



# EFFECT OF BREATHING RELAXATION EXERCISE TRAINING ON THE SELF-CARE AGENCY AND FUNCTIONAL LIFE OF THE LUNG CANCER PATIENTS: A RANDOMIZED CONTROLLED TRIAL

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**Abstract – Objective:** *Dyspnea is an important problem that adversely affects daily routines and functional status of lung cancer patients with a prevalence quite high in all stages of lung cancer. Breathing relaxation exercises are very important in lung cancer in reducing dyspnea and fatigue and increasing daily activities. The aim of this study is to determine the effect of breathing relaxation exercise training provided for the home care needs of lung cancer outpatients on the self-care and functional life of the patient receiving chemotherapy*

**Patients and Methods:** *This randomized controlled study was carried out with 60 lung cancer patients who received chemotherapy in an Outpatient Chemotherapy Unit. Data was collected with the questionnaire form, Self-Care Agency Scale and Functional Living Index Scale. The intervention group was given individual breathing relaxation training.*

**Results:** *In the intervention group, mean Self-Care Agency Scale was  $82.60 \pm 17.87$  pre-test,  $94.13 \pm 16.47$  post-test ( $p=0.001$ ). Self-Care Agency Scale mean was measured as post-test  $94.13 \pm 16.47$  in intervention group, while  $77.00 \pm 10.93$  in control group ( $p=0.001$ ). Post-test mean Functional Living Index Scale (FLIC) was  $93.23 \pm 11.71$  in intervention group and  $85.6 \pm 15.76$  in control group ( $p=0.038$ ).*

**Conclusions:** *Respiratory relaxation exercise training given to patients has been shown to have positive effects on self-care ability and functional life of the patient. It was observed that total Functional Living Index Scale score and psychological function subscale score decreased in the control group. Nurses may perform breathing relaxation exercises as complementary and supportive methods on patients with lung cancer.*

**KEYWORDS:** *Lung cancer, Self-Care Agency, Functional Living Index, Chemotherapy, Randomized controlled trial.*

## INTRODUCTION

Cancer is a highly common disease with an important place among global health problems because it causes death and morbidity. Lung cancer is the cancer with the highest mortality and morbidity in the world and it is responsible for one out of every five deaths<sup>1-3</sup>. In Turkey, lung cancer in men (70.6/100000) is ranked first, while it is the fifth most common

cancer type in women (9.8/100000)<sup>4</sup>. Today, many methods such as hormone therapy, radiotherapy, surgery, chemotherapy and immunotherapy are used in cancer treatment<sup>5</sup>. Chemotherapy is a method used in many types of cancer<sup>6,7</sup>. However, side effects of chemotherapy that affect patients' self-care ability, functional and daily life are also observable (such as dyspnea, fatigue and nausea-vomiting, anorexia, mouth ulcer, constipation / diarrhea and hair loss)<sup>5</sup>.



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Dyspnea is an important problem that adversely affects daily routines and functional status of lung cancer patients. Its prevalence is estimated to be between 55-87% in lung cancer<sup>8</sup>. Breathing relaxation exercises are important at all stages of lung cancer, which reduces fatigue and dyspnea, and makes it easier for the individuals to carry out their daily activities<sup>9</sup>. Studies have indicated that exercise improves physical and psychological health in lung cancer<sup>10</sup>. By teaching relaxation, deep breathing and coughing exercises to the patient, the nurses can help patients breathe more easily, perform self-care and perform daily activities more easily<sup>11</sup>.

Self-efficacy, which is an important part of people's motivation and behavior, also affects actions that can make a change in their lives. Functional status is the ability to meet self-care needs, and also to perform daily roles, daily life activities, and maintain health and well-being. Functions such as being able to bathe, get dressed, relieve oneself, eat, walk, meet economic needs, cook food, do housework, climb stairs, and walk reveal us something about functional status and sufficiency<sup>12,13</sup>. Functional status of patients with lung cancer is adversely affected by physical and psychological problems resulting from disease symptoms, surgical procedures, chemotherapy, and radiotherapy, hospitalization during diagnosis and treatment or repeated hospitalization<sup>12</sup>. It may be helpful to plan appropriate nursing interventions to improve patients' functional abilities, well-being and overall understanding of health, and also to improve compliance with the treatment and care program, which improves quality of life<sup>13</sup>.

