

Nutritional Status and Quality of Life in Lung Cancer Patients

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ABSTRACT The aim of this research is to determine the relationship between nutritional status and quality of life in lung cancer patients. A total of 140 patients were assessed. Nutritional Risk Screening (NRS- 2002) tool was used to determine nutritional status and quality of life was assessed using The European Organization for Research and Treatment of Cancer Quality of Life Core Questionnaire (EORT QLQ-C30). The rate of malnutrition risk was forty percent of all patients, 38.8 percent of the males and 47.4 percent of the females. ($p>0.05$). The risk of malnutrition was higher among in-patients (52.1%) compared to outpatients (26.9%). In patients at risk of malnutrition, the subscale scores of EORT QLQ-C30 form for role function were lower while fatigue, pain, dyspnea, insomnia and anorexia scores were higher than the patients who are not at risk of malnutrition ($p<0.05$). As the patients' total NRS-2002 scores increases, their physical and role function scores decrease; and their fatigue, pain, dyspnea, insomnia and anorexia symptoms increase ($p<0.05$). Nutritional status of these patients should be assessed from the date of diagnosis of disease, these patients should receive nutrition counselling from a dietitian specialized in oncology areas and should be informed on the importance of nutritional status related to its preventive role on quality of life.

INTRODUCTION

Malnutrition is prevalent among patients with lung cancer, and the patients usually suffer from loss of appetite and weight. The incidence of malnutrition has been reported to range between thirty percent and eighty percent, depending on the applied treatment method and the characterization of patient population (Barthelemy et al. 2014). Malnutrition causes the prolongation of the duration of hospital stay, reduction of therapeutic response, increase in compli-

cations, and shortening of survival (Bozzetti et al. 2012; Shiono et al. 2016). In general, malnutrition is correlated with morbidity and mortality. Additionally, it affects the quality of life of the patient (Prevost et al. 2014). In a paper to determine the rate of cachexia in lung cancer, cachexia was reported in seventy-six percent of patients with lung cancer (Hug et al. 2016).

In order to succeed in the treatment of the patient, it is necessary that in the first step, the nutrition risk need to be determined in early stage using appropriate methods, and be treated. Nutritional status should be screened routinely in oncology clinics (Kyle et al. 2006; Marshall et al. 2016). Despite the development of a large number of subjective and objective methods of determining malnutrition risk, there is no consensus among the experts as to which one is the best. Instead of suggesting one method, the expert committee determined that several of them would yield more accurate results (Lis et al. 2012; Experts Committee 2013). Most commonly used methods of determining malnutrition are anthropometric parameters; the history of nutrition; laboratory methods; bioelectrical impedance analysis (BIA); screening tests (Subjective Global Assessment; SGA, NRS-2002; mini-nutrition-

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al assessment-MNA). As for the validated screening tests for oncology patients, they are Malnutrition Universal Screening Tool (MUST) Malnutrition Screening Tool (MST) and NRS-2002. If the institution does not have an official screening system, the patient with malnutrition may be missed. Some nutrition screening tools are more detailed than others, and they are designed for different conditions and users. Therefore, it is advised that a reliable and valid tool appropriate for the purpose be used. It is necessary that the patients with nutritional risk detected be referred to a dietitian or a trained health professional for a more comprehensive subsequent assessment of nutrition (Kyle et al. 2006; Antoun 2009; Isenring 2013; Marshall et al. 2016).

