World Cancer Research Journal WCRJ 2020; 7: e1578

EFFECT OF INDIVIDUAL TRAINING ON THE QUALITY OF LIFE AND THE REDUCTION OF CHEMOTHERAPY SYMPTOMS HEMATOLOGIC CANCER PATIENTS

Z. OLÇAR[1], G. KARADAĞ [2]

[1]Hematology and Oncology Clinic, Mustafa Kemal University, Turkey, İzmir
[2]Nursing Faculty, Dokuz Eylul University, Turkey, İzmir

Abstract – *Objective:* *Chemotherapy results in side-effects that adversely affect patients' quality of life. Nurses can reduce the side effects of chemotherapy and improve the quality of life by training patients. The study was conducted to determine the effect of individual training on patients with hematologic cancer on the quality of life and reduction of chemotherapy symptoms.*

Patients and Methods: *The study which was designed as a randomized controlled trial in pretest-posttest pattern. The study includes 60 patients (30 patients each in intervention and control group). Data was collected with a questionnaire, EORTC QLQ C-30 Scale and Rotterdam Symptom Checklist. The intervention group was given individual training on side effects of chemotherapy.*

Results: *It was determined that the QOL levels of intervention group were higher than the control group. Chemotherapy symptoms, and Rotterdam symptoms were found to be higher in the patients of the intervention group.*

Conclusions: *The individual training gave positive results to the QOL and reduced side effects of chemotherapy. Nurses can improve patients' QOL and reduce the side effects of chemotherapy by training.*

KEYWORDS: *Chemotherapy, Side effect, Quality of life, Rotterdam symptom Checklist, Individual training.*

INTRODUCTION

Cancer is the second leading cause of death worldwide behind cardiovascular disease and a major public health problem in developed and developing countries[1,2]. More than million of new cases and 7.6 million cancer deaths occurred worldwide in 2007[3].

By 2030, it is predicted that there will be 26 million new cancer cases and 17 million cancer deaths per year[3]. The incidence of cancer increases by an average of 1-2% per year in almost every country. Hematologic cancers, which are one of the cancer types, constitute approximately 9.5% of all new cancer diagnoses[4]. Hematological cancers include various diseases such as Hodgkin's lymphoma, non-Hodgkin's lymphoma, leukemia and multiple myelom[5]. In our country, 140 thousand people die from cancer and 150 thousand people are diagnosed with new cancer every year. It is estimated that this ratio will increase to 500 thousand in the next 20 years. It is estimated that the number of cancer patients expected in 2022 will reach 18 million and by 2030 it will reach 22 million[6].

Chemotherapy, which entails the use of chemical substances alone or in combination with the aim of treating the malignant neoplasm, is one of the major therapeutic approaches for hematologic cancers, which enables prolonged life span and reduced cancer progression[7,8]. Chemotherapy, that is associated with significant negative side-effects including nau-

Corresponding Author: Gülendam Karadağ, MD; e-mail: gkaradag71@gmail.com

sea, vomiting, hair loss, loss of appetite, an altered sense of taste, fatigue, sleep disturbances, changes in bowel function, peripheral neuropathy and anemia[1,9,10]. It is widely recognized that the use of chemotherapy results in side-effects that adversely affect patients' quality of life (QOL)[11]. Compared with the general population, the health-related QOL of cancer patients is worse in most dimensions[5]. QOL has become an important tool to guide clinical decision making in oncology[12]. Nurses working with cancer patients evaluate cancer and its treatment, for example, physical symptoms, side effects of treatment, individual's body image, psychological status, work life, social aspect, family roles and spirituality. For this reason, nurses should assist the patients and their family with the holistic care understanding to create a home environment where they feel good and provide training to the patient and family to manage the symptoms related to the disease and treatment, take care of the individual and help them become independent within a short time[13]. Therefore, the aim of this study is to determine the effect of individual education regarding controlling and reducing the side effects of chemotherapy in hematologic cancer patients on the reduction of symptoms and QOL.

