

## Acute Side effects and health care requirements in breast cancer patients treated with radiotherapy

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### ABSTRACT

**Objectives:** To identify the unmet needs of breast cancer patients undergoing radiotherapy

**Methods:** A pretest-posttest single-group experimental design, a variation of the experimental research approach, was employed in this investigation. The study's sample consisted of 28 breast cancer patients undergoing radiotherapy at the radiation oncology clinic of a training and research hospital between November 2021 and April 2022. The sample size was determined using G\*Power 3.1 software. Data were collected using an Information Form, Radiotherapy Acute Side Effects Follow-up Form, and the Supportive Care Needs Scale (SCNS-SF34).

**Results:** Participants reported experiencing side effects such as difficulty swallowing, sore throat, cough, weakness, loss of appetite, skin sensitivity, discomfort, pain, and skin reactions. These reactions moderately impacted their daily activities, psychological well-being, and unmet needs in terms of patient care and support.

**Conclusion:** Breast cancer patients undergoing radiotherapy may not express every side effect they experience to healthcare professionals. This study will contribute to the literature in terms of raising awareness by emphasizing the importance of addressing the comprehensive needs of breast cancer patients throughout their radiotherapy treatment journey.

**Keywords:** radiotherapy, breast cancer, health care needs

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Breast cancer stands as the most prevalent malignancy among women and ranks as the second leading cause of cancer-related fatalities, following lung cancer. According to the World Health Organization's 2020 report, breast cancer affected 2.3 million women, resulting in 685,000 fatalities.<sup>1-8</sup>

The management of breast cancer depends on its stage, involving surgical, radiotherapeutic, chemotherapeutic, and hormone therapy interventions, necessitating a multidisciplinary approach.<sup>7</sup>

Randomized trials and meta-analyses have demonstrated the efficacy of postoperative radiotherapy in augmenting disease-free survival and overall survival for both early and advanced breast cancer cases.<sup>2-9</sup>

Radiotherapy (RT) causes side effects such as erythema, desquamation, oedema, chest and arm pain, fatigue and skin irritation. These are known or expected side effects. Healthcare professionals can easily identify the patient's needs in relation to these side effects. However, patients may not communicate some of their side-effect needs to healthcare professionals, or healthcare professionals may not recognize these needs. These needs, expressed as unmet needs, have a significant impact on patients' quality of life.

This study aims to contribute to the literature by defining the unmet needs of breast cancer patients receiving radiotherapy due to potential acute side effects.

**Methods.** This study used a pretest-posttest single group experimental design, which is one of the experimental study methods. The study population consisted of all patients who received radiotherapy for breast cancer at the Radiation Oncology Clinic of the Department of Internal Medicine, Department of Radiation Oncology, Marmara University Faculty of Medicine, Istanbul, Turkey between November 2021 and April 2022. Taking into account that some patients may want to leave during the study, the sample size was set at 28 patients. Patients aged 18 years or older, diagnosed with breast cancer, receiving radiotherapy, without psychiatric illness, who agreed to participate in the study, and whose consent was obtained were included in the study. Approval for the study was obtained from the local ethics committee (2021/1136, 08.10.2021). Patients were informed on the study and their consent was obtained. The study was prepared in accordance with the principles of the Declaration of Helsinki. Permission to use the scale was obtained from the researchers. Informed consent was obtained from patients by explaining the purpose and method of the study. Patients under the age of 18 and over the age

of 75, who did not agree to participate in the study, who had a psychiatric disease, who were diagnosed with different types of cancer, who did not receive radiotherapy treatment, and who had brain metastases were not included in the study.

The breast education nurse completed the questionnaire form and the Supportive Care Needs Scale (SCNS-SF34) as a pre-test by interviewing the patients who agreed to participate in the study in a quiet environment in the outpatient clinic. The patients were then informed regarding the steps of the radiotherapy, the side effects of the treatment and the precautions to be taken. The patients were followed up for side effects at week 1, week 2, week 3, and week 4. At the end of the radiotherapy, the SCNS-SF34 was again administered as a post-test.

