# Quality of Life and Symptom Experience of Breast Cancer Patients Undergoing Chemotherapy

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The purpose of this study was to examine the effect of educational interventions on breast cancer patients during chemotherapy, with a secondary aim of focusing on describing symptoms in patients during chemotherapy and their effects on the quality of life of patients with breast cancer undergoing chemotherapy. The study was quasi-experimental. A sample of 120 patients participated, of which 60 were in the experimental group and 60 were in the control group. Pre/posttest quality-of-life subgroups were compared in terms of their mean scores. In the posttest in the experimental group, mean scores of the Family subscale, Health and Functioning subscale, Psychological/Spiritual subscale, and Social and Economic subscale correlated negatively and the difference was statistically significant ($P < .05$). **KEY WORDS:** *breast cancer, education, quality of life, symptom control*
*Holist Nurs Pract* 2016;30(4):193–200

Breast cancer is one of the leading causes of death worldwide, including Turkey.[1] Patients with breast cancer often experience multiple symptoms related to both the disease itself and its treatment, and these symptoms can independently predict changes in patient function, treatment efficacy, and posttherapeutic outcomes.[2,3] Most patients with breast cancer receive diagnosis at more advanced stages of the disease, typically experiencing a large symptom burden.[4] Compared with other types of cancer, the distress associated with breast cancer symptoms has been reported to be the most intense,[3,4] and symptoms are often a major detriment to the patients' quality of life (QOL).[5] The symptoms of breast cancer can have profound secondary effects on the patients' emotional, social, physical, and spiritual well-being,[6-8] and different adjuvant treatments can have different effects on patients' psychological health and QOL.[6]

The assessment of symptoms during chemotherapy is important for tracking the patients' QOL, determining problematic areas, developing standards of care, and planning, implementing, and improving nursing activities.[9-11] The assessment of symptoms is also important for the calculation of care-related costs and determination of drug dosages to be used for symptom control.[12] Many studies have emphasized that nurses, in addition to systematically assessing the side effects of patients undergoing cancer chemotherapy, play an important role in supporting patients and providing education for the control of side effects. To provide the efficiency and continuation of treatment in patients who decide to start chemotherapy, nurses should inform patients about potential symptoms caused by the treatment and the interventions available for the management of these secondary symptoms.[7,11-14]

The adverse effects of different cancer- or treatment-related symptoms and types of treatment have been associated with QOL.[7,11,15] Patients with breast cancer experience various distressing symptoms, many of which begin prior to diagnosis and continue throughout the course of treatment, adversely affecting the function and QOL.[15] Information about QOL in patients with breast cancer currently undergoing chemotherapy can provide health care providers with a perspective of posttreatment recovery, including the positive aspects of long-term care, as well as potential problems.[16] To help patients effectively manage the disease- and

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The authors have disclosed that they have no significant relationships with, or financial interest in, any commercial companies pertaining to this article.

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DOI: 10.1097/HNP.0000000000000157

treatment-related symptoms and to receive the most optimal therapeutic outcome, it is vital for health care providers to carefully assess the symptoms that patients experience and their levels of distress, as well as the effects of these symptoms on key patient outcomes such as QOL and health status.[17]

The aim of the present study was to assess the benefits of educational interventions of patients with breast cancer undergoing chemotherapy. The secondary aim of the study was to describe the symptoms that present during chemotherapy and to assess their effects on patients' QOL.

## METHODS

### Study participants

This study was carried out with patients undergoing chemotherapy as either outpatients or inpatients at the Government Hospital. Eligibility criteria included Turkish women who (1) were 18 years or older, (2) had undergone surgery for breast cancer, (3) were midway in their course of treatment by chemotherapy, and (4) were diagnosed with stage I-III breast cancer. Those who (1) had difficulty understanding the questionnaire or communicating in Turkish, (2) had a history of psychiatric disorder, or (3) had metastatic brain disease were excluded from the study. The sample group of the study was selected using a nonprobability consecutive method. The study was completed with 133 patients, since 13 refused to participate in the study. Of the 120 patients, 60 experimental subjects and 60 control subjects were enrolled. The experimental group matched (according to income, education level, marital status, age) with the control group.