MATERIALS AND METHODS

Study sample design

The study was conducted to determine the effect of individual training on patients with hematologic cancer on the QOL and reduction of chemotherapy symptoms. The study was designed as. a randomized controlled trial in pretest-posttest pattern, to determine the effect of personal training given to control and reduce the side effects of chemotherapy-induced symptoms in hematological cancer patients on reducing the symptoms and the life quality. The population of the study consisted of hematologic cancer patients who were inpatients and outpatients receiving chemotherapy in Hematology-Oncology Clinic, Hematology and Oncology Daily Unit of our University Hospital. The Hematology-Oncology Clinic has 13 patient rooms with a capacity of 24 patients. 8 nurses work shifts between 8-16, 16-08 and 16-24 hours. The Hematology and Oncology Daily Unit has 10 seats. In the Hematology-Oncology Daily Unit, 2 nurses serve approximately 30 patients per day between 08:00-16:00. All patients who fulfilled the criteria of the study were included in the sample. The number of patients taken into consideration was determined by considering the studies on this subject and using the appropriate statistical methods according to the opinions of the experts in the field. The sample of the study was selected according to the simple random sampling method, and the sample size was determined according to power analysis. According to the power analysis, the minimum sampling was measured as α=0.05; the testing power was determined to be (1-β) 0.80 with 28 participants in each group and 30 patients were included in the intervention group and 30 patients were in the control group.

The inclusion criteria for the patients were as follows: 1- patients receiving at least 1 course of chemotherapy; 2- experiencing side effects of chemotherapy (nausea, weakness, constipation, diarrhea, infection pain, etc.); 3- communicable, 4- > 18 years 5. cares for self; 6- literacy, vision/communication problems; 7- voluntarily agreed to participate in the study.

Instruments

Data were collected using a questionnaire form, EORTC QLQ C-30, Rotterdam Symptom Checklist and 60 patients were also interviewed (30 control groups, 30 intervention groups) face to face for data collection. Each application lasted an average of 15-20 minutes.

Questionnaire

The questionnaire was prepared by the researcher by examining the related literature: socio-demographic characteristics of the patients (age, sex, marital status, educational status, occupation, social security, number of children and family type, etc.) characteristics (8 items) and disease-related characteristics (diagnosis, duration, duration of treatment, complaints after chemotherapy) and complaints practices (15 items) for a total of 23 questions for evaluation[4,6,14,15].

European Cancer Research and Treatment Organization Quality of Life Questionnaire (EORTC QLQ-C30)

The EORTC QLQ-C30 Version 3.0, developed by Aaronson et al[16] is not a specific survey for hematologic cancer patients, but is a QOL scale widely used throughout the world in patients with cancer. The scale was adapted to Turkish by Güzelant et al[17] and its validity and reliability were determined for Turkish society in patients with lung cancer.

This scale consists of three parts: General Health Status scale (GHS), Functional Scale (FS), symptoms scale (SS), for a total of 30 items.

A functional scale consists of 15 substances: items including physical function (1-5. item), role

function (6-7. item), emotional function (21- 24. item), cognitive function (20-25. item), social function (26-27. item) and its functions to maintain daily life are examined.

Symptom Scale consists of 13 questions and there are items including fatigue (10, 12, 18. item), nausea and vomiting (14-15. item), pain (9, 19. item), dyspnea (8. item), insomnia (11. item), appetite loss (13. item), constipation (16. item), diarrhea (17. item), financial difficulties (28. item) items and it is aimed to reveal specific symptoms that affect the QOL of the patient.

The last two questions (29-30. item) represent the general health status scale and show the patient's assessment of his or her QOL as a whole.

There are four options for each of the 28 questions that show functional and symptom scales: none (1 point), some (2 points), quite (3 points), many (4 points) for each question. The lowest score that can be obtained from the functional score, symptom score and general health score in the scale is 0 and the highest score is 100 (8,33). In the functional area and symptoms sections, low scores indicate that QOL is high and high scores indicate lower QOL.

On the general health scale, there are options ranging from 1 to 7 points, very poor and excellent. The 29th and 30th questions of the scale are the general well-being. The high scores obtained from this section indicate that the QOL is high and the lower scores indicate that the QOL decreases. Güzelant et al[17] showed Cronbach's alpha coefficient of the scale was ≥ 0.70. In this study, Cronbach's alpha coefficients were: Physical function $\alpha = 0.93$, Role function $\alpha = 0.82$, Cognitive function $\alpha = 0.78$, Emotional function $\alpha = 0.58$, General reliability of social function scale $\alpha = 0.93$, General health $\alpha = 0.97$, General reliability of subscale of symptom size; Fatigue reliability was found as $\alpha = 0.52$, Nausea and vomiting $\alpha = 0.76$, Pain $\alpha = 0.34$.

Rotterdam Symptom Checklist

The validity and reliability of the Rotterdam symptom checklist developed by De Haes et al[18] in 1996 was made by Can[19] in 2001 in patients with breast cancer. It is used to evaluate the distress caused by the symptoms experienced by cancer patients. The scale items are scored in Likert type ranging from one to four. The scale consists of 8 items in psychological symptom subscale and 19 items in physical symptom subscale. The psychological symptom subscale was 8 points, the highest 32 points, the physical symptom subscale was 19 points and the highest 76 points. As the score obtained from the scale increases, so does the difficulty experienced. In Can's study, the Cronbach's alpha value was found to be 0.87 for the physical sub-dimension, 0.91 for the psychological sub-dimension, and 0.94 for the overall total. In this study, physical symptom $\alpha = 0.53$ and psychological symptom $\alpha = 0.60$, which are ones of the subscales of Rotterdam symptom inventory, were found.

