Fatigue is a common and distressing symptom for patients receiving radiation therapy (RT), with 95% of patients reporting fatigue to their healthcare providers (Knobf & Sun, 2005). Fatigue creates a multidimensional sense of energy depletion that has the potential to adversely affect multiple aspects of quality of life, including patient functional status, emotional well-being, motivation, mood, and social relationships (John, 2009; Lundh Hagelin, Wengström, Furst, 2009; Poirier, 2011; Sood & Moynihan, 2005). The underlying pathophysiology of fatigue is not well understood, but fatigue may result from changes in muscle metabolism, hormonal changes, and circadian rhythm disruptions related to cancer and cancer therapy (Ryan et al., 2007; Wang, 2008). Cancer-related fatigue may be associated with changes in sympathetic and parasympathetic nervous system activity, suggesting a picture of “accelerated aging” (Fagundes et al., 2011). Fatigue during radiation may cluster with pain and sleep disturbances and also be associated with depression, anemia, poor appetite, anxiety, and neutropenia (Campos, Hassan, Riechelmann, & Del Giglio, 2010; Kim, Barsevick, & Tulman, 2009; Matthews, Schmiege, Cook, & Sousa, 2012; Merriman et al., 2011). Patient and clinical variables, such as age, stage of disease, dose of radiation, and psychosocial factors (e.g., anxiety, depression), have been explored as predictors of fatigue during RT. In patients with breast cancer, evidence regarding those predictors of fatigue during RT has not been consistent across studies (Dhruva et al., 2010). Although patients report fatigue throughout the course of RT, evidence suggests...
that fatigue increases in severity during the early weeks of treatment, peaks around the fifth week of therapy, and declines about two months after the completion of treatment (Borthwick, Knowles, McNamara, O’Dea, & Stroner, 2003; Knobf & Sun, 2005; Nail, 2004). For about 30% of patients, acute fatigue becomes a chronic, long-term symptom that persists for months or years after the completion of RT (Ganz & Bower, 2007; Jereczek-Fossa, Marsiglia, & Orrechia, 2002).

A number of evidence-based interventions have been identified to prevent and manage fatigue. The Oncology Nursing Society’s (ONS’s) evidence-based guidelines recommend exercise as the only intervention supported by strong evidence to prevent and manage fatigue (Mitchell, Beck, & Eaton, 2009). Other interventions that likely are effective include screening for additional contributing and treatable factors, such as anemia, pain, nausea, and sleep disturbances, and addressing those individual problems. Teaching energy conservation, measures to promote adequate sleep, stress and activities management, and complementary and alternative therapies (e.g., relaxation, massage, healing touch) also is likely to be effective. Many pharmacotherapies, such as paroxetine, methylphenidate, donepezil, buproprion, modafinil, and sertraline, have been investigated as interventions to relieve fatigue, but their effectiveness has not yet been established. Nonpharmacologic therapies have the benefit of minimal to no side effects and the potential to address multiple symptoms (Bennett et al., 2009).

Because many of the evidence-based interventions to relieve fatigue are self-care behaviors, healthcare providers need information about how patients are incorporating those interventions into their daily activities. After an educational intervention, women receiving chemotherapy for breast cancer increased the use of self-care measures to manage fatigue, such as rest, relaxation, and exercise; however, these measures did not translate into actual self-reported decreases in fatigue (Williams & Schreirer, 2004; Yates et al., 2005). Haas (2011) suggested that strategies to improve self-efficacy are needed to increase the effectiveness and implementation of self-care measures. Few studies have described the self-care behaviors for fatigue used by patients during RT. Borthwick et al. (2003) found that patients with lung cancer used exercise, education, attention restoring, and energy conservation to relieve fatigue during RT. Lundberg and Rattanasuwan (2007) studied a group of Thai Buddhist patients undergoing RT. Those patients reported relieving fatigue by getting moral support from family and friends, through religion and meditation practices, and consulting with doctors and nurses.

Because little is known about the self-care behaviors used by patients during RT to relieve fatigue, the aim of the current study was to describe the self-care strategies to manage fatigue used by patients undergoing RT. Secondary aims were to explore the effectiveness of the self-care strategies and to identify the source of information for the self-care activities. Unfortunately, some patients believe fatigue is an unavoidable consequence of therapy and, therefore, do not take any preventive actions (Pertl, Hevey, Donohoe, & Collier, 2012). Clinicians need to work to overcome that barrier, educate patients about evidence-based interventions to manage fatigue, and help patients feel confident in their use of self-care measures (Wu & McSweeney, 2007).