Life quality scales, which contains subjective and multidimensional questionnaires, began to be used more and more frequently (Güzelant et al. 2004). In recent years, clinicians have accepted quality of life as a part of their daily practice, and they have used it in the treatment and care of patients as a decision mechanism (Montazeri et al. 1998; Gupta et al. 2006; McCabe 2014; Yam et al. 2016). The quality of life of the patients with cancer is affected considerably by the diagnosis of their disease, the meaning of this diagnosis for an individual, the physical impacts of the disease, long and short-term side effects of different treatment modalities, their mental health, mechanisms of coping with the disease, and the reaction of the family and/or community (Vergara et al. 2013). Besides these factors; symptoms of depression, performance score and conscientiousness are shown as important determinants of quality of life in patients with advanced lung cancer (Mol et al. 2016). Another factors which affect the quality of life of cancer patients are nutritional status and total energy intake. The symptoms related with nutrition, nausea, vomiting, anorexia, diarrhea, and constipation cause the patient to feel poor, and thus, the quality of the patient's life to deteriorate (Hickson 2004; Nourissat et al. 2008; Iqbal et al. 2016). In a study, while the score of global life quality of the cancer patients without loss of weight has been found to be 62.8, the score of the patients with a ten percent weight loss has been found to be 48.8 (Nourissat et al. 2008). The correlation between nutritional status and survival time has been demonstrated, and the importance of nutritional status in maintaining the patient's well-being has been underlined.

Assessment of nutritional status and the provision of appropriate nutritional support enable individuals to cope easily with possible side effects of the disease, and thus, enhance the quality of life (Isenring 2013). Although the importance of the issue is known, there exist few studies on the relationship between the nutritional status of the cancer patients and the quality of their life. Therefore, this study has been planned and conducted to demonstrate the relationship between the nutritional status and the quality of life in patients with lung cancer.

METHODOLOGY

Subjects

This cross-sectional and descriptive study has been conducted on 152 patients older than 18 years who have applied to the Medical Oncology Service of Kayseri Training and Research Hospital between September 2012 - May 2013. According to the records of the year 2011, the number of the patients with lung cancer who received treatment for 12 months in the Medical Oncology Service and Polyclinic of Kayseri Training and Research Hospital was 165. The researchers' target was to reach eighty of these patients throughout the data collection period, and accordingly plans were made to include at least 130 patients in the study. A total of 152 patients were included to study. But 12 patients were excluded because of incomplete data in their questionnaire, and the study was completed with 140 patients. The exclusion criteria are: being younger than 18, breastfeeding at that time and the inability to communication. The questionnaire, filled by the researchers in a face-to-face interview, contained items about the patients' demographic data, smoking status, alcohol intake, vitamin and/or mineral supplement use and complementary alternative therapy preferences. The data regarding the disease (the type and stage of the disease, the time period after the diagnosis, type of the treatment received) were recorded. Prior to the study, an approval was obtained from the ethical committee of Erciyes University Medical Faculty (2012/457).

Nutritional Risk Screening Form (NRS-2002)

In screening the patients' nutritional status, anthropometric measurements [height, weight

measured and BMI calculated with the formula= $\text{Weight (kg)/height (m}^2\text{)}$ have been performed by the researchers, and malnutrition risk has been determined using the form NRS-2002. The form NRS-2002 is a system which scores the deterioration in patients' nutritional status and the severity of diseases comprised of two sections. In the first section, there are questions related with the severity of disease, loss of weight, and the reduction of food intake within last three months. When the responses to all the questions are "no," procession to the second section is not allowed, and weekly screening is continued. When the response to any one of the questions in the first section is "yes," procession to the second section is allowed, and in this section patients are assessed in terms of insufficiency of nutrition and the severity of disease. Each category is classified as normal (score=0), mild (score=1), moderate (score=2), and severe (score=3). For patients aged 70 and over one point is added to the score. The overall total score is 0 to 7 points. The patients with a total score of three and above are considered to have malnutrition while those with a score below three are considered to be well-nourished (Experts Committee 2013). NRS, which has been approved to be used in many different patient population including cancer patients is related with a large number of objective nutritional assessment indicators, morbidity, mortality, and quality of life (Amaral et al. 2008; Ryu 2010; Barthelemy et al. 2014).