Randomization

The patients were informed about the study, and they provided their informed consent prior to randomization. After inclusion in the study, the patients were randomly allocated either to the intervention group or the control group. The randomization was conducted by a statistics specialist who had no contact with the participants. The statistics specialist randomized participants to the intervention or the control group using a computerized random number generator (SPSS version 20 software, SPSS Inc. IBM, Armonk, NY, USA). All individuals involved in the study were blinded to the randomization procedure. However, the researchers were not blinded to the patient groups, due to the nature of the intervention. Participants assigned to the control group continued to receive routine treatment, unaware they were in an education program regarding the controlling and reducing the side effects of chemotherapy. Participants in the intervention group were invited to be part of an education program regarding controlling and reducing the side effects of chemotherapy

Data collection

A pilot study was not performed before the full survey began. The data collection tools used to collect the study data were administered in two stages.

The questionnaire, EORTC QLQ-C30 and Rotterdam Checklist, were applied to the intervention group on the first day of the treatment and the PowerPoint presentation prepared by the researcher about the side effects of chemotherapy and prevention methods after chemotherapy was presented to the patients individually with the help of a laptop computer. Patient training lasted an average of 20-25 minutes for each patient. The opinions of the patients were obtained during and after the training and if any questions were helped. At the same time, the training booklet was given to the patient. After the education, each patient was given the "Booklet for Side Effects of Chemotherapy and Prevention Methods After Chemotherapy." They were also given a phone number to call at any time for assistance.

10 weeks after the training, patients were administered EORTC QLQ-C30, Rotterdam Checklist and Self-Care Scale again.

The control group was administered the questionnaire, EORTC QLQ-C30, Rotterdam Checklist on the

first day of treatment without any intervention and after 10 weeks, the EORTC QLQ-C30 and Rotterdam Checklist were administered again. After the posttest, individual training for control group patients and side effects of chemotherapy and control methods and a booklet of given training were given to the patient.

Statistical analysis

The statistical evaluation of the data obtained as a result of the study was performed using the SPSS version 20 software (SPSS Inc. IBM, Armonk, NY, USA) and $p<0.05$ was considere as statistically significant. Descriptive statistical methods (number, percentage, mean, standard deviation) were used to evaluate the data. The suitability of the data for normal distribution was tested with the Shaphiro wilk test. Mann Whitney U test was used to compare two groups of variables that were not normally distributed. The Willcoxen test was used to compare the measurements obtained at two different times. The relationships between verbal variables were tested by chi-square test. In order to test the validity of the scales, Cronbach alpha internal consistency coefficient was calculated. The findings were evaluated at 95% confidence interval and 5% significance level.

Ethical consideration

Written permission was obtained from the Ethics Committee of the Faculty of Medicine and written permission was obtained from the Head of the Research and Application Hospital. After the necessary explanations were made about the purpose of the study, the method of application and the results planned to be obtained, written informed consent form was obtained from the patients. Permission was obtained from Can (19) for the Rotterdam Symptom Checklist and e-mail from Güzelant et al[17] for Life Quality Scale (EORTC QLQ-C30).

RESULTS

The mean age of the patients was 56.11 ± 13.26. 60.0% of the patients in the intervention group were male, 36.6% were 61 years and older, 53.3% of the patients in the control group were male, 43.4% were 61 years and older. There was no statistically significant difference between the socio-demographic characteristics of the patients in the intervention and control groups ($p>0.05$).

As shown in Table 1, 80.0% of the intervention group patients did not have a similar disease in their family, 30.0% received chemotherapy for 1-6 months, 73.3% of the control group patients had no similar disease in their family, 36.7% had received chemotherapy for 7-12 months. It was determined that 46.7% of the patients in the intervention and control groups were treated as outpatients and inpatients, and 33.3% of the patients in the intervention group had fatigue the most after chemotherapy, 30.0% had nausea and vomiting, and 50.0% used drugs to relieve symptoms. It was determined that 33.3% of the patients in the control group experienced fatigue the most and 26.7% suffered from nausea and vomiting after chemotherapy and 53.3% of them used medication to relieve symptoms.

