and fitness level assessment.</td>
<td>Exercise during cancer treatment results in improved distress, fatigue, and vigor. Home-based walking is simple, sustainable, and helpful in managing side effects. The intervention group demonstrated significantly higher levels of vigor. Greater participation in exercise resulted in lower levels of fatigue, more vigor, and less distress.</td>
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<tr>
<td>Yeo et al., 2012</td>
<td>102 participants after resection of pancreatic or periampullary cancer followed for six months</td>
<td>A randomized clinical trial evaluated a graduated walking program. Patient measures occurred at baseline, and patients were followed at three and six months after surgery.</td>
<td>A home-based low- to moderate-intensity walking program poses little harm and much potential benefit with improved CRF, pain, physical functioning, and mental health. The number of participants still walking at the end of six months was significantly greater in the intervention group.</td>
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CRF—cancer-related fatigue; QOL—quality of life

Gracey, 2013; Fong et al., 2012; Rogers et al., 2014). Prevalence rates of CRF are high, calling clinicians to adopt evidence-based assessment and interventions to address this debilitating side effect. Assessment of CRF includes consideration of the etiology, contributing factors, and intensity of the fatigue. Berger, Mitchell, et al. (2015) reviewed a number of available assessment scales and categorized them as (a) scales resulting in a combined score of fatigue severity, (b) scales resulting in scores for various manifestations of fatigue (e.g., physical fatigue, mental fatigue), and (c) scales indicating the impact of fatigue on daily function.

Nonpharmacologic interventions are the main treatment for CRF. Pharmacologic treatment is warranted to address the etiology or contributing factors, but, otherwise, the benefit has not been established (Berger, Mitchell, et al., 2015). Nonpharmacologic interventions offer considerable opportunities for nursing interventions. The top recommendation to improve CRF is physical activity or exercise (Berger, Mitchell, et al., 2015; Mitchell et al., 2014; NCCN, 2016).

The abundance of research on exercise and activity for patients experiencing CRF has generated guidance for practice from the American Society of Clinical Oncology, Canadian Partnership Against Cancer, ONS, and NCCN (Berger, Mitchell, et al., 2015). A full review of the evidence of activity promotion for CRF, although beyond the scope of this report, reveals an urgent need for EBP to improve patients’ CRF and QOL. In fact, addressing CRF through activity promotion has been selected as an ONS priority for the Choosing Wisely® campaign (Choosing Wisely, 2015). Additional research is needed to determine the specifics of an exercise regimen (e.g., activity, frequency, duration), physiologic underpinnings, methods to support and sustain participation, and measurement of the long-term effects of activity. Strong evidence supports activity to reduce CRF, but few EBP reports describe adoption of activity programs into clinical practice (Van Gerpen & Becker, 2013). Experts have reported sufficient evidence to guide EBP, called for research on implementation of these clinical practice recommendations, and supported the need for reports of approaches.
that promote adoption of EBP for CRF (Berger, Mitchell, et al., 2015). In fact, the NCCN (2016) established a standard for quality improvement monitoring of CRF management.

**Practice Change**

The NCCN’s (2016) guidelines for CRF reported that activity, psychosocial interventions, and physically based therapies (e.g., massage) to reduce fatigue have the highest levels of evidence. Also recommended are education, nutritional counseling, and sleep enhancement, albeit with a lower-level evidence rating (Berger, Mitchell, et al., 2015; Mitchell et al., 2014; NCCN, 2016). ONS’s Putting Evidence Into Practice resource also identified exercise as being recommended for practice, noting the following as likely to be effective: psychoeducation; cognitive behavioral interventions; energy conservation; management of systems; and use of massage, ginseng, yoga, and mindfulness-based stress reduction strategies (Mitchell et al., 2014).

The guidelines and evidence from the literature review were used to design the EBP activity intervention, and evidence and practice recommendations were used to create ETM kits for patients and to guide adoption of the practice change. A number of well-written patient brochures already existed and were screened and selected by the project team (nurses, NPs, Cancer Information Service staff) for use in the patient kits. Prepackaged ETM kits cost the project site about $21.75 per patient because the materials were single-use items and not covered by insurance. The packets included (a) information on physical activity and related benefits; (b) three monthly activity logs and contracts to track physical activity; (c) instructions for strengthening workouts with or without the use of resistance bands; (d) exercise and calorie guides; (e) strategies to promote effective sleep; (f) American Cancer Society booklets on eating and living smart; (g) a walking booklet from Wellmark, Inc., a health insurance provider; (h) a water bottle and bag; (i) two strengths of resistance bands; and (j) a pedometer.