Assessment of Quality of Life

The quality of life has been measured using European Organization for Research Treatment of Cancer–Quality of Life Questionnaire (EORTC QLQ-C30). This scale consists of 30 items and contain scores for five functions (physical role, cognitive, and emotional role; nine symptoms (fatigue, pain, nausea/vomiting, dyspnea, insomnia, anorexia, constipation, diarrhea, and having financial problems); and scores for general health. Raw scores for each function and symptom are converted into standard points within 0-100 range. High points for general health and function scores and low points for symptom scores are indicative of more favorable quality of life. One of the scales most frequently used in cancer research, this scale is valid, reliable, and precise (Nourissat et al. 2008; McCabe 2014).

Statistical Analysis

The data obtained from the research have been analyzed on computer using SPSS 16.0 (Statistical Package for Social Sciences for Windows). The normality tests of the data have been determined with Shapiro–Wilk and Kolmogorov–Smirnov Test. The numbers in the tables have been given as percentage, mean and standard deviation. Student's t-test and Chi-square tests were performed for the comparison of the means, and for categorical data Chi-square test was used. $p < 0.05$ level has been set for statistical significance.

RESULTS

Of the patients, 121 (86.4%) were males and 19 (13.6%) were females. Mean age was 58.5 ± 9.4 (29-80) years. The stage of the disease in 63.6 percent of the patients was IV, and 77.1 percent had non-small cell lung cancer (NSCLC). Of the patients; 39.3 percent were on chemotherapy, 7.1 percent were on radiotherapy, and 42.9 percent were on combined therapy. The percentage of the hospitalized patients was 52.1 percent, and that of the out-patients was 47.9 percent (Table 1).

The malnutrition risk was 38.8 percent of the males and 47.4 percent of the females ($p > 0.05$). Malnutrition was detected in 52.1 percent of the hospitalized patients, and 26.9 percent of the out-patients ($p < 0.05$). 32.7 percent of the patients on chemotherapy, forty percent of those on radiotherapy, and 36.7 percent of the patients on the combined therapy were at risk of malnutrition. The risk of malnutrition was eighty percent in patients who were not on any therapy ($p < 0.05$, Table 2).

The assessment of quality of life of the patients according to their nutritional status has been presented in Table 3. The role function scores were found low, and their fatigue, pain dyspnea, insomnia, and anorexia scores was found significantly high in patients with malnutrition risk compared to patients without malnutrition risk ($p < 0.05$). Global Score (GS) has been found lower in the group with malnutrition risk than that in the well-nourished group (33.3 ± 18.96 and 41.66 ± 19.9 , respectively). However, the difference was not statistically significant ($p > 0.05$, Table 3).

Table 1: Demographic and clinical characteristics of patients (n=140)

<i>Variable</i>	<i>Mean ± SD</i>	
Age (years)	58.5 ± 9.4	
Body weight (kg)	71.6 ± 14.47	
BMI (kg/m ²)	25.3 ± 1.24	
EORTC QLQ-C30 GSS	45.35 ± 21.74	
<i>Gender</i>	<i>n</i>	<i>(%)</i>
Male	121	(86.4%)
Female	19	(13.6%)
<i>Type of Cancer</i>		
Non-small cell lung cancer	108	(77.1%)
Small cell cancer	32	(22.9%)
<i>Tumor Stage</i>		
II	25	(17.8%)
III	26	(18.6%)
IV	89	(63.6%)
<i>The Therapy Applied</i>		
Chemotherapy	55	(39.3%)
Radiotherapy	10	(7.1%)
Chemo+Radiotherapy	60	(42.9%)
No treatment	15	(10.7%)
<i>Patients</i>		
In-patient	73	(52.1%)
Out-patient	67	(47.9%)
<i>NRS-2002 Score</i>		
0	38	(27.1%)
1	1	(0.7%)
2	45	(32.2%)
3	35	(25.0%)
4	16	(11.4%)
5	5	(3.6%)
6		
<i>NRS-2002 Malnourished</i>	56	(40.0%)
<i>NRS-2002 Well-nourished</i>	84	(60.0%)
<i>BMI</i>		
<18.5 (kg/m ²)	11	(7.9%)
18.5–24.9 (kg/m ²)	62	(44.4%)
25.0–29.9 (kg/m ²)	48	(34.6%)
≥30.0 (kg/m ²)	19	(13.6%)

Correlation between the quality of life and several variables has revealed that as the patients' total NRS-2002 points increases, their physical and role function scores decrease, and their fatigue, pain, dyspnea, insomnia, and appetite symptoms increase ($p < 0.05$). As the patients' ages increase, their emotional function scores also increase while their status of experiencing financial problems ($p < 0.05$, Table 4).