Previous studies in the literature showed that training of breathing relaxation exercises reduces the risk of cardiological and respiratory complications and health-related costs, while also improving exercise and breathing capacity as well as psychological symptoms and quality of life. Breathing rehabilitation can improve exercise capacity and reduce the dyspnea and fatigue symptoms<sup>10,14</sup>.

Self-care is one of the concepts in Orem's nursing theory. Self-care is a behavior learned through interaction, communication and culture, the basic requirement that individuals should meet<sup>15</sup>. Cancer and chemotherapy negatively affect individuals in terms of physical, psychological and socio-economic aspects. At the same time, chemotherapy imposes limitations on the life of the individual and affects the fulfillment of daily life activities and basic needs, leading to a decrease in self-care agency<sup>16-18</sup>.

This study was conducted to determine the effect of relaxation exercise training given to meet the home care needs of the patients receiving chemotherapy due to lung cancer on self-care and functional status.

## MATERIALS AND METHODS

### *Study Sample and Design*

The study designed as a randomized controlled trial in pretest-posttest pattern was carried out in a city located in the south of Turkey Oncology Hospital Chemotherapy Unit Affiliated to the University Hospital. The Chemotherapy Unit serves approximately 45 patients a day with 4 nurses from 8.00 am to 16.00 pm. The population of the study was composed of patients with lung cancer admitted to the Chemotherapy Unit. Sample size was calculated to be 60 by power analysis. A total of 80 patients was assessed for eligibility (Figure 1). Of the 65 eligible patients, 60 agreed to participate. No participants withdrew from the study. A total of 60 patients volunteering to participate in the study, having lung cancer, over 18 years of age, with no communication problems, conscious, receiving chemotherapy at the outpatient chemotherapy unit, having previously received at least one chemotherapy, were assigned in the form of 30 patients as intervention and 30 patients as the control by simple random sampling method.

### *Instruments*

The study data were collected using Questionnaire Form, Functional Living Index-Cancer (FLIC), Self-Care Agency Scale (SCAS). For data collection, 30 control groups and 30 intervention groups, a total of 60 patients, were interviewed. Each application took an average of 20-25 minutes.

### *Questionnaire Form*

Questionnaire form was created by the researchers by reviewing the current relevant literature<sup>8,19,20</sup>. The form includes 9 questions about demographic characteristics (age, gender, education, social security, knowing disease, etc.), and 14 questions to evaluate disease-related characteristics (diagnosis, duration of disease, stage, type of treatment, metastasis). It consists of a total of 23 questions.

### *Functional Living Index-Cancer (FLIC)*

FLIC was developed by Schipper et al<sup>21</sup> (1984) to assess the functional state and quality of life in cancer patients. Turkish validity and reliability of FLIC was performed by Bektaş and Akdemir<sup>12</sup> in