The practice change featured education, an ETM kit, and ongoing support of the patient. The DNP student made regular personal connections with patients to encourage and support increased and/or maintenance of activity through low- to moderate-intensity exercise and/or resistance exercises. The focus of these conversations was on finding activities that were enjoyable for the patient and identifying ways to encourage adherence. Follow-up phone calls by the DNP student were used to assess fatigue and QOL, as well as to assess and reinforce

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<tr>
<th>Create awareness and interest</th>
<th>Build knowledge and commitment</th>
<th>Promote action and adoption</th>
<th>Pursue integration and sustained use</th>
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<tr>
<td>• Highlight advantages or anticipated impact&lt;sup&gt;a&lt;/sup&gt;</td>
<td>• Educational outreach and academic detailing&lt;sup&gt;a&lt;/sup&gt;</td>
<td>• Audit key indicators&lt;sup&gt;a&lt;/sup&gt;</td>
<td>• Public recognition&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>• Highlight compatibility&lt;sup&gt;a&lt;/sup&gt;</td>
<td>• Link practice change and power holder and stakeholder priorities&lt;sup&gt;a&lt;/sup&gt;</td>
<td>• Actionable and timely</td>
<td>• Personalize the messages to staff (e.g., reduces work, reduces infection exposure) based on actual improvement data</td>
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<td>• Continuing education programs&lt;sup&gt;a&lt;/sup&gt;</td>
<td>• Change agents (change champion, core group, opinion leader, thought leader)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>• Reminders or practice prompts&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>• Slogans and logos</td>
<td>• Disseminate credible evidence with clear implications for practice&lt;sup&gt;a&lt;/sup&gt;</td>
<td>• Resource materials and quick reference guides</td>
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<td>• Staff meetings</td>
<td>• Gap assessment and gap analysis&lt;sup&gt;a&lt;/sup&gt;</td>
<td>• Give evaluation results to colleagues&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>• Clinician input&lt;sup&gt;a&lt;/sup&gt;</td>
<td>• Try the practice change&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>• Local adaptation and simplify&lt;sup&gt;a&lt;/sup&gt;</td>
<td>• Report progress and updates</td>
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<td></td>
<td>• Match practice change with resources and equipment</td>
<td>• Change agents (change champion, core group, opinion leader, thought leader)&lt;sup&gt;a&lt;/sup&gt;</td>
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<td></td>
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<td>• Role model&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>• Troubleshooting at the point of care or bedside</td>
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<td>• Provide recognition at the point of care&lt;sup&gt;a&lt;/sup&gt;</td>
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<sup>a</sup>Implementation strategy is supported by at least some empirical evidence in health care.

**FIGURE 1. Implementation Strategies Used for Energy Through Motion® Evidence-Based Practice Project**

*Note. Adapted with permission from Laura Cullen, DNP, RN, FAAN, and the University of Iowa Hospitals and Clinics. Contact Laura Cullen at laura-cullen@uiowa.edu for permission to use.*
activity and exercise. The calls also allowed for evaluation of patients’ perceptions of the importance of activity and their perceived ability to engage in regular activity.

**Implementation Strategies**

Implementing EBP projects can be challenging in busy clinics; consequently, effective strategies are needed to promote success (Cullen & Adams, 2012). A variety of implementation strategies were used by the DNP student and the NPs as the project progressed (see Figure 1). To prepare clinicians, early strategies were directed toward creating awareness and building knowledge. Examples of these implementation strategies included developing the ETM slogan and logo. In addition, the DNP student and clinical nurse specialist for the cancer center were identified as opinion leaders, whereas the survivorship clinic NPs were identified as change agents. Providing education on the literature and intervention strategies, as well as promoting strong teamwork, helped to facilitate implementation early in the project. During the adoption and uptake phases of implementation, additional strategies were used to promote adoption of the kits with practice reminders by change agents. Senior leaders, as well as existing and new team members, were regularly updated on progress. Communication to existing and new team members was ongoing.

Patients followed by an NP in either the radiation oncology or medical oncology survivorship clinics were invited to participate in the project. Two groups of patients participated in the project: the usual care group and the ETM activity group. At a clinic visit, the usual care group provided baseline data, including fatigue level as measured by an adaptation of the Brief Fatigue Inventory (BFI) (Mendoza et al., 1999) and a survey of patient knowledge, perception of ability to be active, and the importance of staying active. They were then provided with the traditional instructions for activity, fatigue, sleep, and so forth. No standard protocol or standard patient education or teaching materials existed; individual clinicians determined what they would teach related to fatigue and activity instructions. Three months later, patients were asked to complete the same measures by phone.