**Statistical analysis.** Mann Whitney U analysis was used for comparing paired groups, Kruskal Wallis Analysis was used for comparing more than one group, Mann Whitney U was used for relational inferences, Cronbach  $\alpha$  coefficient, kurtosis and skewness coefficients were used for internal validity. The IBM SPSS Statistics for Windows, version 17.25.0 (IBM Corp, Armonk, NY, USA) was used,  $p < 0.05$  was considered significant.

**Results.** Table 1 shows that all participants are women with 21 of them are married, 12 have a primary school education, 26 are unemployed, and 18 have a middle economic status. Ten of the participants had a disease other than cancer and 5 had diabetes. Twenty have been treated for 0-1 year, 18 lived at home with their spouse during treatment, 6 smoke and 2 of them have been smoking for 1-5 years. None of the participants consumed alcohol. A total of 21 participants were aware of the disease and its treatment and 25 were unaware of the side effects of the treatment. The diagnosis was invasive ductal carcinoma in 25 and all were treated as outpatients. Sixteen were in stage 2 and all had a hypofractionated radiotherapy protocol. Twenty-seven received no treatment other than radiotherapy. The mean age of the participants was  $55.39 \pm 13.03$  years, ranging from 35 to 78 years.

The distribution of adverse events experienced by the participants is shown in Table 2. Dysphagia was absent in week 1, 2 in week 2, 7 in week 3, and 7 in week 4. Sore throat was absent in week 1, 4 in week 2, 5 in week 3, and 5 in week 4. Cough was absent in week 1, 2 in week 2, 4 in week 3, and 3 in week 4.

Fatigue was absent in week 1, but present in 4 patients in week 2, 3 patients in week 3, and 3 patients in week 4. Anorexia was seen in 1 patient in week 1, 3

patients in week 2, and 4 patients in weeks 3 and 4. On the toxicity scale, all were grade 1 in week 1, 25 in week 2, 16 in week 3, and 14 in week 4.

When analyzing the presence of skin sensitivity, discomfort or pain at the treatment site, no symptoms were observed in 27 patients at week 1, 19 patients at week 2, 17 patients at week 3, and 15 patients at week 4. When analyzing the presence of itching at the treatment site, no patients had itching in week 1, 4 patients had itching in week 2 and 15 patients had itching in weeks 3 and 4. When the presence of stinging in the treatment area was analyzed, 25 patients had no stinging in week 1, 19 patients in week 2, 11 patients in week 3, and 14 patients in week 4 had less stinging.

When skin reaction and other symptoms affecting daily activities were analyzed, it was not affected in week 1, 14.3% had mild skin reaction and other symptoms in week 2, 17.9% in week 3, and 21.4% in week 4, while skin reaction and other symptoms moderately affected activities of daily living.

The distribution and comparison of participants' SCNS-SF34 scores are shown in Table 3. The difference between the pre- and post-test scores for the psychological needs sub-dimension was statistically significant ( $p = 0.004$ ,  $p < 0.05$ ). The mean score is higher in the post-test. The difference between pre-test and post-test scores for the Health System and Information Needs sub-dimension and the Physical and Daily Life Needs sub-dimension is not statistically significant ( $p = 0.088$ ,  $p > 0.05$ ,  $p = 0.285$ ,  $p > 0.05$ ). The difference between pre-test and post-test scores for the Patient Care and Support sub-dimension is statistically significant ( $p = 0.036$ ,  $p < 0.05$ ). The mean score is higher in the post-test. The difference between the pre-test and post-test scores for the sexuality and problems sub-dimension was not statistically significant ( $p = 0.300$ ,  $p > 0.05$ ). The difference between the pre- and post-test scores of the SCNS-SF34 is statistically significant ( $p = 0.002$ ,  $p < 0.05$ ). The mean score is higher in the post-test.

**Discussion.** The trial observed varying levels of radiotherapy-related side effects in patients who were followed for 4 weeks. While no side effects other than loss of appetite were observed during the first week of treatment, side effects began to appear in the following weeks, depending on the general condition of the patients. These side effects include difficulty swallowing, sore throat, cough, weakness and loss of appetite. The results of the trial support the literature.