Table 2 shows the comparison of the subscale scores of Rotterdam symptom inventory of intervention and control group patients before and after training. There was no statistically significant difference between the scores of the psychological symptom and Rotterdam symptom scores of the intervention and control group patients before education ($p>0.05$), and the physical symptom levels of the control group were higher than the intervention group ($p<0.05$). It was found that the control group patients had higher Rotterdam symptom scale, physical symptom scale, psychological symptom scale score after the training than the intervention group and there was a statistically significant difference ($p<0.01$).

Table 3 shows the comparison of the subscale scores of the QOL scale before and after education of the intervention and control group patients. There was no significant difference regarding physical and cognitive, emotional, social, functional, general health, fatigue, nausea, vomiting, pain, dyspnea, sleep, loss of appetite, constipation, diarrhea, and financial difficulties of the intervention and control group ($p>0.05$). There was a statistically significant difference in terms of pre-training role function scale scores of intervention and control group patients ($p<0.05$). Functional status, general health status, role function, emotional function and social function levels of the intervention group were higher than the control group after the training ($p<0.01$). After the training, fatigue scale, nausea and vomiting scale, pain scale, sleep scale and loss of appetite scale were found to be higher than the control group ($p<0.05$).

DISCUSSION

In addition to the side effects of treatment, cancer patients experience many problems as a result of diseases caused by cancer[15,20]. These include physical and psychological disorders such as pain, anorexia, cachexia, taste changes, hair loss, nausea, vomiting, mucositis, fatigue, dyspnea, and psychological symptoms such as depression, anxiety[7,11,14,21]. In this study,

TABLE 1. Participiant characteristics.

Features		*Intervention Group(n=30)*		*Control Group (n=30)*				X^2 *p*
		Sayı	*%*	*Sayı*	*%*	*f*	*%*	
Gender	Female	12	40.0	14	46.7	26	43.3	X^2=0.271
	Male	18	60.0	16	53.3	34	56.7	*p*=0.602
Type of treatment	Outpatient	9	30.0	12	40.0	21	35.0	X^2=1.247
	Inpatient	7	23.3	4	13.3	11	18.3	*p*=0.536
	Outpatient and inpatient	14	46.7	14	46.7	28	46.7	
Similar disease in family	Yes	6	20.0	8	26.7	14	23.3	X^2= 0.373
	No	24	80.0	22	73.3	46	76.7	*p*=0.542
Time of receiving chemotherapy	1-6 month	9	30.0	10	33.3	19	31.7	X^2=1.345
	7-12 month	8	26.7	11	36.7	19	31.7	*p*=0.854
	1-2 year	8	26.7	6	20.0	14	23.3	
	3-4 year	3	10.0	2	6.7	5	8.3	
	5-6 year	2	6.7	1	3.3	3	5.0	
The most common symptom after chemotherapy	Nausea and vomiting	9	30.0	8	26.7	17	28.3	X^2=0.125 *p*=0.989
	Fatigue	10	33.3	10	33.3	20	33.3	
	Pain	7	23.3	8	26.7	15	25.0	
	Anorexia	4	13.3	4	13.3	8	13.3	
What is done to relieve symptoms	Doesn't do anything	9	30.0	12	40.0	21	35.0	X^2=2.461 *p*=0.292
	Taking the pills	15	50.0	16	53.3	31	51.7	
	Natural methods	6	20.0	2	6.7	8	13.3	

33.3% of the intervention group complained about fatigue, 26.7% complained about loss of appetite, 33.3% of the control group complained of fatigue and 20.0% complained of pain. In the study performed by Akçay and Gözüm[22], after chemotherapy the most common side effects of patients were fatigue (100.0%) and hair loss (93.3%). In a study conducted by Hintistan et al[23] with hematological cancer patients, it was found that the patients complained about (97.5%) of fatigue. Seven et al[20] in the study of cancer diagnosis and treatment, depending on the patients, determined the highest rate of fatigue.

Symptoms related to cancer and chemotherapy and the long duration of treatment affect the patient's QOL negatively[24,25]. In this study, it was found that there was a statistically significant difference between the general health status scores of the intervention group before and after the education, which was higher than the control group (p <0.05). In the study conducted by Akçay and Gözüm[22] in breast cancer patients, the mean score of the women's QOL scale from the "general well-being" subscale increased after education. In the studies of Çalışkan et al[15] and Gelin and Ulus[24] on patients receiving chemotherapy, the QOL of the participants was found to be moderate. These findings are in parallel with the results of our research. Sharif et al[26] showed that the increased knowledge of cancer patients about the management of side effects of chemotherapy and the improvement in their daily life and social activities have contributed positively. This will improve the QOL of the patients.