### Data collection tools

#### *Patient Demographic Questionnaire (PDQ)*

The PDQ is a form that determines the sociodemographic characteristics of patients. Including information such as age, gender, education level, and marital status, this form was prepared by the researcher as a result of literature review.[9-13]

#### *Chemotherapy Symptom Assessment Scale*

The validity and reliability analysis of the study, which was developed by Brown et al,[18] was performed by Aslan and Vural.[19] The Chemotherapy Symptom Assessment Scale (C-SAS) includes 24 chemotherapy symptoms observed in cancer patients receiving chemotherapy. The first part of the scale includes the frequency of symptoms, the second part includes severity, and third part includes the degree of discomfort. The frequency of symptoms is given in "yes/no" format, symptom severity is scored on a 3-point Likert-type scale (mild: 1; moderate: 2; severe: 3), and the degree of discomfort is scored on a 4-point Likert-type scale (none: 0; mild: 1; quite a lot: 2; excessive: 3). Each symptom is assessed individually. High scores indicate elevated symptom severity and degree of discomfort. The C-SAS shows acceptable levels of validity and reliability (Cronbach $\alpha = 0.75$), as well as responsiveness to clinical change. The Cronbach $\alpha$ as a measure of reliability for our sample at baseline was 0.91.

#### *Quality-of-Life Index–Cancer Version*

The Quality-of-Life Index was developed by Ferrans and Powers[20] to measure QOL in terms of satisfaction with life, and its validity and reliability in the Turkish version have been studied by Can et al.[21] The QOL measures both the satisfaction and importance of various aspects of life. Importance ratings are used to measure satisfaction responses so that scores reflect the respondents' satisfaction with the aspects of life that they value. Items that are rated as more important have a greater impact on scores than those rated as being of lesser importance. The instrument consists of 2 parts: the first measures satisfaction with various aspects of life, and the second measures the importance of those same aspects. Scores are calculated to gauge overall QOL in 4 domains: Health and Functioning, Psychological/Spiritual, Social and Economic, and Family. The total score of the scale ranges from 0 to 30, with a lower score indicating that QOL is affected more negatively.[20] The QOL (total scale) Cronbach $\alpha$s range from 0.84 to 0.98; from 0.70 to 0.93 for the Health and Functioning subscale; from 0.71 to 0.92 for the Social and Economic subscale; and from 0.80 to 0.93 for the Psychological/Spiritual subscale. For the Family subscale, $\alpha$s ranged from 0.63 to 0.92.

### Ethical considerations

The required institutional approval, approval of the institutional ethical committee, and written informed consent of the patients were obtained.

### Procedure

Patients were informed about the study, and their written and oral consent to participate was obtained. A

control group of patients was included in the first stage of the study. The control group included 60 patient volunteers who were undergoing chemotherapy for the first time. Participants were asked to fill out the Patient Demographic Questionnaire which assessed their sociodemographic, clinical, and treatment features prior to the first chemotherapy session and the Chemotherapy Symptom Assessment Scale and Quality of life Index Cancer Version Scale after their third round of Chemotherapy Symptom Assessment and Quality of life Index Cancer Version Scale. The researcher conducted both assessment sessions face to face in a suitable room.

