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ABSTRACT

BACKGROUND
Fatigue is one of the most common cancer-related problems. Fatigue-reduction non-drug methods include energy conservation strategies and improving self-caring efficacy. The aim of the present study was to determine the effect of energy conservation strategies training on fatigue and caring self-efficacy in cancer patients.

METHODS
It was a single-blind clinical trial study performed on 80 breast cancer patients in educational hospitals in Zahedan (Iran) selected by simple random sampling. After randomly assigning patients to two groups (control and intervention), before the intervention, multidimensional fatigue inventory (MFI) and strategies used by people to promote health (SUPPH) were completed by patients in both groups. The control group received no special care except routine care. The intervention consisted of energy conservation strategies that was performed in the experimental group within 3 individual sessions once a week. Following all 3 training sessions, follow-up was performed for 6 weeks and the questionnaires were then administered to the control and intervention groups and the post-test was given.

RESULTS
Most of the participants in the two groups were educated less than high school diploma, were housewives, and in stage II of the diseases. The results showed that fatigue was significantly lower in the intervention group than the control group after the intervention (p= 0.01). The results also showed a significant improvement in the level of caring self-efficacy in the intervention group compared to the control group (p= 0.02).

CONCLUSIONS
The results indicate that educational intervention can be used as an effective strategy and a complementary therapy along with other therapies to reduce fatigue in patients with breast cancer.

KEY WORDS
Fatigue, Breast Cancer, Caring Self-Efficacy
Breast cancer is the most common cancer in women and the leading cause of cancer-related death in women aged 40 to 44 years. Now, breast cancer accounts for 1.3% of all cancers in women and is responsible for 19% of cancer-related deaths.\(^{(1,2,3)}\) Like most developing and developed countries, breast cancer is the most common cancer in Iran and is ranked the first in the country.\(^{(4,5,6,7)}\) There are totally 40,000 patients in Iran and more than seven thousand are added to this figure annually.\(^{(8)}\)

Patients with breast cancer suffer from a variety of physical and psychological complications such as depression, anxiety, pain, and fatigue. One of the most complex and common cancer-related problems is fatigue. Approximately, 72 to 99% of cancer patients suffer from fatigue.\(^{(9)}\) According to the National Comprehensive Cancer Network (NCCN), cancer-related fatigue is a subjective, unpleasant and persistent symptom that manifests as physical (lack of energy, need to rest), emotional (Reduced motivation or interest), and cognitive fatigue (deficits in concentration and attention).\(^{(10,11,12)}\)

Fatigue manifests mainly in a chronic form and is a major complication of cancer treatments, including hormone therapy, and chemotherapy. It disrupts various aspects of the patient’s physical, psychological, and social life and, consequently, reducing their quality of life. Despite the high prevalence of cancer-induced fatigue and strategies to alleviate this problem, because attention is not paid to this problem in patients. The main barriers may include false impression of healthcare providers, (because cancer-related fatigue is similar to fatigue experienced by healthy individuals in their daily lives), insufficient knowledge about the basic mechanisms of cancer-related fatigue. They also include a false belief that no action can be taken for this type of fatigue, failure to distinguish this type of fatigue from depression and the inability to understand the negative effects of this complication on quality of life.\(^{(13)}\)

Existing studies on psychosocial support, modification of sleep and food habits, and some complementary and alternative therapies, such as massage and touch, yoga, relaxation, meditation, and herbal remedies suggest that these techniques may possibly be useful and effective in reducing or eliminating cancer-related fatigue.\(^{(14)}\)

According to a previous study by Tabrizi Moghaddam et al, one of the non-drug fatigue reduction methods and non-drug strategies includes applying energy conservation strategies,\(^{(15)}\) to create a balance between rest and activity in the course of the cancer-related fatigue, and understanding the value of rest followed by planning for incorporation of a rest period with self-care programs during the day.\(^{(16,17)}\)

Considering the high prevalence of fatigue, the educational support needs of women with breast cancer on the one hand, and considering that training on energy conservation strategies and enhancing caring self-efficacy is a non-drug, non-invasive, and low-cost method of controlling physical and psychological problems and can be easily educated to the patient through the nurse, and most of previous studies on cancer patients have emphasized different side effects of chemotherapy and radiotherapy, such as nausea, vomiting, hair loss, other complications, and fatigue, despite all its effects which may have on the cancer patient's life, has been less studied on the other hand, the present study aimed to determine the energy conservation strategies training on fatigue and factors related to caring self-efficacy of cancer patients.