Patients with cancer have to cope with physical and emotional stress, functional deficiencies and symptoms resulting from illness and treatment[27]. In present study, there was an increase in the role function, emotional function, social function and functional levels of the QOL subscale of the intervention group before and after education. In the study conducted by Akçay and Gözüm[22] in women with breast cancer, there was an increase in all areas of the QOL scale except the "sexual disorder" sub-dimension and total QOL score. In their study, Barre et al[27] found that there was a positive change in all sub- and main dimensions of QOL after psychoeducation. Belgacem et al[28] found that education provided to caregivers of cancer patients improves QOL in cancer patients and caregivers. Salonen et al[29] in Finland conducted a systematic review of 18 studies in which internet and computer based education examined the benefits of prostate cancer patients and found that it affects patients positively, improves QOL, increases disease knowledge and increases QOL. Badger et al[30] found that health education and individual counseling provided by voice and video telephony in America improved the QOL in breast cancer patients and their spouses. Sharif et al[26] showed that peer lead education is an effective approach to improve the life quality of mastectomy patients. In this study, it can be said that the increases in the QOL scales stemmed from the trainings given to the patients.

TABLE 2. Comparison of subscale scores of Rotterdam symptom inventory before and after training of intervention and control group patients.

Rotterdam Semptom Inventory	*Before Training*				*After Training*			
Subscales	*Intervention Group (n=30)*	*Control Group (n=30)*	*z*	*p*	*Intervention Group (n=30)*	*Control Group (n=30)*	*z*	*p*
Physical symptom scale	31.43±5.74	33.63±3.99	-2.686	0.007	26.30±3.17	33.16±3.53	-5.767	0.001
Psychological symptom scale	11.60±2.79	11.20±2.05	-0.242	0.809	9.53±1.33	11.60±2.11	-4.290	0.001
Total Rotterdam symptom scale	32.64±5.67	34.87±7.84	-0.991	0.322	21.79±5.41	34.18±7.62	-5.441	0.001

TABLE 3. Comparison of subscale scores of pre-and post-educational QOL of intervention and control group patients.

EORTC QLQ-C30	*Before Training*				*After Training*			
	Intervention Group (n=30)	*Control Group (n=30)*	*z*	*p*	*Intervention Group (n=30)*	*Control Group (n=30)*	*z*	*p*
Functional Status	66.81±10.99	63.55±11.72	-1.090	0.276	76.37±10.64	62.44±13.00	-4.135	0.001
Physical function	70.00±22.33	66.00±24.96	-0.478	0.306	73.77±20.10	64.22±25.09	-1.345	0.179
Role Function	71.66±20.12	62.77±17.33	-2.455	0.014	76.11±17.33	55.55±18.74	-4.182	0.001
Cognitive Function	88.33±19.64	83.33±20.99	-1.014	0.311	88.33±19.64	86.66±17.72	-0.580	0.562
Emotional Function	91.38±10.37	91.66±11.37	-0.102	0.919	97.22±5.05	92.22±6.16	-3.417	0.001
Social Function	61.66±13.94	57.77±21.76	-0.604	0.546	66.66±13.84	58.33±18.95	-2.136	0.033
General health status	55.27±17.15	53.88±17.33	-0.443	0.658	62.77±12.32	51.38±12.96	-3.204	0.001
Fatigue	48.88±9.93	48.88±15.32	-0.333	0.739	34.07±10.07	52.59±15.96	-4.289	0.001
Nausea and vomiting	20.00±22.48	18.88±20.40	-0.055	0.956	5.55±9.11	15.00±17.14	-2.164	0.030
Pain	51.11±13.08	52.77±15.21	-0.283	0.778	35.55±10.48	51.66±16.58	-4.248	0.001
Dyspnea	24.44±23.04	31.11±32.67	-0.570	0.569	21.11±18.53	31.11±28.94	-1.258	0.208
Sleep	22.22±23.70	28.88±27.31	-0.907	0.365	14.44±16.80	31.11±17.36	-3.401	0.001
Anorexia	46.66±27.12	46.66±28.50	-0.063	0.950	25.55±14.33	40.00±25.37	-2.467	0.014
Constipation	8.88±14.99	8.88±14.99	0.001	1.000	1.11±6.08	5.55±12.63	-1.707	0.088
Diarrhea	4.44±11.52	5.55±15.37	-0.050	0.960	5.55±12.63	5.55±15.37	-0.298	0.765
Financial difficulties	28.88±24.34	42.22±28.94	-1.796	0.073	31.11±21.32	40.00±26.83	-1.358	0.175

Nausea and vomiting are the most common symptoms we encounter due to chemotherapy treatment[31]. However, there was a significant difference between the nausea and vomiting scale scores of the intervention group before and after the training (z=-2.948; p=0.003), and the scores of the nausea and vomiting scale applied to the patients were decreased. In addition, appetite loss levels decreased before and after training and there was a significant difference between the appetite loss scale scores before and after training (z=-3.477; p=0.001). Sajjad et al[32] indicated that individualized patient education and emotional support improved patients' overall QOL in the intervention group, as compared to the control group. These results are in parallel with our study.