After completing assessments of the control group, 60 patients were recruited for the experimental group. These participants were volunteers receiving chemotherapy for the first time. First, a meeting was arranged with the authorized personnel in the clinic. The room used for education sessions was silent, comfortable, and away from external stimuli. Prior to the education sessions, researchers met with the patients for the following: to determine each patient's educational needs, review medical and nursing records, and collect patient data. Participants completed the PDQ prior to the education sessions. The educational intervention sessions were conducted as follows: Considering the chemotherapy plan organized by the patient's oncologist, the first session of each personalized educational session was conducted prior to the first chemotherapy cycle. Considering the possible side effects of the chemotherapy, during the first educational session, patients were given information on topics including symptoms, underlying causes, prevention, and control. This first education session lasted for 50 to 55 minutes. Patients were encouraged to ask questions during the session, and their questions were answered. A booklet about these educational topics was provided at the end of the session. The second educational session was held for patients prior to their second chemotherapy cycle, which is generally performed within 35 to 45 days after the first session. The topics covered during the first session were discussed again. This session lasted for 30 to 45 minutes, and emphasis was placed on each patient's symptoms and their control. The third and final educational session was held for patients and their relatives prior to the third chemotherapy cycle. The topics covered within the first and second education sessions were discussed again according to the needs of each patient. Once again, emphasis was given to each patient's symptoms and their control. Any questions from the patients were answered. The C-SAS was completed 10 days following the third chemotherapy session.

The oncologist and other team members decided on each patient's particular chemotherapy protocol by considering various factors, including cancer type, stage, overall condition of the patient, and biochemical parameters. In addition, because the duration of each chemotherapy cycle and posttreatment recovery varies among patients, the time period between any 2 given chemotherapy rounds was not constant. During this period, the researcher and the patient, along with input from the oncologist and other team members, decided on the date of the educational session together while keeping in mind the date of the upcoming chemotherapy. In addition to the support provided by the education booklet provided after the first education session, the researcher informed the patients that they could contact the researcher via personal telephone. Because of ethical requirements, following the educational sessions provided to the experimental group, a personalized educational session was also held for each control participant.

### *Educational booklet*

The content of the educational sessions and the educational information booklet was prepared on the

**TABLE 1.** Experimental and Control Groups' Characteristics in Terms of Control Variables

| Characteristics | Experimental Group, n (%) | Control Group, n (%) |
|---|---|---|
| Income | | |
| Low | 24 (40.0) | 26 (43.3) |
| Medium | 22 (36.6) | 24 (36.6) |
| High | 14 (23.4) | 10 (20.1) |
| Total | 60 (100) | 60 (100) |
| Test and *P* | $\chi^2 = 0.685$; SD = 2; $P > .05$ | |
| Education | | |
| Literate | 38 (63.3) | 41 (68.3) |
| Primary school | 16 (26.6) | 12 (20.0) |
| High school | 6 (10.1) | 7 (11.7) |
| Total | 60 (100) | 60 (100) |
| Test and *P* | $\chi^2 = 0.452$; SD = 2; $P > .05$ | |
| Marital status | | |
| Married | 52 (86.6) | 49 (81.6) |
| Unmarried | 8 (13.4) | 11 (18.4) |
| Total | 60 (100) | 60 (100) |
| Test and *P* | $\chi^2 = 0.530$; SD = 1; $P > .05$ | |
| Age | | |
| $X \pm$ SD | 48.51 ± 9.20 | 47.20 ± 8.36 |
| Test and *P* | $t = 1.254$; $P > .05$ | |

basis of relevant literature, standard clinical practices, and clinicians' expert opinions. The information booklet covered topics such as chemotherapy and both the pharmacologic and nonpharmacologic interventions that can be considered to protect from and reduce the side effects of chemotherapy. The booklet also contained information on diarrhea, constipation, differences in taste, problems of the mouth, gums, and throat, loss of appetite and changes in diet, infection, susceptibility to bleeding, anemia, changes in skin and nails, hair loss, changes in the muscular and nervous systems, pain, changes in the urinary tract, sexual problems, emotional changes, fatigue, sleep problems, difficulty breathing, and eye-related symptoms. Each patient was given the booklet after the first training session. Pharmacologic and nonpharmacologic information regarding the control of these symptoms was provided during the educational sessions, in addition to the educational booklet.