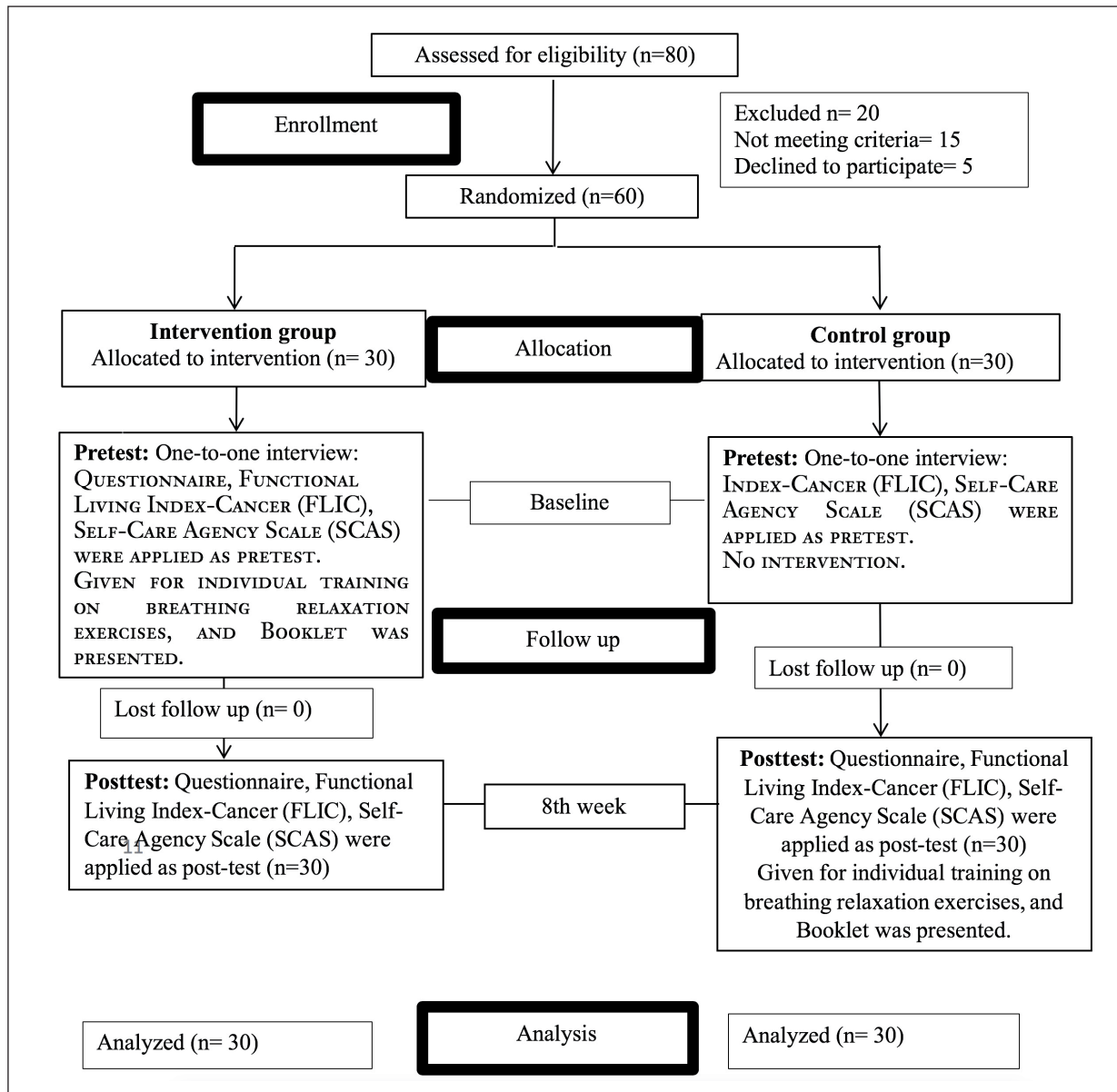


Fig. 1. Flowchart of the study for the participant

2008. FLIC is a 7-point Likert-type scale consisting of 5 sub-dimensions and 22 questions including physical functions, psychological functions, general well-being (difficulties related to cancer), social functions and gastrointestinal symptoms (nausea). The maximum score that can be obtained on the scale is 154 and the minimum score is 22. The functional status is evaluated positively as the score increases. Cronbach's alpha value of the scale was 0.89 by Bektaş and Akdemir<sup>12</sup>; in this study, it was found to be 0.87. The FLIC determines the effect of disease and treatment symptoms on all areas of the individual's life (functional abilities, mental and physical capacity). The scale consists of questions about patient's situation in the last 2 weeks, last month or present day.

### Self-Care Agency Scale (SCAS)

SCAS was developed in 1979 by Kearney and Fleischer as 43 items<sup>22</sup>. Turkish validity and reliability were reorganized in 1994 by Nahcivan<sup>15</sup> as 35 items. The scale is a 5-point Likert-type. Each statement in the scale was attributed to a score between 0–4 points. Depending on the response of each patient, 0 was assigned to 'Does not describe me at all,' and 4, to 'Describes me a lot'. Eight of the statements (items 3, 6, 9, 13, 19, 22, 26, 31) are assessed negatively and the scoring is reversed. The maximum score that can be obtained on the scale is 140 and the minimum score is 35. Low score indicates low self-care agency high score, high self-care agency. Cronbach's alpha value of



the scale was 0.89 by Nahcivan<sup>15</sup>; in this study, it was found to be 0.84.