Fatigue may be caused by cancer itself or may be due to chemotherapy, anemia, pain, sleep disorders, mental illness, infection, malnutrition, and electrolyte imbalance[20]. Training and counseling are essential in all initiatives to relieve fatigue. In the present study, a statistically significant difference was found between the pre- and post-training fatigue scale scores (z=-4.024; p=0.001). In the study conducted by Yeşilbalkan et al[33] in cancer patients, it was determined that fatigue of patients and their families decreased as a result of fatigue training compared to the pre-treatment period. These results are similar to our study.

Depending on the disease and treatment methods, individuals with cancer may encounter psychosocial problems such as anxiety, fear, depression, changes in body image, and deterioration in family and social relations. All these symptoms adversely affect the QOL by disrupting the functional status of individuals[20]. Therefore, cancer patients should be evaluated holistically when planning nursing care. Thus, it should be aimed to optimize the functional status, to maintain the well-being and self-care power, and to improve the functional status of the patients. In the present study, functional levels of the intervention group were increased before and after the training, and a significant difference was found between the functional scale scores before and after the training (z=-4.371; p=0.001). Yeşilbalkan[33], in his study about cancer patients found that functional QOL improvement areas were improved after training. In the study of Shahsavari et al[34], QOL of the patients with breast cancer has been enhanced under the influence of self-care education and this improvement has not been only related to the total score of the QOL but has occurred in all its dimensions.

Pain is an important health problem for cancer patients. To improve the QOL, symptom control, pain relief, individual relief and psychosocial support are extremely important[35]. In the present study, the intervention group had a high score in the pain scale before and after the training, whereas a significant difference was found between the pain scale scores before and after the training (z=-4.506; p=0.001). In a randomized multicenter study carried out by Jahn et al[36] in Germany, it was found that the training given to manage their own pain reduces patients' pain. In our study, the alleviation of pain also showed that the education given was effective. This situation was associated with the suggestion in the training booklet that patients with pain should keep their environment calm and quiet, and do activities (rest, sleep, listening to music, reading books, watching television, daydreaming) to help reduce pain.

In our study, physical symptom, psychological symptom subscale of the Rotterdam Symptom Subscale of the intervention group was decreased before and after the training and a significant difference was found between the scores of physical symptom, psychological symptom and Rotterdam Symptom Scale. In a study conducted by Ovayolu et al[37] in order to determine the effect of aromatherapy massage in breast cancer patients, the psychological and physical symptom scores of Rotterdam Symptom Checklist deteriorated over time in the control group, and the mean psychological symptom scores in the massage group improved gradually in the sixth and tenth weeks. The improvement in physical symptom scores in the sixth week was deteriorated again in the 10th week. Aslan et al[38] found that education given to cancer patients reduced symptoms after chemotherapy.

CONCLUSIONS

We found that the training gave positive results to the intervention group, and the QOL of the intervention group patients increased significantly compared to the control group patients. It was observed that the symptoms experienced by the intervention group patients about the side effects of chemotherapy after training were significantly reduced compared to the intervention group patients. According to these results, systematic evaluation of patients' symptoms after chemotherapy by nurses will contribute to improve QOL. It is also recommended that patients and their families prepare planned discharge training on the side effects and management of chemotherapy before leaving the hospital, provide training booklets on the side effects and reduction of chemotherapy, and provide training nurses to assist patients at regular intervals. In addition, it is recommended to repeat this study in larger samples to test its validity, and to conduct studies that assess the outcomes of the training in this patient group in the long-term.

Acknowledgments:
The authors thank the participants in this study.

Funding:
This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflict of Interest:
All authors certify that there is no conflict of interest with financial, personal or other relationships with other people or organizations within three years of beginning the submitted work that could inappropriately influence, or be perceived to influence, their work.