**METHODS**

**Study Design and Registration**

This Single-blind) clinical trial study was performed on 80 women with breast cancer from January 2018 to May 2019 at two educational hospitals (Ali-ibn Abi Talib and Khatamolaniah hospitals), Zahedan University of Medical Sciences, Iran. This study was registered at the Ethics Committee of Zahedan University of Medical Sciences (Ethic code: IR.ZAUMS.REC.1397.392). This clinical trial was also registered at the Iranian Registry of Clinical Trials (IRCT201710093065N4). Consort checklist was used to report this study.

Sample size was estimated to be 14 individuals in each group based on fatigue variable in Tabrizi et al.’s study (2016) with 95% confidence interval and study power =95%\(^{(18)}\) using. In order to consider possible drop-out and to ensure the adequacy of sample size, 40 individuals were assigned in each group and a total of 80 individuals were included.

**Participants**

Participants were patients with breast cancer, who were estimated to be 14 individuals T. Inclusion criteria included individuals aged 20 to 60 years, being at stage I or II, individuals receiving at least one chemotherapy session, being able to communicate and cooperate, lack of cardiopulmonary disease, lack of known psychiatric illness and the use of psychiatric drugs. Exclusion criteria also included being absent in training sessions for one session, failure to implement the training program for 1 week, disease metastasis and patient’s death.

**Instruments**

Data collection instrument included a three-part questionnaire including demographic characteristics, MI fatigue questionnaire, and caring self-efficacy questionnaire (SUPPH). Demographic characteristics included (age, marital status, occupation, educational level, treatment strategy, stage of disease, type of surgery, chemotherapy session, and history of disease).

**Multidimensional Fatigue Inventory (MFI)**

This instrument helps achieve a deeper understanding of individual's fatigue by assessing five dimensions of fatigue including general fatigue, physical fatigue, reduced activity, reduced motivation, and subjective fatigue.\(^{(19)}\) It consists of 20 items rated on a 5-point Likert scale (ranging from 1 = Yes completely right to 5 = No, completely wrong). Ultimately higher scores indicate greater fatigue. There are 4 questions for each dimension and Positive and negative have been used simultaneous while writing them down to reduce the likelihood of respondents' bias.\(^{(19)}\) This questionnaire was first presented by Smets in 1996 and its validity and reliability were evaluated across different demographic groups, such as cancer patients undergoing radiotherapy,
patients with chronic fatigue syndrome, first-year psychology and medical students, soldiers, and third-year medical students.(20) This questionnaire has been translated into Persian and its reliability and validity have been confirmed.(21)

Self-Efficacy Questionnaire
Strategies Used by People to Promote Health (SUPPH)- The self-care self-efficacy questionnaire was first designed by Lev (1997) specifically for cancer patients and translated into Persian and used by Azizi-Fini.(22) The questionnaire consists of 29 questions scored based on 5-point Likert-type ranging from (completely confident) to (poorly confident=1). The questions in this questionnaire investigate an individuals’ level of confidence while performing their self-care tasks and the total score is between 29 and 145. This instrument has a self-report state and its internal consistency has been reported 0.94 by calculating Cronbach’s alpha.(22)

Procedure
After coordinating with the person in charge of the oncology department, the researcher explained the goals for patients who met the inclusion criteria. Written consent was obtained from patients who were willing to participate in the study. Initially, participants were selected using convenience sampling and to ensure random allocation of participants, envelopes containing group name cards were first prepared for all study sample studied. The cards were then arranged randomly, with one of these cards being assigned to each of them that determined the individual’s group (intervention or control). At the end, the participants of both groups were identified. Before the intervention, the questionnaire was completed by the participants in both intervention and control groups. Questionnaires were completed by the patient with the help of the researcher within 15 minutes. In the intervention group, patients received intervention containing energy conservation strategies in 3 individual sessions once a week. After completing 3 training sessions, follow-up was performed for 6 weeks and the questionnaires were then completed by the participants. The training sessions included a pamphlet and a training booklet, and their scientific content was approved by an oncologist.

Statistical analysis
At first, frequency, percentage, mean, standard deviation, minimum, and maximum were determined by descriptive statistics. To compare pre and post-intervention means in each group, paired t-test was used. Independent t-test was also used to compare means between intervention and control groups. Covariance Analysis test was used to compare fatigue score between two groups before and after intervention. P-value> 0.05 was considered as the significance level.