## Methods

### Sample and Setting

The current study used a convenience sample of adults (aged 18 years or older) at the University of Virginia (UVa) Health System who were receiving external beam RT as adjuvant or primary therapy for cancer. To be eligible for the study, patients needed to understand English, have a Karnofsky performance score greater than 80 (as determined by the RT team), and complete at least two weeks of therapy. Patients were excluded if they were receiving concurrent chemotherapy or they had a cognitive, psychiatric, or communication disorder that would interfere with recall of symptoms or completion of study forms.

Thirty patients consented to participate in the study, but one patient withdrew because of time constraints before data were collected. The remaining 29 patients included 18 women (62%) and 11 men (38%). Twenty patients were Caucasian (69%) and nine were African American (31%); the mean age of the sample was 58.8 years (SD = 10.1, range = 40–80 years). Participants were receiving RT for a variety of cancers. At the time of data collection, patients were in their second through seventh week.
of RT (average week = 4.7), and the patients had received a 55.6 Gy (range = 20–62.3) dose of radiation (see Table 1).

**Procedures**

The UVa Cancer Center Protocol Review Committee and the UVa Institutional Review Board approved the study. Clinic nursing staff introduced the study to the patients, and the study coordinator met with those patients interested in hearing more about the study to complete the informed consent process. Questions about the study were encouraged and answered. Once the consent process was completed, participants completed the Brief Fatigue Inventory (BFI) as a screening tool and were eligible to continue in the study if their response to the first question, “Have you felt unusually tired or fatigued in the prior week?” was “yes.”

Participants who indicated that they felt unusually tired or fatigued in the prior week completed a 15-minute semi-structured interview conducted by the study coordinator. The interview consisted of open-ended questions to determine the self-care activities used by the participant to relieve fatigue and the effectiveness of the interventions (see Figure 1). After the participant stated his or her preferred or first intervention, the study coordinator asked for additional interventions until the participant had described all the activities used to relieve fatigue. Participants also were asked to describe the effectiveness of the intervention and the source of information about that intervention. At the conclusion of the interview, the study coordinator discussed the educational handout, “Seven Ways to Manage Cancer-Related Fatigue” (American Cancer Society, 2010) (see Figure 2) and answered any questions.

**Instrument**

The BFI measures the severity of fatigue and the impact of fatigue on daily functioning in the prior week (Mendoza et al., 1999). The BFI has nine items, and participants respond using a Likert-type scale from 0 (no fatigue or does not interfere) to 10 (as bad as can be imagined or completely interferes). The average of the 9 items represents a global fatigue score, and higher responses indicate worse fatigue and higher interference. The BFI had been a reliable instrument to measure fatigue in previous studies (Mendoza et al., 1999; Poirier, 2006). In the current study, internal consistency for the BFI measured with Cronbach alpha was 0.94.

**Data Analysis**

The study coordinator recorded notes during each interview. After the interview, participants’ responses were organized under each question using a prestructured case approach, such as, “What was the first intervention named to relieve fatigue?” (Miles & Huberman, 1994). Using an open-coding approach, two experienced oncology nurses placed similar responses into categories under each question until they reached complete agreement on categorization. Participants who responded under a particular category also were counted or quantified (Wilkins & Woodgate, 2008). The categories and frequencies were verified by three coauthors.

**Results**

**Fatigue**

The entire sample’s BFI scores ranged from 0–8.7, with a mean score of 4.53. Twenty-two participants (76%) indicated they felt unusually tired or fatigued during the prior week and proceeded to complete the study interview. The BFI scores for participants who reported unusually high fatigue during the previous week and completed the interview were significantly higher than the scores of those who did not report high fatigue ($t = 3.57$, $p = 0.001$).

Participants named between 1–6 interventions that they used to relieve fatigue, with an average of 2.7 interventions per participant. Table 2 lists the interventions that were named by study participants. The majority of participants (68%) reported that they first rested or slept to improve their fatigue, but other responses included decreasing activity level, exercising, maintaining usual activity level, using stimulant substances, and eating or drinking something nutritious, such as Boost® supplements. Additional strategies named by the participants included the support of family and friends, complementary and alternative therapies such as mind-body practices and massage, and religious practices such as praying.