REFERENCES

1. Nagai H, Kim YH. Cancer prevention from the perspective of global cancer burden patterns. J Thorac Dis 2017; 9: 448-451.
2. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global Cancer Statistics 2018: GLOBOCAN estimates of ıncidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin 2018; 68: 394-424.
3. Thun MJ, DeLancey JO, Center MM, Jemal A, Ward EM. The global burden of cancer: Priorities for prevention. Carcinogenesis 2010; 31: 100-110.
4. Merdin A, Avcı F. Cancer and hematology awareness of the community. Turk J Oncol 2013; 28: 150-153.
5. Allart-Vorelli P, Porro B, Baguet F, Michel A, Cousson-Gelie F. Haematological cancer and quality of life: a systematic literature review. Blood Cancer J 2015; 5: e305.
6. Uğur Ö. Kanser hastasının semptom yönetimi. (Symptom management of cancer patients). Türk Onkoloji Dergisi. Turk J Oncol 2014; 29: 125-135.
7. Andrade V, Sawada NO, Barichello E. Quality of life in hematologic oncology patients undergoing chemotherapy. Rev Esc Enferm USP 2013; 47: 355-361.
8. Fu B, Wang N, Tan HY, Li S, Cheung F, Feng Y. Multi-component herbal products in the prevention and treatment of chemotherapy-associated toxicity and side effects: A review on experimental and clinical evidences. Front Pharmacol 2018; 29: 1394.
9. Nurgali K, Jagoe RT, Abalo R. Adverse effects of cancer chemotherapy: anything new to improve tolerance and reduce sequelae? Front Pharmacol 2018; 9: 245.
10. Chui PL. Cancer-and chemotherapy-related symptoms and the use of complementary and alternative medicine. Asia Pac J Oncol Nurs 2019; 6: 4-6.
11. Weaver A, Young AM, Rowntree J, Townsend N, Pearson S, Smith J, Gibson O, Cobern W, Larsen M, Tarassenko L. Application of mobile phone technology for managing chemotherapy-associated side-effects. Ann Oncol 2007; 18: 1887-1892.
12. Esser P, Kuba K, Mehnert A, Johansen C, Hinz A, Lordick F, Götze H. Quality of life in survivors of hematological malignancies stratified by cancer type, time since diagnosis and stem cell transplantation. Eur J Haematol 2018; 101: 340-348.
13. Yeşilot SB, Öz F. Cancer patients' perceptions of nursing presence. J Psychiatr Nurs 2017; 8: 150-156. doi: 10.14744/phd.2017.92005
14. Üstündag S, Zencirci AD. Factors affecting the quality of life of cancer patients undergoing chemotherapy: A questionnaire study. Asia Pacific J Oncol Nurs 2015; 2: 17-25.
15. Çalışkan T, Duran S, Karadaş A, Ergün S, Tekir Ö. Kanser hastalarının yaşam kalitesi ve sosyal destek düzeylerinin değerlendirilmesi. (Assessment the levels of life quality and social support of the cancer patients). Kırıkkale Üniversitesi Tıp Fakültesi Dergisi, The Journal of Kırıkkale University Faculty of Medicine 2015; 7: 27-36.
16. Aaronson NK, Ahmedzai S, Bergman B, Bullinger M, Cull A, Duez NJ. The European Organization for Research and Treatment of Cancer QLQ-C30: A quality of life instrument for use in international clinical trials in oncology. J Natl Cancer Inst 1993; 85: 365-376.
17. Güzelant A, Goksel T, Ozkok S, Tasbakan S, Aysan T, Bottomley A. The European Organization for Research and Treatment of Cancer QLQ-C30: An examination into the cultural validity and reliability of the Turkish version of the EORTC QLQ-C30. Eur J Cancer Care 2004; 13: 135-144.
18. De Haes JC, Olschewski M, Fayers P. The Rotterdam Symptom Checklist-A manual. The Netherlands: University of Groningen, 1996.
19. Can G. Meme Kanserli Hastalarda Yorgunluğun ve Bakım Gereksinimlerinin Değerlendirilmesi, (Evaluation of Fatigue and Care Needs in Patients with Breast Cancer). Doktora Tezi, İstanbul Üniversitesi, 2001.
20. Seven M, Akyüz A, Sever N, Dinçer Ş. Kanser tanısı alan hastaların yaşadığı fiziksel ve psikolojik semptomların belirlenmesi. (Studying the physical and psychological symptoms of patients with cancer). TSK Koruyucu Hekimlik Bülteni, TAF Prev Med Bull 2013; 12: 219-224.
21. Hui D, Didwaniya N, Vidal M, Shin SH, Chisholm G, Roquemore J, Bruera E. Quality of end-of-life care in patients with hematologic malignancies: a retrospective cohort study. Cancer 2014; 120: 1572-1578.
22. Akçay D, Gözüm S. Kemoterapi alan meme kanserli hastalarda, kemoterapinin yan etkilerine ilişkin verilen eğitim ve evde izlemin yaşam kalitesine etkisinin değerlendirilmesi. (Evaluation of the effect of education of chemotherapy side effects and home follow-up on the quality of life in patients with breast cancer given chemotherapy). Meme Sağlığı Dergisi, The Journal of Breast Health 2012; 8: 191-199.
23. Hintistan S, Çilingir D, Nural N, Akkaş Gürsoy A. Hematolojik kanserli hastaların kemoterapiye bağlı yaşadıkları semptomlara yönelik uygulamaları. (Applications of patients with hematologic cancers for experienced symptoms due to chemotherapy). Gümüşhane Üniversitesi Sağlık Bilimleri Dergisi, Gümüşhane University Journal of Health Sciences 2012; 1: 153-164.
24. Gelin D, Ulus B. Hastanede kemoterapi alan hastaların yaşam kalitesi ve bunu etkileyen faktörler. (The life quality of the patients receiving chemotherapy in the hospital and the influening factors). Acıbadem Üniversitesi Sağlık Bilimleri Dergisi, Acibadem University Health Sciences Journal 2015; 6: 31-35.
25. Nayak MG, George A, Vidyasagar MS, Mathew S, Nayak S, Nayak BS, Shashidhara YN, Kamath A. Quality of life among cancer patients. Indian J Palliat Care 2017; 23: 445-450.
26. Sharif F, Abshorshori N, Tahmasebi S, Hazrati M, Zare N, Masoumi S. The effect of peer-led education on the life quality of mastectomy patients referred to breast cancer-clinics in Shiraz, Iran 2009. Health Qual Life Outcomes 2010; 8: 74.
27. Barre PV, Padmaja G, Rana S, Tiamongla. Stress and quality of life in cancer patients: Medical and psychological intervention. Indian J Psychol Med 2018; 40: 232-238.