## **Randomization**

The patients were informed about the study before the randomization. The patients were randomly assigned to intervention or control group. Statistics expert randomized participants to the intervention or control group using a computerized random number generator. The individuals participating in the study were blind about which group they were appointed, whether intervention or control groups. However, the researchers were not blinded to patient groups by the nature of the intervention. The was control group administered questionnaire, FLIC and SCAS on the first day of treatment. The patients then continued their routine treatment and 8 weeks after the pretest, the questionnaire, FLIC and SCAS were re-administered. In the intervention group, the questionnaire form, FLIC and SCAS were administered, and after the patient's chemotherapy session was completed in the outpatient chemotherapy unit, 20-25-minute presentation was given for individual training on breathing relaxation exercises. During the presentation, relaxation exercises were performed by the researcher and the patient was allowed to repeat. A training booklet was given to the patients after the training. The "Booklet for Lung Cancer Patients to Breathing Relaxation Exercise" was prepared to provide education regarding the efficient breathing relaxation exercise to patients with lung cancer. The guide was developed in the light of current information in the literature and by consulting academic members. Patients were instructed to practice relaxation exercises twice a day at home for 4 weeks. The patients were called once a week for further encouragement to perform relaxation exercises and to receive feedback. Eight weeks after the training, the questionnaire form, FLIC, and SCAS were administered again. After the post-test, the breathing relaxation exercise training and the training booklet were given to the patients in the control group (Figure 1).

## **Data Collection**

Before starting the study, a pilot application was conducted on 8 patients who were treated in the Oncology Hospital Chemotherapy Unit. After the pilot application, necessary revisions were made in the questionnaire and the final version was obtained. 60 patients were divided into two groups as

intervention and control groups. The first patient admitted to the Unit was placed in the intervention group and the rest of the patients were sequentially placed in the control and intervention group based on the order of admission. Data were collected between 15 April 2015- 15 September 2016.

## **Statistical Analysis**

While analyzing the data of the study, Shapiro Wilk, Student *t*, Paired *t* and chi-square tests were used. Cronbach alpha internal consistency coefficient was calculated for validity of the scales and  $p < 0.05$  was considered statistically significant. All analyzes were performed using SPSS for Windows 24.0 (IBM Corp., Armonk, NY, USA).

## **Ethical consideration**

Before the onset, the written permission was obtained from the Scientific Ethics Committee of the Faculty of Medicine (2015/118) and the Oncology Hospital Chief Physician. After making necessary explanations about the study, written informed consent was obtained from all patients. Permission was obtained by e-mail for the scales used in the study. The study was conducted in compliance with the "Ethical principles for medical research involving human subjects" of the Helsinki Declaration. Independent variables in the study were age, education level, gender, marital status, profession, income level, place of residence, diagnosis, duration of disease, stage. The total scores of functional life index scale and self-care agency scale in lung cancer patients were dependent variables.

## **RESULTS**

### **Participant Characteristics**

A total of 80 patients were assessed for eligibility (Figure 1). Of the 65 eligible patients 60 agreed to participate. No participants withdrew from the study. Table 1 shows the comparison of disease characteristics of the groups. The mean age was  $60.96 \pm 9.41$  in intervention group and  $59.53 \pm 13.30$  in control group. The mean disease duration of the intervention group was  $13.43 \pm 7.65$ , and that of the control group was  $12.77 \pm 15.35$  months. 93.3% of the intervention group and 90% of the control group were male. 96.7% of the intervention group and 96.7% of the control group knew about the disease. 63.3% of the intervention and 73.3% of the control did not have family his-