Patients in the ETM activity group also provided the same baseline data at a clinic visit. They were then provided with an ETM kit. Items in the ETM kit were reviewed, and patients were provided with an explanation of how each item could be useful. The monthly activity log and contract was for the patient’s own use. The DNP student or the NP explained that outlining a goal or goals for an activity and tracking activity can be helpful in terms of accountability and motivation to adhere to a plan. Tracking activity can also show improvement and progress toward goals. Participants were told that they would be called and asked about their activity; as such, the record could also be helpful when asked about physical activity during the calls. The DNP student called the patients in the ETM activity group at one and two months to informally evaluate progress toward staying physically active. During the phone calls, the DNP student addressed questions and concerns and reinforced the benefits of staying physically active. At three months after program implementation, the ETM activity group completed the same assessment done at baseline, by phone.

**Evaluation**

The Iowa Model outlines steps for piloting the practice change that include collection of baseline and postimplementation data. Fatigue is known to change over time, so collecting baseline data was important to understand the patients’ experiences at two time points. The usual care group consisted of 30 patients enrolled from August to November 2012, whereas the ETM activity group was made up of 20 patients enrolled from November to December 2012. This was a convenience sample of patients. The institutional review board at the University of Iowa determined that the project was not human subjects research.

Standard EBP evaluation includes process and outcome measures. The value of evaluation in EBP is to determine if the practice change worked as intended to guide EBP uptake. Measures

![Image: Graph showing change from baseline on 0-10 scale for different categories such as fatigue, general activity, work, relationships, and enjoyment of life, with data points indicating significant changes in perceptions of quality of life.]

**FIGURE 2. Change in Ratings of Fatigue and Quality of Life From Pre- to Postassessment**

<table>
<thead>
<tr>
<th>Measurement</th>
<th>df</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatigue</td>
<td>41</td>
<td>3.7</td>
<td>0.0006</td>
</tr>
<tr>
<td>General activity</td>
<td>42</td>
<td>2.86</td>
<td>0.0066</td>
</tr>
<tr>
<td>Work</td>
<td>42</td>
<td>4.19</td>
<td>0.0001</td>
</tr>
<tr>
<td>Relationships</td>
<td>43</td>
<td>2.66</td>
<td>0.0108</td>
</tr>
<tr>
<td>Enjoyment of life</td>
<td>43</td>
<td>2.78</td>
<td>0.0081</td>
</tr>
</tbody>
</table>

Note. On the 0–10 scale of the adapted Brief Fatigue Inventory, higher numbers indicate greater impact (i.e., 0 = no interference, 10 = interferes completely).
for this project matched challenges identified by CRF experts (Berger, Mitchell, et al., 2015), supporting this EBP evaluation design to measure activity, CRF, and QOL.

Existing tools with established psychometrics were used and included in this evaluation. Questionnaires included the adapted BFI, a standardized tool (Mendoza et al., 1999) with good psychometric properties (Berger, Mitchell, et al., 2015; NCCN, 2016; Seyidova-Khoshknabi, Davis, & Walsh, 2011). The adapted BFI assessed outcomes and impact of fatigue on QOL measures (general activity, work, relationships, and enjoyment of life) using a 0–10 scale in which higher numbers indicated greater impact. The questionnaire also assessed process measures, including patient knowledge, perception of ability to be active, and importance of staying active, using a four-point Likert-type scale ranging from 1 (strongly agree) to 4 (strongly disagree). Statistical analysis used two-sample t-test and Fisher's exact tests to determine differences. SAS®, version 9.3, was used.

Forty-five of the 50 patients completed the three-month program (90% completion rate); the remaining five were lost to follow-up. The voluntary nature of participation in this project and the requirement that participants only needed to complete a phone-delivered survey at the end of three months is believed to be the reason such a high completion rate was obtained.