One of the most important side effects of radiotherapy is skin reactions. The presence of skin sensitivity,

**Table 1** - Demographic characteristics of the participants.

Characteristics		n	%		
Gender	Woman	28	100		
Marital status	Married	21	75.0		
	Single	7	25.0		
Educational status	Illiterate	6	21.4		
	Primary school	12	42.9		
	Middle School	3	10.7		
	High school	3	10.7		
	University	4	14.3		
Working status	Yes	2	7.1		
	No	26	92.9		
Economical situation	Bad	5	17.9		
	Middle	18	64.3		
	Good	5	17.9		
Non-cancerous disease receiving continuous treatment	No	18	64.3		
	There is	10	35.7		
	Diabetes	5	50.0		
	Goiter	1	10.0		
	Pituitary failure	1	10.0		
	Heart disease	1	10.0		
	Stomach disease	1	10.0		
	Hypertension	1	10.0		
Treatment time	0-1year	20	71.4		
	1-5years	6	21.4		
	5-10years	1	3.6		
	more than 10 years	1	3.6		
Place of treatment process	Home alone	3	10.7		
	Pair at home	18	64.3		
	With children	6	21.4		
	Other	1	3.6		
Smoking	No	22	78.6		
	Yes	6	21.4		
	0-1 year	1	25.0		
	1-5 years	2	50.0		
	5-10 years	1	25.0		
Drinking Alcohol	No	28	100		
Information on disease and treatment	Yes	21	75.0		
	No	7	25.0		
Knowing the side effects of treatment	Yes	3	10.7		
	No	25	89.3		
Diagnosis	Invasive ductal carcinoma	21	75.0		
	Invasive lobular carcinoma	3	10.7		
	Invasive pleomorphic lobular carcinoma	1	3.6		
	Invasive solid papillary carcinoma	1	3.6		
	Tubular carcinoma	1	3.6		
	Matrix-produced Ionaplastic carcinoma	1	3.6		
Treatment Status	Ambulatory	28	100		
Stage of the disease	Stage 1	9	32.1		
	Stage 2	16	57.1		
	Stage 3	3	10.7		
Radiotherapy treatment protocol	Hypofractionated	28	100		
Application of additional treatment non-radiotherapy	No	27	96.4		
	Yes	1	3.6		
	Psychiatry	1	100		
Numeric variables	n	Min.	Max.	Average	SD.
Age	28	35.00	78.00	55.39	13.03

SD: standard deviation

**Table 2** - Distribution of side effects experienced by participants

Demographics	1st Week		2nd Week		3rd Week		4th Week	
	n	%	n	%	n	%	n	%
<i>Swallowing difficulty</i>								
There is	-	-	2	7.1	7	25.0	7	25.0
No	28	100	26	92.9	21	75.0	21	75.0
<i>Throat ache</i>								
There is	-	-	4	14.3	5	17.9	5	17.9
No	28	100	24	85.7	23	82.1	23	82.1
<i>Cough</i>								
There is	-	-	2	7.1	4	14.3	3	10.7
No	28	100	26	92.9	24	85.7	25	89.3
<i>Weakness</i>								
There is	-	-	4	14.3	3	10.7	3	10.7
No	28	100	24	85.7	25	89.3	25	89.3
<i>Anorexia</i>								
There is	1	3.6	3	10.7	4	14.3	4	14.3
No	27	96.4	25	89.3	24	85.7	24	85.7
<i>Toxicity (RTOG scale)</i>								
Grade 0	-	-	25	89.3	16	57.1	14	50.0
Grade 1	28	100	3	10.7	12	42.9	11	39.3
Grade 2	-	-	-	-	-	-	3	10.7
<i>Presence of tenderness, discomfort, or pain at the treatment site</i>								
No	27	96.4	19	67.9	6	21.4	6	21.4
Little	1	3.6	8	28.6	17	60.7	15	53.6
Middle	-	-	1	3.6	5	17.9	7	25.0
<i>Presence of itching in the treatment area</i>								
No	28	100	23	82.1	9	32.1	6	21.4
Little	-	-	4	14.3	15	53.6	15	53.6
Middle	-	-	1	3.6	4	14.3	7	25.0
<i>Presence of burning sensation in the treatment area</i>								
No	25	89.3	19	67.9	11	39.3	5	17.9
Little	3	10.7	7	25.0	11	39.3	14	50.0
Middle	-	-	2	7.1	6	21.4	8	28.6
No	-	-	-	-	-	-	1	3.6
Little	28	100.0	24	85.7	21	75.0	17	60.7
Middle	-	-	4	14.3	2	7.1	5	17.9
No	-	-	-	-	5	17.9	6	21.4