**TABLE 1.** Comparison of sociodemographic and disease-related characteristics of groups.

<b>Characteristics</b>	<b>Intervention Group (n=30) Mean±SD</b>		<b>Control Group (n=30) Mean±SD</b>		<b>p</b>
Age	60.96±9.41		59.53±13.30		0.633
Duration of Disease	13.43±7.65		12.77±15.35		0.832
	<b>n</b>	<b>%</b>	<b>n</b>	<b>%</b>	
<b>Gender</b>					
Female	2	6.7	3	10.0	0.640
Male	28	93.3	27	90.0	
<b>Marital Status</b>					
Married	28	93.3	28	93.3	1.000
Single	2	6.7	2	6.7	
<b>Education</b>					
Illiterate	2	6.7	5	16.7	0.390
Literate	3	10.0	6	20.0	
Primary School	18	60.0	14	46.7	
High School	7	23.3	5	16.7	
<b>Knowing the disease</b>					
Yes	29	96.7	29	96.7	1.000
No	1	3.3	1	3.3	
<b>Metastasis</b>					
Yes	11	36.7	8	26.7	0.405
No	19	63.3	22	73.3	
<b>Family history of cancer</b>					
Yes	8	26.7	15	50.0	0.063
No	22	73.3	15	50.0	
<b>Type of treatment*</b>					
Chemotherapy	29	96.7	30	100.0	0.313
Radiotherapy	12	40.0	19	63.3	0.071
Surgical treatment	6	20.0	9	30.0	0.371
<b>Received training about disease</b>					
Yes	3	10.0	2	6.7	0.640
No	27	90.0	28	93.3	

SD: Standard deviation. \*Significant at 0.05 level; Student *t*-test for numerical variables, Chi-square test for categorical variables. †More than one answer can be selected.

tory of cancer. 73.3% of the intervention and 50% of the control group had no metastasis, and 96.7% of the intervention and 100% of the control group were receiving chemotherapy. 90% of the intervention and 93.3% of the control group did not receive any education or training about the disease and treatment. There was no statistically significant difference between the intervention and control groups ( $p > 0.05$ ).

### Results Related to Functional Living Index Scale

Table 2 shows the comparison of FLIC results between and within groups. In the intervention group, FLIC pre-test mean score was  $91.87 \pm 10.66$ , and the post-test mean score was  $93.23 \pm 11.71$ . In the control group, FLIC pre-test mean score was  $85.93 \pm 18.97$  and post-test mean score was  $85.6 \pm 15.76$ , and there was no statistically sig-

nificant difference within the groups ( $p = 0.408$ ). There was no significant difference between the mean FLIC pre-test scores of the control and the intervention group ( $p = 0.141$ ), but there was a significant difference between the mean FLIC post-test score of the intervention group and the control group ( $p = 0.038$ ).

When physical function subdomain of FLIC was compared, there was no statistically significant difference between the pre-test score ( $34.07 \pm 4.87$ ) and post-test score ( $34.47 \pm 4.52$ ) in the intervention group ( $p = 0.638$ ). However, there was a statistically significant difference between the pre-test score ( $30.27 \pm 8.41$ ) and the post-test score ( $31.4 \pm 7.7$ ) in the control group ( $p = 0.021$ ). The mean pre-test score of physical function subdomain was  $34.07 \pm 4.87$  in the intervention group and  $30.27 \pm 8.41$  in the control group ( $p = 0.036$ ). The mean post-test score of physical function subdomain was  $34.47 \pm 4.52$  in the intervention group, and  $31.4 \pm 7.7$  in the control group ( $p = 0.065$ ).



**TABLE 2.** Comparison of Self-Care Agency Scale between and within groups.

Variables		Experimental (n=30) Mean±SD	Control (n=30) Mean±SD	$p_{intergroup}$
Self-Care Agency Scale	Pre-test	82.6 ± 17.87	79.97 ± 11.12	0.496
Total Score	Post-test	94.13 ± 16.47	77.00 ± 10.93	<b>0.001*</b>
$p_{intragroup}$		<b>0.001*</b>	<b>0.001*</b>	

SD: Standard deviation. \*Significant at 0.05 level; Student *t*-test for Intergroup comparison and Paired sample *t*-test for intra group comparison.

When psychological function subdomain of FLIC was compared, there was a statistically significant difference between the pre-test score ( $25.97 \pm 4.03$ ) and post-test score ( $27.63 \pm 3.59$ ) in the intervention group ( $p = 0.010$ ). There was a statistically significant difference between the pre-test score ( $23.33 \pm 6.84$ ) and the post-test score ( $22.33 \pm 5.51$ ) in the control group ( $p = 0.010$ ). The mean pre-test score of psychological function subdomain was  $25.97 \pm 4.03$  in the intervention group and  $22.33 \pm 6.84$  in the control group, and there was no significant difference ( $p = 0.074$ ). The mean post-test score of psychological function subdomain was  $27.63 \pm 3.59$  in the intervention group and  $22.33 \pm 5.51$  in the control group, and there was a significant difference ( $p = 0.001$ ).

