Int J Clin Exp Med 2016;9(2):4053-4058
www.ijcem.com /ISSN:1940-5901/IJCEM0015708

Original Article

The fatigue, anxiety and depression levels of patients with breast cancer during radiotherapy

Gulay Oyur Celik[1], Arzu Tuna[2], Sevgin Samancioglu[3], Medet Korkmaz[4]

[1]Division of Surgical Nursing, Department of Nursing, Izmir Katip Celebi University Faculty of Health Science, Izmir, Turkey; [2]Division of Surgical Nursing, Department of Nursing, SANKO University Faculty of Health Sciences, Gaziantep, Turkey; [3]Department of Nursing, Gaziantep University Health Science Faculty, Gaziantep, Turkey; [4]Division of Medical Nursing, Department of Nursing, SANKO University Faculty of Health Sciences, Gaziantep, Turkey

Received September 6, 2015; Accepted January 21, 2016; Epub February 15, 2016; Published February 29, 2016

Abstract: The aim of this study was to investigate fatigue, anxiety and depression scores before or after radiotherapy (RT) in breast cancer patients. A total of 51 patients with breast cancer were evaluated with Fatigue Scale, and Hospital Anxiety and Depression Scale before and after RT. Lee Fatigue Scale-fatigue subscale score significantly increased after RT (P=0.001); while energy subscale score significantly decreased after RT (P=0.001). Hospital Anxiety Scale score and Hospital Depression Scale score did not differ significantly before and after RT (P=0.630, and P=0.058, respectively). Relationship between patients' anxiety-depression levels and fatigue-energy levels before and after radiotherapy did not reveal any significant difference. Although an increase of fatigue, and a decrease of energy was observed after RT, no difference in anxiety and depression scores were observed in patients with breast cancer.

Keywords: Breast neoplasms, radiotherapy, fatigue, anxiety, depression

Introduction

A cancer diagnosis has remarkable concerns for most patients who experience it. In the case of breast cancer, the primary treatment generally consists of surgery, and after that many patients are recommended one or more further treatments including radiotherapy (RT), chemotherapy, and hormonal therapy [1]. All these factors may, of course, affect the patients' quality of life.

While the occurrence of depressive symptoms is four times higher in patients with cancer than in general population, breast cancer patients show increased levels of depressive symptoms than do most cases with other malignancies [2]. Depressive symptoms in these patients vary between 1-50% [3, 4]. Depression symptoms are related with decreased quality of life [5].

Cancer-related fatigue is another common problem among breast cancer patients that receive adjuvant treatment, with a prevalence of 25-99% [6]. Many studies have tried to explain biological mechanisms underlying fatigue during radiotherapy, but no consensus is reached concerning biological bases and potential impact of radiation therapy. Among potential causes, the local activation of substances such as systemic inflammatory markers and proinflammatory cytokines has been hypothesized [7, 8].

The aim of psychosocial support in patients with breast cancer is to provide patients with the opportunity of verbalizing their feelings and concerns, to increase their ability of coping with treatment stress, to improve their quality of life, to decrease their complaints, to increase their adaptation to their new condition and emotional investment [9]. Nurses can provide emotional support and help patients with cancer to decrease their complaints and increase their coping skills [10].

The aim of the present study was to determine the correlates of fatigue, anxiety and depres-

sion among breast cancer patients receiving radiotherapy.

Material and methods

Study design

The study has been conducted in accordance with the principles of the Helsinki Declaration and approved by the local Institutional Review Board (29 December 2014-428). All subjects gave written informed consent. A total of 51 patients with breast cancer, admitted to the Department of Radiology of a university hospital, between January 2015 and March 2015 constituted the study group. This study included breast cancer patients who undergone conservative surgery and RT.

Only patients who met the following eligibility criteria were included: age ≤ 70 and > 25 years, native Turkish, at least a primary school graduate, conserving surgery, early stage disease with no nodal involvement (T1N0M0 and TisN0M0), standard postoperative radiotherapy, no previous chemotherapy, lack of significant comorbid conditions (cardiovascular disease, hypertension, respiratory disease, diabetes, cerebral-vascular disease, arthritis, and hypothyroidism), normal level of hemoglobin (> 11 g/dl), thyroid function test levels, glucose and electrolyte levels, no previous history of any kind of cancer, major psychiatric diseases, not taking alcohol, and antidepressants.

Outcome parameters

Patients were interviewed face-to face in hospital interview room before and after radiotherapy. At the first RT, necessary information along with a booklet was given to each patient by one of the researchers. The aforementioned information and booklet contained knowledge about fatigue, anemia and behavioral interventions, such as energy control, relaxation therapy, physical exercise, sleep and nutrition. Training was repeated during the RT treatment.

Patients descriptive information form: This form was used to collect data for determining the sociodemographic characteristics of the patients (age, marital status, status of having children, family type, educational level, occupation, perceived income level, social security health insurance status) as well as other symptoms after RT (skin desquamation, itching, breast pain, breast edema).