DISCUSSION

Malnutrition is a frequently occurring problem in cancer patients, and is correlated unfavorable clinical consequences. This condition can be reversed with nutritional support. The first thing to do for a successful nutritional treat-

ment is to assess the patient's nutritional status accurately. In a multitude of studies it has been demonstrated that patients with lung cancer in advanced stage lose weight to a considerable extent ($>10\%$) (Scott et al. 2003; Etienne et al. 2007; Wie et al. 2010; Barthelemy et al. 2014). Malnutrition rate among patients with lung cancer has been reported to be within 30-80 percent range (Barthelemy et al. 2014).

BMI is an indicator frequently used in assessing nutritional status. BMI < 18.5 kg/m² indicates a serious risk nutritional deficiency, and most clinicians interpret this as cachexia (Bozetti et al. 2009). Papers related to cancer cachexia shows that BMI is not an adequately precise indicator of malnutrition risk in cancer patients (Nourissat et al. 2008; Amaral et al. 2008; Aydin 2008; Ryu 2010). Similar with these result, the researchers' study group, the rate of the patients with BMI < 18.5 kg/m² has been found to be 7.9 percent. However, by NRS-2002, forty percent of the researchers' study group carry malnutrition risk. Thus, there occurs frequent fluctuations in the body weight of critical patients. Excessive use of fluid in therapy, the presence of edema-ascite, organomegaly and massive tumors can mask weight loss. In addition, for reasons such as the unprofitability of anthropometric measurements on daily basis, problems resulting from the patient or the person who obtains the measurements, weight measurement and BMI is a disadvantaged indicator. It has been reported that in patients with gastrointestinal system cancer, the patients with BMI within normal limits have turned out malnourished by SGA done by questioning weight loss or NRS-2002 (Ryu 2010). It has been demonstrated that malnutrition risk can be determined even in patients whose BMI is not below 20 (Aydin 2008). Therefore, using several methods together is of greater importance in determining malnutrition risk (Aydin 2008; Planas et al. 2016).

On the other hand, ESPEN (European Society for Clinical Nutrition and Metabolism) suggests that NRS-2002 be used in determining malnutrition in cancer patients. The validation of NRS-2002 has been realized on oncologic patients (Amaral et al. 2008; Antoun 2009). Supported by the 128 randomized controlled studies, NRS-2002 is an evidence-based, simple and easy-to-use tool that objectively reflects the nutritional risks of patients based on comprehensive analysis of the nutritional status, dis-

Table 2: Distribution of malnutrition risk to certain variables

Variable	Malnourished		Well-nourished		Total	
	n	%	n	%	n	%
<i>Sex</i>						
Male	47	38.8	74	61.2	121	100
Female	9	47.4	10	52.6	19	100
$\chi^2=0.497$; $p=0.481$						
<i>Cancer Stage</i>						
II	8	32	17	68	25	100
III	10	38.5	16	61.5	26	100
IV	38	42.7	51	57.3	89	100
$\chi^2=1.406$; $p=0.704$						
<i>Delay Since Diagnosis</i>						
<1 year	42	39.2	65	60.8	107	100
>1 year	14	42.4	19	57.6	33	100
$\chi^2=0.106$; $p=0.750$						
<i>Patients</i>						
In-patients	38	52.1	35	47.9	73	100
Out-patients	18	26.9	49	73.1	67	100
$\chi^2=9.236$; $p=0.002$						
<i>Treatment</i>						
Chemotherapy	18	32.7	37	67.3	55	100
Radiotherapy	4	40	6	60	10	100
Chemo+Radiotherapy	22	36.7	38	63.3	60	100
No treatment	12	80	3	20	15	100
$\chi^2=11.490$; $p=0.009$						

ease severity and age-related confounding factors to minimize subjective disturbance (Experts Committee 2013).