When general well-being subdomain of FLIC was compared, there was no statistically significant difference between the pre-test score ( $12.53 \pm 2.6$ ) and post-test score ( $12.53 \pm 2.74$ ) in the intervention group ( $p = 1.000$ ). There was no statistically significant difference between the pre-test score ( $12.4 \pm 3.18$ ) and the post-test score ( $12.2 \pm 2.91$ ) in the control group ( $p = 0.405$ ). The mean pre-test score of general well-being subdomain was  $12.53 \pm 2.6$  in the intervention group and  $12.4 \pm 3.18$  in the control group, and there was no significant difference ( $p = 0.859$ ). The mean post-test score of general well-being subdomain was  $12.53 \pm 2.74$  in the intervention group and  $12.2 \pm 2.91$  in the control group, and there was no significant difference ( $p = 0.649$ ).

When social function subdomain of FLIC was compared, there was no statistically significant difference between the pre-test score ( $11.83 \pm 2.35$ ) and post-test score ( $12.03 \pm 2.94$ ) in the intervention group ( $p = 0.647$ ). There was a statistically significant difference between the pre-test score ( $12.4 \pm 2.09$ ) and the post-test score ( $11.93 \pm 2.08$ ) in the control group ( $p = 0.008$ ). The mean pre-test score of social function subdomain was  $11.83 \pm 2.35$  in the intervention group and  $12.4 \pm 2.09$  in the control group, and there was no signif-

icant difference between the groups ( $p = 0.328$ ). The mean post-test score of social function subdomain was  $12.03 \pm 2.94$  in the intervention group and  $11.93 \pm 2.08$  in the control group, and there was no significant difference ( $p = 0.880$ ).

When gastrointestinal function subdomain of FLIC was compared, there was a statistically significant difference between the pre-test score ( $7.47 \pm 2.29$ ) and post-test score ( $6.57 \pm 2.79$ ) in the intervention group ( $p = 0.005$ ). There was no statistically significant difference between the pre-test score ( $7.53 \pm 3.43$ ) and the post-test score ( $7.73 \pm 3.11$ ) in the control group ( $p = 0.351$ ). The mean pre-test score of gastrointestinal functions subdomain was  $7.47 \pm 2.29$  in the intervention group and  $7.53 \pm 3.43$  in the control group, and there was no significant difference between the groups ( $p = 0.930$ ). The mean post-test score of gastrointestinal function subdomain was  $6.57 \pm 2.79$  in the intervention group and  $7.73 \pm 3.11$  in the control group, and there was no significant difference ( $p = 0.131$ ).

## Results Related to Self-Care Agency Scale

As shown in Table 3, when the self-care agency scale scores were compared between and within groups, there was a significant difference between the mean SCAS pre-test score ( $82.6 \pm 17.87$ ) and the mean post-test score ( $94.13 \pm 16.47$ ) in the intervention group ( $p = 0.001$ ). In the control group, the mean SCAS pre-test score was  $79.97 \pm 11.12$ , and the mean post-test score was  $77.00 \pm 10.93$  ( $p = 0.001$ ). Also, the mean SCAS pre-test score was  $82.6 \pm 17.87$  in the intervention group and  $79.97 \pm 11.12$  in the control group, and there was no significant difference between the groups ( $p = 0.496$ ). There was a significant difference between the mean SCAS post-test score in the intervention group ( $94.13 \pm 16.47$ ) and the mean SCAS post-test score in the control group ( $77.00 \pm 10.93$ ) ( $p = 0.001$ ).