Lee fatigue scale: Lee Fatigue Scale (LFS) was designed to be a simple and quick measurement of fatigue and energy levels for patients' in general medical population. The 18-item scale was adapted from visual analogue scale format to 0 to 10 Numeric Rating Scale so as to evaluate fatigue and energy. Fatigue severity score is estimated as the mean of the 13 items in the fatigue subscale (ranges from 0 to 10, higher scores representing increased fatigue). Other 5 items are averaged to yield an energy subscale score (ranges from 0 to 10, higher scores representing increased energy levels). Lee Fatigue Scale has established validity and internal consistency reliability coefficients ranging from 0.91 to 0.96. Fatigue related items were 1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 16, 17, and 18; while energy related items were 6, 7, 8, 9, and 10 [11]. Yurtsever and Beduk showed validity and reliability of the scale in Turkey [12]. Cronbach's alpha score was 0.74 for energy and 0.90 for fatigue [12].

Hospital anxiety and depression scale: The Hospital Anxiety and Depression Scale (HADS) is a commonly used tool to show psychological suffering in patients with cancer [13]. HADS gives noteworthy results as a psychological measurement instrument in studies with numerous features of disease and quality of life. Aydemir et al. showed validity and reliability of the scale in Turkey [14]. The 14-item questionnaire consists anxiety and depression subscales. Each question is answered on a four-point scale (max score is 21 for anxiety and depression). Scores of 11 or more on either subscale are considered to show psychological morbidity, 8-10 represents "borderline", and 0-7 "normal" [15].

Statistical analysis

Data were analyzed using the IBM Statistical Package for Social Sciences v21 (SPSS Inc., Chicago, IL, USA). Parametric tests were applied to data of normal distribution and non-parametric tests were applied to data of questionably normal distribution. The paired sample t test was used for comparing fatigue, anxiety and depression levels obtained before and after RT nursing interventions. Continuous data

Table 1. Demographic characteristics of the patients

Demographic Variable		n (%)
Marital status	Single	6 (11.8%)
	Married	45 (88.2%)
Climacteric	Pre-menopausal	8 (15.7%)
	Post-menopausal	43 (84.3%)
Have a children	Yes	45 (88.2%)
	No	6 (11.8%)
Family type	Elementary	32 (62.7%)
	Extended	19 (37.3%)
Educational level	Primary school	24 (50.0%)
	High school	8 (15.7%)
	University	19 (37.3%)
Occupation	Housewife	39 (76.5%)
	Retired	4 (7.8%)
	Worker	8 (15.7%)
Perceived income	High	12 (17.6%)
	Middle	31 (70.6%)
	Low	8 (11.8%)
Health insurance	Yes	51 (100%)
Family history of breast cancer	Yes	14 (33.3%)
	No	37 (66.7%)
Post-RT skin desquamation and itching	Yes	51 (100%)
	No	0
Post-RT breast pain with breast oedema	Yes	43 (84.3%)
	No	8 (15.7%)

were presented as mean ± standard deviation or median [minimum-maximum], as appropriate. All differences associated with a chance probability of 0.05 or less were considered statistically significant.

Results

A total of 51 patients met the eligibility criteria for the study. Of the 51 patients, the mean age was 53.03±9.53 (range, 36 to 70) years.

Demographic characteristics of the patients were shown in **Table 1**. Of the study group, 88.2% were married and had children, 84.3% were in the post-menopausal period, 62.7% had elementary family type, 50% were primary school graduates, 76.5% were housewives, and 33.3% had family history of breast cancer. Post-RT skin desquamation and itching were observed in all patients in the study group; while post-RT breast pain with breast edema were observed in 84.3% of the study group (**Table 1**).

Fatigue, energy, anxiety, and depression levels of patients before and after radiotherapy were shown in **Table 2**. Lee Fatigue Scale-fatigue subscale score significantly increased after RT (P=0.001); while energy subscale score significantly decreased after RT (P=0.001). Hospital Anxiety Scale score and Hospital Depression Scale score did not differ significantly before and after RT (P=0.630, and P=0.058, respectively).

Relationship between patients' anxiety-depression levels and fatigue-energy levels before and after radiotherapy did not reveal any significant difference (**Table 3**, **Figure 1**).

Discussion

This study evaluated fatigue, anxiety and depression before and after RT in breast cancer patients. Although an increase of fatigue, and a decrease of energy was observed after RT, no difference in anxiety and depression scores were observed in patients with breast cancer.

Patients with cancer often experience symptoms as a result of the disease and its treatment. Among various symptoms, fatigue, pain, anxiety, and depression are the most prevalent affecting patients with breast cancer [16, 17]. Patients with breast cancer usually perceive moderate to severe levels of fatigue [18] and its severity may be augmented during treatment [16]. Previous studies have shown that more than 50% of patients with breast cancer experience pain [19]. Anxiety and depression are described as a significant issue for such patients, with prevalence rates ranging from 33% [20] to 54% [21].