While, by NRS-2002, there were no significant correlation between malnutrition and gender, the stage of the tumor, and the period after the diagnosis, malnutrition rate was found significantly greater in hospitalized patients, in those on combined therapy or on no therapy. In patients with lung cancer, curative or palliative therapy plans should be made as surgical, chemotherapy, radiotherapy, or combined therapies in view of the type of the disease, its stage, and the patient's performance (Wintner et al. 2013).

Chemotherapy, besides being a systematic treatment modality used to kill tumor cells, causes problems such as nausea, vomiting, abdominal pain, diarrhea, and anorexia, which in turn, cause malnutrition (Caillet et al. 2016). Similarly, depending on the site they are applied to, radiotherapy also causes gastrointestinal disorders such as mucositis, odynophagia, dysphagia,

reduction in saliva secretion, xerostomia, weakening of the senses of taste and smell, diarrhea, constipation, abdominal pain and flatulence, thus causing inadequate nutrition (Kang et al. 2016). In a study, malnutrition rates among the patients on chemotherapy was forty-four percent (Daly et al. 2016). In the researchers' paper, malnutrition risk has been detected in 32.7 percent of the patients on chemotherapy, forty percent of the patients on radiotherapy and eighty percent of the 15 patients with no therapy ($p<0.05$) (Table 2).

The quality of life among cancer patients reflects the status of health and is largely affected by nutritional factors. Cancer itself or metabolic changes resulting from therapy change the physiological and psychological functions of the patients, adversely affecting both the quality of life and the nutritional status of the patient. It has been reported that malnutrition changes cancer patients' quality of life and thereby making the treatment difficult (Van den Berg et al.

Table 3: Assessment of patients' quality of life scores according to their nutritional status

<i>Variable</i>	<i>Malnourished Median±SS (25%-75%)</i>	<i>Well-nourished Median±SS (25%-75%)</i>	<i>z</i>	<i>p</i>
<i>Global Score</i>	33.33± 18.96 (16.66- 50.0)	41.66± 19.90 (29.16- 50.0)	-1.087	0.277
<i>Physical Functioning</i>	33.33± 25.95 (6.66- 56.66)	53.33± 32.79 (16.66- 73.33)	-1.653	0.098
<i>Role Functioning</i>	33.33± 34.14 (0- 66.66)	33.33± 37.92 (33.33-100.0)	-2.183	0.029
<i>Emotional Functioning</i>	41.66± 35.39 (12.50- 83.33)	58.33± 34.33 (25.0- 91.66)	-1.807	0.071
<i>Cognitive Functioning</i>	66.66± 31.20 (33.33-100.0)	66.66± 35.42 (33.33-100.0)	-0.038	0.97
<i>Social Functioning</i>	33.33± 34.42 (0- 66.66)	33.33± 42.37 (0-100.0)	-1.229	0.219
<i>Fatigue</i>	88.88± 20.89 (66.66-100.0)	66.66± 31.11 (50.0-100.0)	-2.151	0.031
<i>Nausea And Vomiting</i>	16.66± 34.07 (0- 50.0)	0± 28.11 (0- 33.33)	-1.764	0.078
<i>Pain</i>	66.66± 30.42 (50.0-100.0)	50.0± 32.62 (33.33- 83.33)	-2.386	0.017
<i>Dyspnea</i>	66.66± 37.79 (33.33-100.0)	33.33± 41.12 (0-100.0)	-2.412	0.016
<i>Insomnia</i>	66.66± 36.74 (33.33-100.0)	33.33± 41.37 (0- 83.33)	-2.335	0.02
<i>Appetite Loss</i>	100.0± 39.84 (33.33-100.0)	33.33± 40.54 (0-100.0)	-2.295	0.022
<i>Constipation</i>	33.33± 44.48 (0-100.0)	33.33± 44.72 (0-100.0)	-0.775	0.438
<i>Diarrhea</i>	0± 29.38 (0- 0)	0± 26.96 (0- 16.66)	-0.488	0.626
<i>Financial Difficulties</i>	66.66± 39.04 (33.33-100.0)	66.66± 37.33 (33.33-100.0)	-0.519	0.604