**TABLE 3.** Comparison of Functional Living Index Scale between and within groups.

<b>Variables</b>	<b>Intervention Group (n=30) Mean±SD</b>	<b>Control Group (n=30) Mean±SD</b>	<b>P<sub>intergroup</sub></b>
<b>Functional living index scale total</b>			
Pre-test	91.87± 10,66	85.93±18,97	0.141
Post-test	93.23± 11.71	85.6 ± 15.76	<b>0.038*</b>
P <sub>intragroup</sub>	0.408	0.709	
<b>Subdomains Physical function</b>			
Pre-test	34.07 ± 4.87	30.27 ± 8.41	0.036*
Post-test	34.47 ± 4.52	31.4 ± 7.7	<b>0.065</b>
P <sub>intragroup</sub>	0.638	<b>0.021*</b>	
<b>Psychological function</b>			
Pre-test	25.97 ± 4.03	23.33 ± 6.84	0.074
Post-test	27.63 ± 3.59	22.33 ± 5.51	<b>0.001*</b>
P <sub>intragroup</sub>	<b>0.010*</b>	<b>0.010*</b>	
<b>General well-being</b>			
Pre-test	12.53 ± 2.6	12.4 ± 3,18	0.859
Post-test	12.53 ± 2.74	12.2 ± 2.91	0.649
P <sub>intragroup</sub>	1.000	0.405	
<b>Social functions</b>			
Pre-test	11.83 ± 2.35	12.4 ± 2.09	0.328
Post-test	12.03 ± 2.94	11.93 ± 2.08	0.880
P <sub>intragroup</sub>	0.647	<b>0.008*</b>	
<b>Gastrointestinal symptoms</b>			
Pre-test	7.47 ± 2.29	7.53 ± 3.43	0.930
Post-test	6.57 ± 2.79	7.73 ± 3.11	0.131
P <sub>intragroup</sub>	<b>0.005*</b>	0.351	

SD: Standard deviation. \*Significant at 0.05 level; Student t-test for intergroup comparison and paired sample *t*-test for intra group comparison.

## DISCUSSION

Lung cancer is usually diagnosed late and has a low life expectancy due to its incidence, high mortality and initial asymptomatic course<sup>23</sup>. In the present study, 96.7% of the patients in both groups were seen to be informed about the diagnosis, 36.7% of the intervention group and 26.7% of the control group had metastasis.

### SCAS Comparison of Patients

The lowest score obtained from SCAS was 41, while the highest score was 108, and the mean score was  $81.28 \pm 14.81$ . The Cronbach's alpha reliability coefficient of the self-care agency scale was 0.84. The mean SCAS pre-test score was  $82.6 \pm 17.87$  and the mean post-test score was  $94.13 \pm 16.4$  intervention group. On the other hand, in the control group, the mean SCAS pre-test score was  $79.97 \pm 11.22$  and the mean post-test score was  $77.00 \pm 10.93$ . It was observed that the mean score of the study group increased after the training, whereas the mean score of the control group decreased. In a study conducted by Üstündağ and Zengin<sup>24</sup> on

patients with head and neck cancer having undergone surgery, 38% of the patients were seen to have moderate self-care score ( $80.88 \pm 11.51$ ). In another study on cancer patients receiving chemotherapy, Yoshida and Kanda<sup>18</sup> found the mean self-care score as  $124.02 \pm 13.56$ . In the present study, it was found that the mean pre-test self-care agency was lower compared to other studies. There are limited studies in the literature evaluating self-care agency of lung cancer patients. O'Regan et al<sup>25</sup> in a multi-center study with cancer patients found the mean SCAS score as  $93.09 \pm 10.4$ .

In the present study, it was determined that mean self-care agency score of the intervention group increased, while it decreased in the control group after the intervention. In a study by Firat and Öztunç<sup>26</sup> it was found that the training given to patients who underwent total laryngectomy increased the patient's self-care agency.

### FLIC Comparison of Patients

Functional status of cancer patients should be evaluated in detail to control symptoms of fatigue and to maintain physical and emotional well-being<sup>13</sup>.