### Statistical analysis

Data were analyzed using SPSS (Statistical Package for Social Sciences, Chicago, Illinois), version 12.0. Statistical significance was defined as $P < \cdot 05$. The $\chi^2$ test or Fisher exact test was used to determine differences in demographical features between the groups. The frequency of symptoms was analyzed by the paired *t* test to determine differences, if any, in the pre- and posttest results for each group. For the severity and degree of discomfort from symptoms for comparing the intervention group with the control group according to the posttest results, the Mann-Whitney *U* test was applied. Comparison of Quality-of-Life Index subgroups' mean scores between the experimental and control groups was analyzed by the paired *t* test to determine differences in the pre- and posttest results for each group.

## RESULTS

The experimental and control groups were examined in terms of control variables. Both groups were similar in terms of control variables. There was no significant difference between the experimental and control groups in terms of age, education, and marital status (Table 1).

Table 2 compares the experimental and control groups in terms of pre/posttest symptom frequency. It

**TABLE 2.** Frequency of Symptoms in the Experimental and Control Group Patients

| | Frequency of Symptoms | | | | |
|---|---|---|---|---|---|
| | Control Group (n = 60) | | Experimental Group (n = 60) | | |
| Symptoms | Pretest, n (%) | Posttest, n (%) | Pretest, n (%) | Posttest, n (%) | *P* |
| Nausea and vomiting before treatment | 5 (4.4) | 5 (4.4) | 12 (12.8) | 4.4 | >.05 |
| Nausea | 45 (75.0) | 47 (78.3) | 38 (63.3) | 42 (70.0) | >.05 |
| Vomiting | 52 (86.6) | 50 (83.3) | 55 (91.6) | 57 (95.0) | >.05 |
| Constipation | 25 (41.6) | 55 (91.6) | 36 (60.0) | 38 (63.3) | >.05 |
| Diarrhea | 36 (60.0) | 37 (61.6) | 30 (50.0) | 41 (68.3) | >.05 |
| Pain (patient specifies where) | 41 (68.3) | 56 (93.3) | 53 (88.3) | 56 (93.3) | >.05 |
| Shortness of breath | 46 (76.6) | 55 (91.6) | 54 (90.0) | 56 (93.3) | >.05 |
| Signs of infection | 43 (71.6) | 50 (83.3) | 42 (70.0) | 52 (86.6) | >.05 |
| Bleeding or bruising | 30 (50.0) | 36 (60.0) | 37 (61.6) | 48 (80.0) | >.05 |
| Pins and needles/numbness of hands and feet | 43 (71.6) | 46 (76.6) | 39 (65.5) | 52 (86.6) | >.05 |
| Problems with the skin and nails | 55 (91.6) | 58 (96.6) | 33 (55.0) | 46 (76.6) | >.05 |
| Hair loss | 36 (60.0) | 41 (68.3) | 47 (78.3) | 53 (88.3) | >.05 |
| A sore/sensitive mouth or throat | 55 (91.6) | 57 (95.0) | 33 (55.5) | 39 (65.5) | >.05 |
| A change in appetite | 39 (65.0) | 41 (68.3) | 41 (68.3) | 56 (93.3) | >.05 |
| Weight gain or loss | 47 (78.3) | 56 (93.3) | 38 (63.3) | 47 (78.3) | >.05 |
| Sore/scratchy/dry eyes | 34 (56.6) | 39 (65.5) | 28 (46.6) | 30 (50.0) | >.05 |
| Feeling weak | 28 (46.6) | 33 (55.0) | 47 (78.3) | 55 (91.6) | >.05 |
| Feeling unusual fatigue | 22 (36.6) | 38 (63.3) | 57 (95.0) | 21 (35.0) | <.001 |
| Difficulty sleeping | 41 (68.3) | 55 (91.6) | 47 (78.3) | 14 (23.3) | <.001 |
| Headaches | 33 (55.0) | 34 (56.6) | 27 (88.5) | 29 (92.2) | >.05 |
| Feeling distressed/anxious | 43 (71.6) | 52 (86.6) | 55 (91.6) | 18 (30.0) | <.001 |
| Feeling pessimistic/unhappy | 34 (56.6) | 39 (65.5) | 49 (81.6) | 10 (16.6) | <.001 |
| Change in sexual life | 32 (53.3) | 33 (55.5) | 38 (63.3) | 41 (68.3) | >.05 |
| Irregular periods (female patients) | 20 (33.3) | 26 (43.3) | 33 (55.5) | 39 (65.5) | >.05 |