Cancer related fatigue is considered as a multidimensional symptom related to the activation of several immunomodulatory pathways due to genetic, psychological, and physiological factors [22]. Bower *et al*. examined fatigue in 1957 breast cancer survivors who had undergone

Table 2. Fatigue, energy, anxiety, and depression levels of patients before and after radiotherapy

	Before RT	After RT	t	*P* Value
Lee Fatigue Scale-*Fatigue Subscale*	2.09±0.25	5.35±0.28	67.92	0.001
Lee Fatigue Scale-*Energy Subscale*	8.97±0.5	5.22±0.32	40.97	0.001
Hospital Anxiety Scale	10.56±3.94	10.82±3.6	0.48	0.630
Hospital Depression Scale	5.49±4.13	6.19±3.5	1.94	0.058

RT = Radiotherapy.

Table 3. Relationship between patients' anxiety-depression levels and fatigue-energy levels before and after radiotherapy

Related	Relationship between fatigue and radiotherapy	
	r	*P* value
Anxiety before radiotherapy	0.28	> 0.05
Anxiety after radiotherapy	0.12	> 0.05
Depression before radiotherapy	0.36	> 0.05
Depression after radiotherapy	0.11	> 0.05

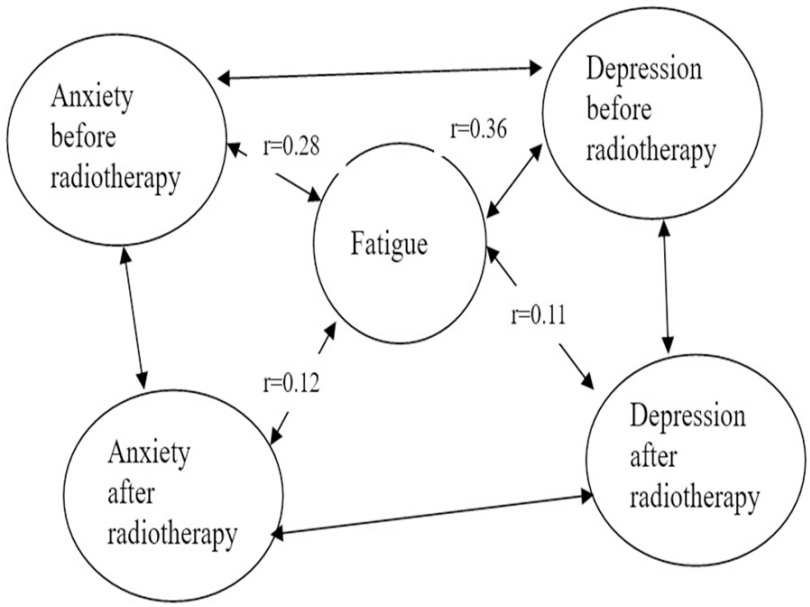

Figure 1. Correlation between patients' anxiety-depression levels and fatigue-energy levels before and after radiotherapy.

various types of treatment, including radiation therapy [18]. The authors did not find differences in the level of fatigue between patients and controls. However, about one-third of the breast cancer survivors reported more severe fatigue than the controls. In the present study, fatigue subscale score significantly increased after RT.

Some overlapping subjective symptoms of fatigue and depression may lead to incorrect fatigue diagnosis. Major depressive disorders or fatigue may share similar biological bases, as postulated elsewhere [23]. Thus, it is very important to distinguish fatigue from major depressive disorders. Depression is less prevalent than fatigue in cancer patients [22]. Whilst the presence of fatigue and psychological distress are largely attributable to events surrounding diagnosis and treatment [22], a number of studies have suggested that fatigue and depressed mood either exhibit divergent chronologies and trajectories [24] or have independent determinants [25]. A distinctive feature of fatigue symptomology is a generalized sensation of weakness, which is associated with an extra-ordinary amount of effort required to complete motor tasks [25]. Conversely, anhedonia is a common feature of depressive disorder but not fatigue. In the present study, both anxiety and depression scores of the patients did not change significantly before and after RT.

The main limitation of our study was relatively small size of our series. Secondly, our study findings may potentially have been influenced by confounding factors. The variables affecting patients' metabolic fatigue conditions such as the hemoglobin, creatinine, and thyroid results may not be documented, women's optimistic personal characteristics were not defined, and no scale was used to define cultural values and beliefs in terms of their continuing to housework despite fatigue. Finally, this was a single-institution study. Due

to these restrictions, associations should be interpreted with caution.

Although an increase of fatigue, and a decrease of energy was observed after RT, no difference in anxiety and depression scores were observed in patients with breast cancer. Because of the close relationship between a nurse and patient, nurses could play a distinctive role in assessing, confronting, and managing undesirable symptoms and associated problems experienced by patients. The results of the present study should enhance nurses' clinical sensitivity in identifying vulnerable group of patients. Because fatigue is the most prevalent symptom in patients with cancer, a quick screening for the symptoms should be incorporated into nursing assessment procedures.

Acknowledgements

The English in this document has been checked by at least two professional editors, both native speakers of English.

Disclosure of conflict of interest

None.

Address correspondence to: Dr. Gulay Oyur Celik, Division of Surgical Nursing, Department of Nursing, Izmir Katip Celebi University Faculty of Health Science, Balatcik Yerleskesi, Izmir 35640, Turkey. Tel: +902323250535; Fax: +902323293999; E-mail: gulayoyur@gmail.com

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