28. Belgacem B, Auclair C, Fedor MC, Brugnon D, Blanquet M, Tournilhac O, Gerbaud L. A caregiver educational program improves quality of life and burden for cancer patients and their caregivers: a randomised clinical trial. Eur J Oncol Nurs 2013; 17: 870-876.
29. Salonen A, Ryha¨nen AM, Leino-Kilpi H. Educational benefits of internet and computer-based programmes for prostate cancer patients: a systematic review. Patient Educ Couns 2014; 94: 10-19.
30. Badger TA, Segrin C, Hepworth JT, Pasvogel A, Weihs K, Lopez AM. Telephone-delivered health education and interpersonal counseling improve quality of life for Latinas with breast cancer and their supportive partners. Psychooncology 2013; 22: 1035-1042.
31. Salihah N, Mazlan N, Lua PL. Chemotherapy-induced nausea and vomiting: exploring patients' subjective experience. Multidiscip Healthc 2016; 9: 145-151.
32. Sajjad S, Ali S, Gul RB, Mateen A, Rozi S. The effect of individualized patient education, along with emotional support, on the quality of life of breast cancer patients-A pilot study. Eur J Oncol Nurs 2016; 21: 75-82.
33. Yeşilbalkan ÖU, Karadakovan A, Göker E. The effectiveness of nursing education as an intervention to decrease fatigue in Turkish patients receiving chemotherapy. Oncol Nurs Forum 2009; 36: 215-222.
34. Shahsavari H, Matory P, Zare Z, Taleghani F, Kaji MA. Effect of self-care education on the quality of life in patients with breast cancer. J Educ Health Promot 2015; 4: 70.
35. Ovayolu Ö, Ovayolu N. Palyatif bakım alan kanser hastalarının ağrı yönetiminde integratif yaklaşımlar. (Integrative approaches in pain management of cancer patients with palliative care). Hacettepe Üniversitesi Hemşirelik Fakültesi Dergisi, Journal of Hacettepe University Faculty of Nursing 2017; 43: 54-64.
36. Jahn P, Kuss O, Schmidt H, Bauer A, Kitzmantel M, Jordan K, Krasemann S, Landenberger M. Improvement of pain-related self-management for cancer patients through a modular transitional nursing intervention: a cluster-randomized multicenter trial. PAIN 2014; 55: 746-754.
37. Ovayolu Ö, Seviğ Ü, Ovayolu N, Sevinç A. The effect of aromatherapy and massage administered in different ways to women with breast cancer on their symptoms and quality of life. Int J Nurs Pract 2014; 20: 408-417.
38. Aslan Ö, Vural H, Kömürcü ş, Özet A. Kemoterapi alan kanser hastalarına verilen eğitimin kemoterapi semptomlarına etkisi (Effect of education on chemotherapy symptoms in cancer patients receiving chemotherapy). Cumhuriyet Üniversitesi Hemşirelik Yüksekokulu Dergisi, Cumhuriyet University Nursing High School Journal 2006; 10: 15-28.