was determined that the symptoms of distress/anxiety, feeling pessimistic/unhappy, feeling unusual tired, and difficulty sleeping were significantly less common in the posttest experimental group.

Table 3 compares the experimental and control groups in terms of pre/posttest symptom severity. It was determined that the symptoms of distress/anxiety, feeling pessimistic/unhappy, feeling unusual tired, and difficulty sleeping were significantly less common in the posttest experimental group.

Degrees of discomfort from symptoms of the experimental and control groups in terms of pre/posttest distress/anxiety, feeling pessimistic/unhappy, and difficulty sleeping were significantly lower in the posttest experimental group than in the posttest control group (Table 4).

Table 5 compares within-group pre/posttest QOL of subgroups in terms of their mean scores. In the posttest in the experimental group, mean scores of the Family subscale, Health and Functioning subscale, Psychological/Spiritual subscale, and Social and Economic subscale correlated negatively and the difference was statistically significant ($P < .05$). In the control group, on the contrary, the difference between mean scores in all subscales was insignificant ($P > .05$).

## DISCUSSION

This study evaluated the QOL and symptom experience of an educational intervention for breast cancer survivors in the first year of undergoing chemotherapy. The QOL scores improved for the women in the intervention group. Compared with the control group, survivors in the intervention group who received the intervention program experienced higher overall QOL. Our findings confirm the results of earlier studies that education has beneficial effects on psychological distress and QOL of patients with breast cancer.[2,22,23] The QOL decline in the control group from the posttest to the follow-up test is consistent with the view that patients with breast cancer face different sources of stress, treatment sequelae, social disruption, and uncertainty about their disease, which can disrupt QOL, although many physical concerns related to illness and treatment have been resolved.[24-26] Many studies have stressed that QOL may be