**The median value was used because the data were not normally distributed

2008; Carey et al. 2011; McCabe 2014). Lis et al. (2012) have reported in a compilation in which they have researched into the effects of nutritional status on the quality of life that the nutritional status has enhanced the quality in 24 of the 26 publications interpreted. Therefore, the preservation of the quality of life is an important issue in modern oncology (Prevost et al. 2014). In this study, EORTC-QLQ-C30 questionnaire has been chosen as it is an instrument whose validity in assessing cancer patients' quality of life (Fayers 2002; Güzelant et al. 2004; Gupta et al. 2006; Van den Berg et al. 2008).

Nutrition-related symptoms in cancer such as nausea, vomiting, diarrhea, and constipation affect the patient's well-being and lower the quality of life. Nutritional status and nutritional support play an important role in sustaining the quality of life (Iqbal et al. 2016). The researchers' paper, the role function scores of the patients at malnutrition risk have been found significantly

low compared to those of the patients without malnutrition risk. On the other hand, the scores of fatigue, pain, dyspnea, insomnia and anorexia have been higher in patients at malnutrition risk than those of the patients without malnutrition risk ($p < 0.05$). In addition, with the increase in the patients' NRS-2002 scores, physical and role function scores have decreased while their symptoms of fatigue, pain, dyspnea, insomnia and anorexia have increased. The researchers' findings are consistent with several studies (Scott et al. 2003; Hickson 2004; Pressoir et al. 2010; Wie et al. 2010). Vergara et al. (2013), have assessed in their study the nutritional status and the quality of life in patients on chemotherapy, and demonstrated that with the increases in malnutrition risk, the role function, physical, emotional, cognitive and general health scores have decreased significantly. Moreover, it has been reported that the problems such as nausea-vomiting, pain, insomnia, and anorexia oc-

Table 4: Correlation between the patients' quality of life scores and nutritional parameters

Variable		NRS score	BMI	Age
Global Score	(r)	-0.100	0.138	0.062
	(p)	0.318	0.218	0.467
Physical Functioning	(r)	-0.249	0.146	-0.093
	(p)	0.012	0.192	0.273
Role Functioning	(r)	-0.294	0.148	-0.068
	(p)	0.003	0.188	0.424
Emotional Functioning	(r)	-0.184	0.004	0.168
	(p)	0.065	0.971	0.047
Cognitive Functioning	(r)	-0.042	-0.042	-0.001
	(p)	0.675	0.710	0.990
Social Functioning	(r)	-0.189	-0.052	0.069
	(p)	0.057	0.646	0.416
Fatigue	(r)	0.290	-0.078	-0.044
	(p)	0.003	0.488	0.610
Nausea and Vomiting	(r)	0.178	-0.013	0.034
	(p)	0.073	0.911	0.694
Pain	(r)	0.276	-0.038	-0.012
	(p)	0.005	0.738	0.885
Dyspnea	(r)	0.283	0.146	0.166
	(p)	0.004	0.194	0.051
Insomnia	(r)	0.203	0.117	-0.111
	(p)	0.041	0.296	0.191
Appetite loss	(r)	0.241	-0.223	0.046
	(p)	0.015	0.045	0.587
Constipation	(r)	0.045	0.063	0.071
	(p)	0.652	0.574	0.403
Diarrhea	(r)	-0.014	-0.073	-0.068
	(p)	0.887	0.520	0.422
Financial Difficulties	(r)	0.074	-0.020	-0.186
	(p)	0.457	0.857	0.027