Responding to how often they used interventions to relieve fatigue, most participants incorporated those strategies into their daily lifestyles. Of the 17 participants who reported that they rested or slept to relieve fatigue, 14 reported that they used this

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**Implications for Practice**

- Patients receiving radiation therapy may suffer from cancer-related fatigue and use a number of strategies on a daily basis for relief, particularly sleep and rest.
- Nurses need to explore patients’ daytime activity levels and daytime sleep to be sure that excessive inactivity is not inadvertently contributing to fatigue.
- Continued assessment and discussion about fatigue are necessary to legitimize the symptom of fatigue and tailor interventions to prevent and manage this dynamic symptom.

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You told us that you have felt unusually tired or fatigued during this past week. It is common for people to feel tired during radiation therapy. I want to explore what helps people when they feel tired and fatigued during radiation therapy.

1. What do you most often to relieve your fatigue or tiredness?
   - How often do you do this activity?
   - How much does it help to relieve your fatigue?
   - Where did you hear of this activity to relieve fatigue?
   - Would you recommend this activity to someone else with the same problem? Why or why not?
2. What else do you do to relieve your fatigue or tiredness?

(Continue with sequence of questions until the participant does not name any activities.)

**FIGURE 1. Interview Guide to Elicit Self-Care Behaviors Used to Relieve Fatigue**

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You told us that you have felt unusually tired or fatigued during this past week. It is common for people to feel tired during radiation therapy. I want to explore what helps people when they feel tired and fatigued during radiation therapy.
strategy every day, including two patients who napped twice a day and two patients who took “many small naps” during the day. Of the participants who exercised, three took daily walks and two exercised at the gym 2–4 times a week. Participants who reported using stimulant substances used them every day; one reported an intake of “four cups of coffee throughout the day.”

Participants were asked about the effectiveness of the interventions they used to relieve fatigue. More than half of the participants (68%) reported at least some relief of fatigue, regardless of the intervention they were using. Most participants responded that they would recommend the interventions they were using to others, but also commented that each person has to figure out what works best for them. One person suggested, “If you were an active person before cancer, it will probably help you to try to stay active.”

The majority of participants (80%) reported that they learned how to manage their fatigue from their own knowledge and experience and from trial and error. For example, one participant said that she figured out that keeping busy relieved her fatigue. Another participant shared that lying down when he felt tired was “just what I do.” Only 20% of the participants recalled having a discussion about fatigue management with a nurse, physician, or nutritionist.

Discussion

About 80% of the current sample reported feeling unusually tired during the prior week, consistent with previous studies. The current sample also reported trying a number of interventions to relieve fatigue that are recommended and likely to be effective, according to the ONS Putting Evidence Into Practice (PEP) resources (Mitchell et al., 2009). A few patients reported they used caffeine as a stimulant to reduce fatigue, which is not recommended as an evidence-based intervention, although other stimulant substances, such as methylphenidate and modafinil, have been studied (Jean-Pierre et al., 2010; Minton, Richardson, Sharpe, Hotopf, & Stone, 2011). Patients also reported using nutritional interventions and enlisting the support of family and friends, which also are interventions that are recommended by the experts as consistent with sound clinical practice. With the exception of one patient who used marijuana, patients in this study did not use any interventions that were controversial or potentially harmful. Most patients reported that they received some relief of their fatigue with their chosen interventions and incorporated those strategies into their daily lifestyles, but no patient reported that their fatigue was completely alleviated.

Findings from the current study suggest that the majority of patients report sleep and rest as their primary method to relieve RT-related fatigue. How often the participants napped during the day and decreased their activity level is not known, although rest and an adequate amount of quality sleep are recommended, decreased physical activity also can be associated with increased fatigue as well as other negative physical and psychological consequences (Lowe, Watanabe, Baracos, & Courneya, 2009; Schmitz et. al., 2010). Patients experiencing fatigue may have a natural instinct to rest or decrease activity when feeling fatigued; however, this practice may achieve the opposite of the desired effect and, in fact, cause more severe

### FIGURE 2. Seven Ways to Manage Cancer-Related Fatigue

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TABLE 2. Interventions Reported by Patients to Relieve Fatigue (N = 22)