**TABLE 3.** Severity of Symptoms in the Experimental and Control Group Patients

| | Severity of Symptoms | | | | |
|---|---|---|---|---|---|
| | Control Group | | Experimental Group | | |
| Symptoms | Pretest, $X \pm SD$ | Posttest, $X \pm SD$ | Pretest, $X \pm SD$ | Posttest, $X \pm SD$ | *P* |
| Nausea and vomiting before treatment | 1.77 ± 0.25 | 1.54 ± 0.65 | 1.65 ± 0.22 | 1.74 ± 0.42 | >.05 |
| Nausea | 2.45 ± 0.38 | 2.66 ± 0.45 | 2.30 ± 0.15 | 2.38 ± 0.66 | >.05 |
| Vomiting | 2.63 ± 0.32 | 2.93 ± 0.31 | 2.52 ± 0.28 | 2.63 ± 0.34 | >.05 |
| Constipation | 2.08 ± 0.23 | 2.66 ± 0.42 | 2.41 ± 0.21 | 2.53 ± 0.12 | >.05 |
| Diarrhea | 1.17 ± 0.19 | 1.39 ± 0.54 | 1.28 ± 0.17 | 1.40 ± 0.29 | >.05 |
| Pain (patient specifies where) | 2.88 ± 0.51 | 2.93 ± 0.77 | 2.70 ± 0.32 | 2.88 ± 0.20 | >.05 |
| Shortness of breath | 1.52 ± 0.27 | 1.59 ± 0.30 | 1.47 ± 0.51 | 1.55 ± 0.36 | >.05 |
| Signs of infection | 1.20 ± 0.49 | 1.96 ± 0.46 | 1.09 ± 0.20 | 1.18 ± 0.19 | >.05 |
| Bleeding or bruising | 1.74 ± 0.39 | 1.98 ± 0.37 | 1.28 ± 0.43 | 1.92 ± 0.24 | >.05 |
| Pins and needles/numbness of hands and feet | 1.47 ± 0.66 | 2.10 ± 0.69 | 2.21 ± 0.33 | 2.35 ± 0.78 | >.05 |
| Problems with the skin and nails | 1.74 ± 0.56 | 1.93 ± 0.51 | 1.41 ± 0.29 | 1.72 ± 0.22 | >.05 |
| Hair loss | 2.66 ± 0.38 | 2.81 ± 0.47 | 1.49 ± 0.69 | 1.70 ± 0.88 | >.05 |
| A sore/sensitive mouth or throat | 2.56 ± 0.23 | 2.76 ± 0.33 | 1.98 ± 0.29 | 2.45 ± 0.67 | >.05 |
| A change in appetite | 1.20 ± 0.74 | 1.34 ± 0.31 | 1.63 ± 0.17 | 1.82 ± 0.36 | >.05 |
| Weight gain or loss | 1.23 ± 0.63 | 1.44 ± 0.37 | 1.18 ± 0.28 | 1.21 ± 0.13 | >.05 |
| Sore/scratchy/dry eyes | 1.50 ± 0.32 | 1.68 ± 0.41 | 1.83 ± 0.33 | 1.94 ± 0.19 | >.05 |
| Feeling weak | 2.30 ± 0.20 | 2.53 ± 0.25 | 2.08 ± 0.35 | 2.30 ± 0.58 | >0.05 |
| Feeling unusual fatigue | 2.71 ± 0.40 | 2.79 ± 0.51 | 2.91 ± 0.52 | 1.00 ± 0.74 | <.001 |
| Difficulty sleeping | 2.89 ± 0.24 | 2.96 ± 0.66 | 1.58 ± 0.47 | 1.63 ± 0.52 | <.001 |
| Headaches | 1.44 ± 0.48 | 1.78 ± 0.32 | 1.20 ± 0.50 | 1.33 ± 0.18 | >.05 |
| Feeling distressed/anxious | 2.81 ± 0.43 | 2.93 ± 0.20 | 2.89 ± 0.36 | 1.10 ± 0.42 | <.001 |
| Feeling pessimistic/unhappy | 2.79 ± 0.23 | 2.96 ± 0.30 | 2.90 ± 0.62 | 1.19 ± 0.17 | <.001 |
| Change in sexual life | 1.74 ± 0.63 | 1.80 ± 0.96 | 1.66 ± 0.33 | 1.84 ± 0.40 | >.05 |
| Irregular periods (female patients) | 1.66 ± 0.18 | 1.81 ± 0.30 | 1.62 ± 0.44 | 1.70 ± 0.42 | >.05 |