Results

Participants were a convenience sample from two survivorship clinics, one in radiation oncology and one in medical oncology. Any patient seen in one of these NP-led clinics could participate. Demographics were not collected because generalization of results is beyond the EBP project scope. The adapted BFI used a scale of 0 (no interference) to 10 (interferes completely). Participants in the ETM activity group reported increased activity levels by a mean of 2.59 points (p = 0.0016), whereas the usual care group reported decreased activity levels by a mean of 1.07 points from pre- to postassessment. Patients in both groups rated their fatigue and QOL (see Figure 2). Fatigue decreased by an average of two points in the ETM activity group and increased by 0.69 points in the usual care group (p = 0.0006). QOL improved in all measured areas from 1.24–2.41 points (0–10 scale) in the ETM activity group, but decreased across all measured areas in the usual care group (0.69–1.41 points). In measuring patient perception, both groups agreed at postassessment that they knew what to do to stay active. However, from pre- to postassessment, the usual care group reported less ability to manage their energy by staying active (see Figure 3). This finding suggests that, although both groups had sufficient knowledge about staying active, only the ETM activity group was becoming or staying active and, therefore, managing their energy better. Because the groups were not matched, definitive conclusions on efficacy cannot be drawn from these data. However, the results support the use of activity promotion kits and follow-up phone calls to help cancer survivors increase activity, decreasing fatigue and its impact on QOL.

Differences in pre- to postassessment scores for the ETM activity group were statistically significant at a 0.05 level, including fatigue, interference of fatigue with life activities, number of activities and patient reports of knowledge, perception of ability to be active, and importance of staying active.

Implications for Nursing

Oncology nurse–patient relationships are developed across multiple encounters after a cancer diagnosis. The oncology nurse is in a prime position to assess CRF and educate patients about the effects of physical activity on CRF. Fatigue levels and their impact on QOL should be assessed by nurses during active cancer treatment and at follow-up visits (Bormenman, 2013; NCCN, 2016). Following the fatigue assessment, nurses can provide verbal education, as well as written handouts, discussing methods for managing energy through increasing physical activity. Activity kits can be simple and low cost. The ETM project showed that the nurse-recommended methods for increasing activity do not need to be complicated and that they can be conducted at home by patients.

This EBP project using ETM kits and nurse support demonstrated that not only did provision of exercise materials lead to increased physical activity by cancer survivors, but also that follow-up by nurses can assess adherence and encourage activity that may increase physical activity. Therefore, oncology nurses can improve activity involvement by evaluating exercise throughout the course of treatment. Nurse–patient interactions can take place via face-to-face visits, phone calls, or electronic communication. When integrating the fatigue assessment and subsequent education into clinic workflow, nurses must ensure that adequate time is built into patient visits for assessment, education, and questions.

This was a low-cost initiative with applicability to a variety of settings and for a variety of patient populations. Patients were provided with tools to assist in staying active but were allowed to choose their own activities. The unstructured regime permitted patient involvement across ages and various physical abilities.

Future efforts need to focus on incorporating these interventions into the workflow of clinicians. The assessment of
fatigue and activity promotion will be routinely discussed when patients are seen in the cancer clinic. As technology in health care continues to expand, opportunities to align EBP projects with personal health records and options for patient-reported data can also enhance incorporation into nurses’ workflow.

Another challenge with sustaining an intervention such as this is the cost for the materials that support physical activity. Although the costs are minimal, resources are needed to continue to support these interventions. After completion of this project, continuation of funding for patient supplies was obtained through requests from a regular benefactor of the cancer center.

Conclusion

As healthcare outcomes become more patient-focused, investment is needed in symptom management interventions. A national effort is underway to address the “Triple Aim,” which includes improving the patient experience of care (quality and satisfaction). Legislation proposed to the U.S. House of Representatives Subcommittee on Health, H.R. 1661, or the “Improving Cancer Treatment Education Act of 2013,” has a focus on improving coverage for comprehensive education services for patients with cancer, along with research to advance cancer symptom management and the patient experience (http://1.usa.gov/24RYlJZ). The Centers for Medicare and Medicaid Services (2011) are also focused more on patient satisfaction, as demonstrated by the move to pay for performance initiatives, such as value-based purchasing. The best support for the sustainability of the ETM program is the fact that it addresses symptom management.

The results from this EBP project demonstrate that increased physical activity has a positive impact on CRF, as well as that nurse-led interventions are feasible in a busy academic cancer center. The ETM outcomes have also served as a trigger for a national effort to address cancer-related fatigue. The effect on patients is important—reducing fatigue with increased activity while improving QOL. More research is needed for individualized activity prescriptions for more diverse populations of people living with cancer across cancer types and with differing treatment goals. Nurses are key to helping patients and families combat fatigue associated with cancer and cancer treatment.

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