cur more frequently in patients carrying malnutrition risk. In another study on the effects of malnutrition on the quality of life of the patients with head and neck cancer, the physical role and social function scores of the patients at malnutrition risk have been found lower, and it has been detected that the complaints of fatigue, nausea-vomiting, and anorexia occur more often in such patients (Capuano et al. 2010). Still in another study on patients with gastrointestinal (GIS) cancer, it has been reported that the patients at malnutrition risk have lower scores of role and physical function, however have higher scores of anorexia, dyspnea, and fatigue than their counterparts without malnutrition risk (Sánchez-Lara et al. 2012). In another study on patients with GIS cancer, however, it has been reported that the physical role, cognitive, social function scores of the patients who have lost weight have significantly fallen, and their symptoms of fatigue, nausea-vomiting, insomnia and anorexia occur more often compared to those of

the patients who have retained their weights (Carey et al. 2011).

Another study showed that patients with newly diagnosed lung cancer had higher malnutrition risk and lower quality of life scores with increased risk of malnutrition (Eðlenoğlu et al. 2016). Takayama et al. (2016) have assessed in their study that body weight loss was significantly associated with worsening of quality of life.

The researchers' study, the scores of global quality of life of all patients, with or without malnutrition were considerably lower (33.33 ± 18.96 and 41.66 ± 19.9 , respectively) than EORTC reference values (Scott et al. 2008). Similarly, the scores of the quality of life have also been found below the reference values whereas their symptom scores have been found above the reference values. These findings reflect that the researchers' study group is below the average capacity in terms of physical, social, emotional, and cognitive parameters. When com-

pared with the other studies performed with EORTC (Gupta et al. 2006; Van den Berg et al. 2008; Nourissat et al. 2008; Carey et al. 2011; Vergara et al. 2013; Wintner et al. 2013) the mean scores of the researchers' study group are rather unfavorable. The quality of life scores of the patients at stage 4, of those on combined therapy, and of hospitalized patients are low (data non-existent in the data). It has been reported that as the stage of the disease advances, enough food intake diminishes, the scores of life quality deteriorate, and thus the patients' chances of recovery are reduced. (Lis et al. 2012; Experts Committee 2013; Strom et al. 2013). The effects of the treatment applied in cancer such as chemotherapy, radiotherapy and other treatment modalities on survival, clinical outcome, and the quality of life are different. In patients with advanced or inoperable lung cancer, palliative treatment enhances the quality of life and clinical picture to a great degree, but in patients on chemotherapy or radiotherapy, normally two-year survival time is longer, despite their scores of life quality being lower (Zoganas et al. 2006; Beisland et al. 2016; Eichler et al. 2016). On the other hand, Winter et al. (2013) have observed that the scores of life of quality have not changed throughout the treatment period in patients with lung cancer on chemotherapy. Storm et al. (2013) have demonstrated that chemo-radio-therapy, compared to chemotherapy alone, in NSCLC patients has enhanced survival time and the quality of life. Therefore, it would not be correct to say that chemotherapy alone in cancer patients affects the quality of life in cancer patients. The progression rate of cancer, the type of the previous treatment, and the patient's prior nutritional status also may change the effects of the therapy on the quality of life.

CONCLUSION

The correlation between the impaired quality of life and malnutrition has been demonstrated in all areas of life, and this has been also confirmed in our study. Malnutrition risk in patients with lung cancer is high, which affect their life adversely. The role function scores of the patients at malnutrition risk have been found to be lower than of the patients without malnutrition risk, the symptoms of fatigue, pain, dyspnea, insomnia, and anorexia have been seen more frequently.

RECOMMENDATIONS

The nutritional status of cancer patients should be assessed at frequent intervals and nutritional support be initiated at an early stage. Nutrition therapy should be integrated into oncologic therapies. Patients should be informed of the protection of the nutritional status and of the relationship between the nutritional status and quality of life.

LIMITATIONS OF THE STUDY

Progressive cancer, inadequate pain control, comorbid diseases and depression have strengthened communication with patients. Some patients were reluctant to communicate with health personnel because of the stress they were experiencing, leading to incomplete and incorrect answers to the questionnaire.

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