**TABLE 4.** Degree of Discomfort From Symptoms in the Experimental and Control Group Patients

| | Degree of Discomfort From Symptoms | | | | |
|---|---|---|---|---|---|
| | Control Group | | Experimental Group | | |
| Symptoms | Pretest, $X \pm SD$ | Posttest, $X \pm SD$ | Pretest, $X \pm SD$ | Posttest, $X \pm SD$ | *P* |
| Nausea and vomiting before treatment | 1.39 ± 0.14 | 1.56 ± 0.25 | 1.85 ± 0.20 | 2.04 ± 0.17 | >.05 |
| Nausea | 1.23 ± 0.10 | 1.47 ± 0.09 | 1.28 ± 0.30 | 1.45 ± 0.54 | >.05 |
| Vomiting | 1.55 ± 0.29 | 1.64 ± 0.13 | 1.98 ± 0.41 | 2.20 ± 0.61 | >.05 |
| Constipation | 1.23 ± 0.52 | 1.38 ± 0.57 | 1.18 ± 0.12 | 1.29 ± 0.22 | >.05 |
| Diarrhea | 1.51 ± 0.40 | 1.64 ± 0.31 | 1.74 ± 0.21 | 1.80 ± 0.69 | >.05 |
| Pain (patient specifies where) | 2.88 ± 0.29 | 2.92 ± 0.33 | 2.17 ± 0.33 | 2.36 ± 0.19 | >.05 |
| Shortness of breath | 2.54 ± 0.12 | 2.66 ± 0.35 | 1.99 ± 0.47 | 2.223 ± 0.38 | >.05 |
| Signs of infection | 1.66 ± 0.88 | 1.78 ± 0.54 | 1.35 ± 0.32 | 1.54 ± 0.47 | >.05 |
| Bleeding or bruising | 1.77 ± 0.64 | 2.07 ± 0.68 | 1.29 ± 0.13 | 1.63 ± 0.45 | >.05 |
| Pins and needles/numbness of hands and feet | 1.28 ± 0.64 | 1.60 ± 0.19 | 1.42 ± 0.24 | 1.66 ± 0.11 | >.05 |
| Problems with the skin and nails | 1.66 ± 0.52 | 1.79 ± 0.66 | 1.20 ± 0.37 | 1.56 ± 0.52 | >.05 |
| Hair loss | 1.86 ± 0.91 | 1.90 ± 0.23 | 1.69 ± 0.14 | 1.77 ± 0.36 | >.05 |
| A sore/sensitive mouth or throat | 1.22 ± 0.17 | 1.63 ± 0.33 | 1.87 ± 0.58 | 2.10 ± 0.63 | >.05 |
| A change in appetite | 1.39 ± 0.26 | 2.66 ± 0.20 | 1.78 ± 0.56 | 1.81 ± 0.30 | >.05 |
| Weight gain or loss | 1.88 ± 0.23 | 1.92 ± 0.38 | 1.66 ± 0.21 | 1.74 ± 0.32 | >.05 |
| Sore/scratchy/dry eyes | 1.32 ± 0.52 | 1.55 ± 0.71 | 1.77 ± 0.45 | 1.85 ± 0.29 | >.05 |
| Feeling weak | 2.55 ± 0.24 | 2.78 ± 0.53 | 2.00 ± 0.21 | 2.10 ± 0.24 | >.05 |
| Feeling unusual fatigue | 2.33 ± 0.48 | 2.57 ± 0.45 | 2.01 ± 0.63 | 1.04 ± 0.75 | <.001 |
| Difficulty sleeping | 2.58 ± 0.52 | 2.60 ± 0.39 | 2.68 ± 0.22 | 1.16 ± 0.34 | <.001 |
| Headaches | 1.24 ± 0.16 | 1.33 ± 0.75 | 1.28 ± 0.40 | 1.74 ± 0.47 | >.05 |
| Feeling distressed/anxious | 1.66 ± 0.12 | 1.73 ± 0.30 | 2.88 ± 0.35 | 1.17 ± 0.29 | <.001 |
| Feeling pessimistic/unhappy | 1.56 ±0.10 | 2.10 ± 0.25 | 2.79 ± 0.20 | 1.22 ± 0.31 | <.001 |
| Change in sexual life | 1.66 ± 0.63 | 1.71 ± 0.48 | 1.30 ± 0.46 | 1.24 ± 0.98 | >.05 |
| Irregular periods (female patients) | 1.96 ± 0.54 | 2.00 ± 0.66 | 1.50 ± 0.50 | 1.22 ± 0.72 | >.05 |

improved and adherence to the disease and treatment processes may be increased by education.[22,23-26] This study also demonstrated that the education on symptom control given to patients with breast cancer undergoing chemotherapy increases QOL.