<table>
<thead>
<tr>
<th>Intervention</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary</strong></td>
<td></td>
</tr>
<tr>
<td>Lie down, rest, sleep</td>
<td>15</td>
</tr>
<tr>
<td>Decrease activity level or do quiet activities</td>
<td>2</td>
</tr>
<tr>
<td>Exercise</td>
<td>2</td>
</tr>
<tr>
<td>Eat or drink something nutritious (e.g., Boost®)</td>
<td>1</td>
</tr>
<tr>
<td>Maintain activity level</td>
<td>1</td>
</tr>
<tr>
<td>Use stimulant substances (e.g., coffee)</td>
<td>1</td>
</tr>
<tr>
<td><strong>Secondary</strong></td>
<td></td>
</tr>
<tr>
<td>Maintain usual activity level</td>
<td>7</td>
</tr>
<tr>
<td>Rely on support of family and friends</td>
<td>7</td>
</tr>
<tr>
<td>Complementary and alternative therapy</td>
<td>5</td>
</tr>
<tr>
<td>Exercise</td>
<td>5</td>
</tr>
<tr>
<td>Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>Pray or rely on religion</td>
<td>3</td>
</tr>
<tr>
<td>Use stimulant substances</td>
<td>3</td>
</tr>
<tr>
<td>Decrease activity level or do quiet activities</td>
<td>2</td>
</tr>
<tr>
<td>Lie down, rest, sleep</td>
<td>2</td>
</tr>
</tbody>
</table>

Note. Participants could choose more than one secondary intervention.

Fatigue. Nurses need to explore patient daytime activity level and daytime sleep to be sure that excessive inactivity is not inadvertently contributing to fatigue. Nurses should encourage patients to maintain an optimal level of activity through usual daily-life activities as well as mild-to-moderate exercise after ruling out the presence of factors that would contraindicate physical activity, such as anemia or risk for bone instability. Nurses should explore and address barriers to physical activity, such as low self-efficacy, deconditioning, symptoms such as pain, shortness of breath, or fear of injury (Haas, 2011; Wanchai, Armer, & Stewart, 2011). Nurses can encourage physical activity using strategies and resources, such as support from other patients, exercise and physical therapy consultations, exercise groups, and activity interventions incorporated into the RT setting.

The standard of nursing practice in the RT clinic is to teach patients about symptoms and symptom management at the start of their treatment course and to assess symptom severity at weekly intervals during treatment. However, only 20% of patients in the current study recalled learning about fatigue management from a nurse or other healthcare provider, which may indicate the persistent belief that fatigue is an unavoidable consequence that must be endured during treatment. To legitimize fatigue as a concerning symptom and help patients strategize about relief, nurses must make a concerted effort to continue assessment and ongoing discussions about the management of fatigue. Patient education resources are available in print or electronic format from a variety of organizations, such as the American Cancer Society, ONS, and CancerCare®. Nurses have a responsibility to stay informed about evidence-based symptom management interventions, share the most current recommendations with their patients, and evaluate patient outcomes related to patient education and use of those interventions.

Patients receiving RT become fatigued not only from the actual treatment, but also from travel to daily appointments, physical symptoms such as pain, poor appetite, and emotional distress, as well as other comorbidities. Because a variety of factors contribute to fatigue during RT, nurses need to explore the complex dynamics of fatigue with each patient and tailor multiple evidence-based interventions to improve each individual patient’s functional status and quality of life (Stricker, Drake, Hoyer, & Mock, 2004).

Limitations

Limitations of the study include a small, heterogeneous, convenience sample of patients who were receiving RT. Socioeconomic, cognitive, and psychiatric variables were not measured, which may provide more insight into the choice of self-care strategies reported by the participants. In addition, the teaching each patient received about fatigue management was not explored, so conclusions about the effectiveness of patient education cannot be made. In addition, several patients were interviewed during the second and third weeks of RT, which may have been before the onset of treatment-related fatigue.

Conclusions

Despite advances in symptom management, patients commonly experience fatigue during their course of RT. Although many factors contribute to fatigue, a number of evidence-based recommendations are available for nurses to tailor and recommend to patients. The current study illustrates that patients are likely to use a variety of recommended self-care measures to relieve fatigue. Nurses may need to make special efforts to explore how patients are adjusting their physical activity level when experiencing fatigue and to remind them that fatigue is an important symptom that can be prevented and managed. The current study suggests that patients may be more likely to reduce their level of physical activity rather than stay physically active, which actually may contribute to increased fatigue.

References


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