RTOG: Radiation Oncology/Toxicity grading

burning, itching and pain in the treatment area should be questioned during treatment. In addition, at the start of radiotherapy, the integrity of the skin should be diagnosed, the necessary treatment areas monitored, the patient/family educated on skin protection and trauma reduction, the area cleaned with warm water, patted dry with a dry, soft towel without rubbing, and the use of soap, deodorant, and perfume avoided if necessary. Patients should be informed about the use of fragrance-free soaps; avoidance of cosmetics such as deodorants, perfumes and powders on the skin; recommendation of loose cotton clothing that absorbs sweat and does not irritate; avoidance of tight clothing such as belts and

bras; and avoidance of hot applications such as hot thermophoresis and electric blankets.<sup>1-3,11,12</sup> The study found that the majority of patients were informed on the disease and treatment options, but were not aware of the side effects of these treatments. In addition, skin assessments showed that while the incidence of skin sensitivity, discomfort or pain was very low in the first few weeks, there were reactions in the following weeks that interfered with patients' daily activities. The results of the study are consistent with the literature.<sup>1-3,11,12</sup>

Effective communication is very important in managing side effects. Side effects caused by radiotherapy may go unnoticed because patients are unable to express

**Table 3** - distribution and comparison of participants' scores from the supportive care needs scale (SCNS-SF34).

Characteristics	n	Pre-test			Dn	Min	Final test			Materiality P-values
		Min	Max	Average			Max	Average	SD	
Psychological needs	28	24.00	100	68.71	28	32.00	100	82.07	18.42	$t=-3.140, p=0.004$
Health system and information needs	28	21.82	100	88.77	28	74.55	100	93.77	6.88	$Z=-1.706, p=0.088$
Physical and daily living needs	28	20.00	100	74.14	28	20.00	100	77.57	22.97	$t=-1.090, p=0.285$
Patient care and support needs	28	20.00	100	77.29	28	48.00	100	85.86	16.71	$t=-2.203, p=0.036$
Sexuality and problems	28	20.00	93.33	42.14	28	20.00	100	45.95	23.54	$t=-1.057, p=0.300$
Supportive maintenance requirements scale (SCNS-SF34)	28	23.53	97.65	74.92	28	56.47	95.88	82.56	11.25	$t=-3.434, p=0.002$

SD: standard deviation, Min: minimum, Max: maximum

themselves adequately. For this reason, a language free of medical terms should be used when making a treatment plan. A detailed assessment should be carried out to identify those side effects that patients are unable to express in a timely manner. Treatment and care should be continually reviewed and updated. In this way, improvements in symptoms or the development of new symptoms can be identified early.<sup>5-12</sup>

The study used the SCNS-SF34 to assess patients' unmet needs before and at the end of treatment. Comparing the results obtained, it was concluded that patients needed more support at the end of treatment. This finding supports the other results of the study. It was found that patients were unaware of the side effects that could occur at the start of treatment, that they realized that the side effects they experienced were caused by the treatment with the information given by the training nurse and doctor during treatment, and that they were better at expressing their needs to the healthcare professionals.

**Study limitations.** The study was carried out with 28 patients, and studies with larger sample sizes may help to provide more data on acute side effects and health care needs in breast cancer patients undergoing radiotherapy. In addition, the covid-19 pandemic during the study period made it difficult to collect data.

Although there are many studies on this subject in the literature, there is a need for new studies to be carried out in order to prevent possible complications in accordance with the current information, by identifying the care needs of patients for treatment and in accordance with their needs.

In conclusion, considering all the side effects mentioned in the studies, the patients receiving radiotherapy treatment should be followed closely in terms of possible symptoms before, during, and after the treatment, and it should be ensured that the side effects

are controlled at an early stage. It is of great importance that the nurses working in the clinic know and try to prevent possible side effects in the best way, providing appropriate care for side effects, implementing the planned treatment, maintaining daily life activities, and involving the patient and caregivers in the process and providing training.

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