In our study, chemotherapy patients given education had a decrease in the frequency, severity, and degrees of discomfort from psychological symptoms such as distress/anxiety, feeling pessimistic/unhappy, and difficulty sleeping. This educational program had a positive effect on the psychological symptom experience of patients with breast cancer. The intervention program effect on symptom experience was maintained over time in the intervention group. In contrast, the control group reported a significant increase in symptom distress. Previous studies reported that both physical and psychological symptoms can occur in the short term but have also been described as persisting over the years after completion of treatment and have the potential to diminish QOL and adaptation in cancer survivors.[27-29] The findings of this study confirm that breast cancer survivors continue to experience a variety of physical symptoms.

**TABLE 5.** Comparison of Quality-of-Life Index Subgroups' Mean Scores Between the Experimental and Control Groups

| | Experimental Group | | | | Control Group | | | |
|---|---|---|---|---|---|---|---|---|
| Quality-of-Life Index Subgroups | Pretest, $X \pm SD$ | Posttest, $X \pm SD$ | *t* | *P* | Pretest, $X \pm SD$ | Posttest $X \pm SD$ | *t* | *P* |
| Family subscale | 11.29 ± 4.18 | 24.45 ± 4.08 | 4.10 | **<.05** | 11.32 ± 4.38 | 12.05 ± 4.24 | 0.63 | >.05 |
| Psychological/Spiritual subscale | 11.66 ± 4.21 | 22.65 ± 4.36 | 5.01 | **<.05** | 11.22 ± 4.20 | 11.40 ± 4.28 | 0.76 | >.05 |
| Social and Economic subscale | 14.29 ± 4.35 | 25.45 ± 3.18 | 4.05 | **<.05** | 10.18 ± 3.63 | 10.45 ± 3.57 | 0.81 | >.05 |
| Health/Functioning subscale | 10.33 ± 4.56 | 20.33 ± 3.44 | 4.38 | **<.05** | 10.41 ± 4.25 | 11.18 ± 4.32 | 0.87 | >.05 |

King et al[25] and Schott et al[30] reported that informing patients of their status decreases fear and anxiety and diminishes some of the side effects of cancer therapy. Similarly, Şahin and Ergüney[31] detected a lesser degree of psychological symptoms such as anxiety, fatigue, and sleep disorder as a result of education. Our findings indicating a decrease in posttreatment psychological symptoms is in agreement with the findings of the study by Mollaoğlu and Erdoğan[32] on patients undergoing cancer chemotherapy demonstrating that psychological symptoms can be controlled by education.

Although many factors such as culture, personality, and socioeconomic status are known to affect symptom perception, the beneficial effect of education on symptoms is an anticipated result.[33-35] Although there have been few interventions aimed at women's adjustment after treatment, there is compelling evidence for future research to develop, implement, and test information and support interventions to improve survivor outcomes.[29,36-38] The findings of this study clearly highlight the need to provide comprehensive educational programs to help prepare women for the transition from breast cancer therapy. Future research is needed to develop and implement information and support interventions to improve survivors' QOL and symptom management.

### Limitations of the study

The information gained from this study should increase awareness among breast cancer care professionals about a range of experienced symptoms and may help them target patients in breast cancer groups for particular care interventions. The long-term aim is to use the data from this research to produce a standardized profile of symptoms. This would enable nurses to focus their approach to the patients according to their predicted symptoms. Assessments should evaluate the frequency and severity of symptoms, as well as whether cancer survivors attribute their symptoms to cancer or to other conditions. Understanding the unique contributions of chronic health problems to the symptom experiences of cancer survivors is important. The information will guide the development of interventions to manage symptoms.

In our study, the small number of participants who satisfied these eligibility conditions created an important limitation to the study. The results of our study cannot be generalized beyond this study group because the population of our study was restricted to patients with breast cancer who applied to the ambulatory chemotherapy unit at the Government Hospital. More comprehensive studies including different cancer types should be undertaken.

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