In the present study in which the functional life of the patients diagnosed with lung cancer was evaluated, the lowest and the highest scores obtained from FLIC were 55 and 136, and the mean score was  $88.90 \pm 15.54$ . Scores obtained from FLIC subdomains were as follows: Physical functions  $32.17 \pm 7.07$ , psychological functions  $24.65 \pm 5.72$ , general well-being  $12.47 \pm 2.87$ , social functions  $12.12 \pm 2.22$ , and gastrointestinal symptoms  $7.50 \pm 2.89$ . In the study by Bektaş and Akdemir<sup>12</sup> evaluating functional status of cancer patients, the mean FLIC score of all patients was  $102.2 \pm 20.3$  and the mean FLIC score of patients with lung cancer was  $108.80 \pm 21.4$ . Similarly, Dedeli et al<sup>27</sup> found that the mean total FLIC score in cancer patients was  $92.3 \pm 7.2$ . In the same study, the scores from the subscales were determined to be  $38.0 \pm 7.0$  for physical functions,  $24.3 \pm 4.4$  for psychological functions and  $13.3 \pm 3.2$  for general well-being. In a study by Özkan and Akin<sup>13</sup> the mean FLIC score was  $107.9 \pm 27.3$  and scores obtained from the subscales were  $38.58 \pm 13.20$  for physical functions,  $31.6 \pm 6.8$  for psychological functions, and  $15.8 \pm 4.8$  for general well-being. In the study by Akkuzu et al<sup>19</sup> evaluating functional status gynecologic cancer patients, FLIC scores were found to be  $37.83 \pm 11.69$  for physical function,  $24.7 \pm 11.8$  for psychological functions,  $12.40 \pm 5.05$  for general wellbeing,  $8.50 \pm 3.57$  for social functions, and  $8.14 \pm 3.41$  for gastrointestinal symptoms. Based on the results of previous studies, patients with lung cancer have low functional living index scale scores. Another study on colon cancer patients FLIC total scores were found as  $112.9 \pm 22.4$ , and  $43.7 \pm 11.5$  for physical function,  $32.9 \pm 5.5$  for psychological functions,  $15.0 \pm 3.8$  for general wellbeing,  $11.1 \pm 2.5$  for social functions, and  $10.2 \pm 3.8$  for gastrointestinal symptoms<sup>28</sup>. Consistent with the literature, the mean FLIC scores were also low in the present study. In the literature, studies evaluating functional status of lung cancer patients are limited.

In the intervention group, the mean FLIC pre-test score was  $91.87 \pm 10.66$ , and it increased to  $93.23 \pm 11.71$  after breathing relaxation training. Psychological functions subscale pre-test score was  $25.97 \pm 4.03$ , and the post-test score increased to  $27.6 \pm 3.59$ . It was observed that FLIC total score and psychological functions score increased in the intervention group. In contrast, the mean FLIC pre-test score of the control group was  $85.93 \pm 18.97$  and the mean post-test score was  $85.6 \pm 15.76$ . Psychological functions subscale pre-test score was  $23.33 \pm 6.84$ , and the final test score was  $22.33 \pm 5.51$ . It was observed that the FLIC total score and psychological function subscale score decreased in the control group. Volpato et al<sup>9</sup> found that relaxation techniques improve psy-

chological well-being and symptom management of people with chronic obstructive pulmonary disease. Cilekar et al<sup>29</sup> found that low-intensity pulmonary rehabilitation therapy increases exercise capacity and reduces dyspnea patients.

## CONCLUSIONS

In the present study, it was seen that pre-training self-care and functional status scores were low in patients. Breathing relaxation training given to lung cancer patients had positive effects on self-care agency and functional status. Nurses may perform breathing relaxation exercises as complementary and supportive methods on patients with lung cancer. Nurses can improve self-care agency and functional ability of patients by teaching appropriate coping methods and breathing relaxation exercises for chemotherapy symptoms observed in these patients. Nurses teaching and practicing breathing relaxation exercises on patients with lung cancer can support patients' functional lives. In addition, public health nurses should pay home visits to the patients with lung cancer who receive chemotherapy and regular trainings to increase their functional status and self-care agency should be planned. Finally, similar studies are recommended to be conducted on larger populations and different types of cancer.

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Study conception and design: IHG and GK. Data analysis and interpretation: SK. Data collection: IHG. Drafting of the article: IHG, GK and SK. Critical revision of the article: IHG, GK and SK.

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All authors certify that there are no conflicts of interest with other people or organizations that may be perceived to adversely affect or affect their work, with financial, personal or other relationships.

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