RESULTS
A total of 80 participants were enrolled in the study and were present in the final phase of the study. Demographic characteristics were approximately similar in both groups.

Most participants in both groups had under diploma, were housewives and stage II patients, and primary care spouses (Table 1).

<table>
<thead>
<tr>
<th>Level of Education</th>
<th>Group</th>
<th>Intervention</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Under diploma</td>
<td>25</td>
<td>55</td>
<td>22</td>
</tr>
<tr>
<td>Above diploma</td>
<td>11</td>
<td>27%</td>
<td>18</td>
</tr>
<tr>
<td>Employment Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housewife</td>
<td>37</td>
<td>92%</td>
<td>35</td>
</tr>
<tr>
<td>Employee</td>
<td>3</td>
<td>7%</td>
<td>5</td>
</tr>
<tr>
<td>Stage of Disease</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage I</td>
<td>5</td>
<td>12.5%</td>
<td>5</td>
</tr>
<tr>
<td>Stage II</td>
<td>24</td>
<td>60%</td>
<td>23</td>
</tr>
<tr>
<td>Stage III</td>
<td>11</td>
<td>27.5%</td>
<td>12</td>
</tr>
<tr>
<td>Primary Caregiver</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mothers</td>
<td>7</td>
<td>17.5%</td>
<td>10</td>
</tr>
<tr>
<td>Spouse</td>
<td>18</td>
<td>45%</td>
<td>18</td>
</tr>
<tr>
<td>Child</td>
<td>19</td>
<td>47.5%</td>
<td>11</td>
</tr>
</tbody>
</table>

Table 1. Frequency Distribution of Research Subjects by Education, Occupational Status, Stage of Disease, and Primary Caregiver

Aim of this study was to investigate the effect of energy conservation strategies training on fatigue and factors related to caring self-efficacy in patients with breast cancer. The results of this study showed the positive effect of energy conservation strategies training intervention on fatigue. The mean fatigue score was 9.97±54.85 and 7.23± 63.95 out of 100.

**Discussion**

The results of this study showed significant differences in the mean fatigue score between intervention and control groups in the pre-intervention phase. The mean fatigue score was 9.97±54.85 and 7.23± 63.95 out of 100 in the intervention and control groups, respectively. The results of paired t-test showed a significant reduction in the intervention group compared to the control group after intervention (p= 0.001) (Table 2). The results of paired t-test regarding self-efficacy also showed that intervention of energy conservation strategies training improves caring self-efficacy in these patients (Table 3).
In the present study, the post-intervention self-efficacy level in cancer patients undergoing chemotherapy was significantly increased in the intervention group (p= 0). In studies by Lev et al. (1996) and Akin et al. (2008), self-efficacy levels of cancer patients were (135.55 ± 35.26) and (96.02 ± 28.6), respectively. The self-efficacy level of cancer patients undergoing bone marrow transplantation in Azizi-Fini’s study (2011) and haemodialysis patients in Habibzadeh et al (2010) was 81.02± 16.53 and 50.73± 7.5, respectively. There has been no article similar to the present article investigating the effect of energy conservation strategies on the self-efficacy.

Self-efficacy means having confidence in yourself and your ability to perform successfully; so, it seems obvious that people who have positive and high self-efficacy won’t leave the scene in challenging situations and do not feel helpless. However, self-efficacy decreases among women with breast cancer due to a lack of physical strength, reduced ability to perform day-to-day activities, frequent and prolonged hospitalizations, and depression. Self-efficacy helps one not to lose his or her mobility and to pursue a career or activity with regard to the disease and his/her specific characteristics.

Overall, it can be said that cancer is a very inconvenient event for everyone, and the subsequent fatigue is an unpleasant experience for the patient. Although we can’t completely prevent physical, emotional, and cognitive problems in these patients, it is possible to improve the patient’s energy supply and prevent the progression or creation of new problems caused by fatigue that can also negatively affect self-care self-efficacy through counseling and training on how to deal with these problems. Therefore, healthcare providers’ awareness of this fact is the most important step toward optimal patient care.

CONCLUSIONS

Intervention through energy conservation strategies resulted in reduction of fatigue and increased self-caring efficacy of patients. Educational intervention can be used as an effective strategy and a complementary therapy along with other therapies to reduce fatigue in patients with breast cancer.

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