



Research Article/Özgün Araştırma

Symptom clusters in patients with lung cancer patients receiving chemotherapy
Kemoterapi alan akciğer kanserli hastalarda semptom kümelerinin belirlenmesi

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Abstract

Aim: The aim was to identify symptoms experienced by patients with lung cancer who had received chemotherapy and to determine the symptom clusters.

Materials and Methods: This was a descriptive and cross-sectional study. A Patient Presentation Form, the ECOG Performance Scale, and the Memorial Symptom Assessment Scale were used. The data were collected between September 2016 and June 2017. The sample of the study consisted of 100 patients who met the selection criteria.

Results: When the prevalence of the symptoms experienced by the patients was examined, the most common complaints were lack of energy (82%), loss of appetite (71%), change in taste of food (62%), anxiety and feeling irritable (69%). The most common symptoms were weakness (8%), loss of appetite (14%), anxiety (20%) and feeling sad (28%).

Conclusion: When the occurrence and severity ratings were examined, the symptoms could be placed into five groups: the gastrointestinal system cluster, the psychology cluster, the respiratory cluster, the neurology cluster, and the cluster of skin changes. The symptoms of lung cancer patients interact with each other and should be managed with appropriate interventions. Moreover, health professionals' awareness of symptom management should be improved.

Keywords: Chemotherapy; Lung cancer; Symptom clusters.

Öz

Amaç: Amaç kemoterapi alan akciğer kanserli hastaların yaşadığı semptomların ve semptom kümelerinin belirlenmesidir.

Gereç ve Yöntem: Tanımlayıcı ve kesitsel bir çalışmadır. Çalışmada "Hasta Sunum Formu", "ECOG Performans Ölçeği", "Memorial Semptom Değerlendirme Ölçeği" kullanılmıştır. Veriler Eylül 2016 ile Haziran 2017 tarihleri arasında toplanmıştır. Araştırmanın örneklemini seçim kriterlerini karşılayan 100 hasta oluşturmuştur.

Bulgular: Hastaların yaşadıkları semptomların yaygınlığı incelendiğinde en sık görülen semptomların enerji eksikliği (%82), iştahsızlık (%71), tad değişikliği (%62), kaygı ve huzursuzluk (%69) olduğu saptanmıştır. En sık görülen semptomlar ise halsizlik (%8), iştahsızlık (%14), kaygı (%20) ve üzgün hissetmedir (%28).

Sonuç: Sıklığı ve şiddet dereceleri incelendiğinde; semptomlar gastrointestinal sistem kümesi, psikoloji kümesi, solunum kümesi, nöroloji kümesi ve cilt değişiklikleri kümesi olmak üzere beş gruba ayrılmıştır. Akciğer kanserli hastaların semptomları birbirleriyle etkileşim halindedir ve uygun müdahalelerle tedavi edilmelidir. Ayrıca sağlık profesyonellerinin semptom yönetimi konusunda farkındalıkları artırılmalıdır.

Anahtar Kelimeler: Kemoterapi; Akciğer kanseri; Semptom kümeleri.

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intihal incelemesinden geçirilmiştir.



Introduction

Lung cancer has been the most commonly diagnosed type of cancer worldwide for over a thousand years and accounts for 28% of cancer-related deaths.¹⁻² The five-year and longer survival rate of those with lung cancer is 10.9% when examined in terms of diagnosis and treatment processes.³ According to the World Health Organization's (WHO) 2020 data, 19.3 million new cases of cancer were diagnosed in the world, and lung cancer ranked second in the number of new cases with 2.21 million. According to Globocan's 2020 data, 233.000 new cases of cancer were diagnosed in Turkey and the most common cancers were lung, breast, colorectal, prostate, thyroid and stomach cancer. In terms of the incidence of lung cancer in Turkey, it ranks first for men and second for women.⁴

Individuals with lung cancer are confronted with numerous symptoms that can be difficult to control during the course of the disease, after treatment, and during the terminal period.⁵ In a study by Given et al.⁶, it was found that symptom burdens increased as time progressed in patients with early-stage lung cancer. In other studies conducted with patients with lung cancer, it was determined that the group of symptoms of fatigue, dyspnea, pain and insomnia negatively affected the performance of the patients.^{6,18-19,23-25} These underlying symptoms interact with each other and create a synergistic effect.^{8-10,13,22-25} This situation affects patients' quality of life negatively.^{3,10,13,19,21,23-25,28}

The symptoms of lung cancer patients have an effect on each other and should be managed with appropriate interventions. Both the symptoms of cancer itself and the symptoms associated with its treatment need to be evaluated as a whole.⁸ This requires a multidisciplinary team approach. There have been studies in Turkey to determine the symptom cluster in patients treated for cancer.^{13,32-34} However, there has been no symptom cluster study for lung cancer patients. The symptoms of lung cancer patients and associated symptom clusters can be diagnosed in line with the data obtained from the present study. It therefore aimed to identify the symptoms experienced by patients with lung

cancer who had received chemotherapy and to determine the symptom clusters.

Research Questions

- What symptoms are experienced by lung cancer patients receiving chemotherapy?
- What are the symptom clusters in lung cancer patients receiving chemotherapy?

Material and Methods

The type of the research

This study was conducted in a descriptive and cross-sectional manner to identify the symptom clusters of lung cancer patients receiving chemotherapy.

The samples of the research

The study was conducted in the Daytime Treatment Center of a university hospital. The universe of the study consisted of lung cancer patients who were admitted to the Daytime Treatment Center to receive chemotherapy. Since the number of lung cancer patients in the center was an unknown, a sampling formula with an unknown universe was used for the calculation of the sample power ($n=t^2.p.q./d^2$), and the sample number was determined as 98.¹¹ The sample of the study consisted of 100 patients who met the selection criteria. The data were collected between September 2016 and June 2017. Patients who were 18 years of age or older, able to speak and understand Turkish, who had received two or more chemotherapy treatments or who were in any cycle of treatment, and who were willing to participate in the study, were included.

Data collection tools

A Patient Presentation Form, the ECOG Performance Scale, and the Memorial Symptom Assessment Scale were used to collect the data.

The Patient Presentation Form, contained questions aiming to collect data on the sociodemographic and disease status of the patient. The form was prepared by the researchers after reviewing the literature.^{10, 12-13}

The ECOG Performance Scale (ECOG) is a measure developed to determine the functional status of patients. The functional capacity of

the patient is scored from 0 to 5 points. If the patient has no complaints, they score 0 points; if the patient has a complaint but it does not affect their daily life they score 1 point; if the patient has a complaint but they have spent less than half of their day resting they score 2 points; if the patient has a complain but they have spent more than half of their day resting, they score 3 points; if the patient has a complaint and has spent their whole day resting, they score 4 points. 5 points indicates death. The scale was published in 1982 by Oken et al.¹⁴ Validity and display of the conducted ECOG performance exhibition. Evaluation of a study is widely used for the purpose of evaluating the performance evaluation of both clinical and evaluation cancer patients.⁷⁻¹⁰

The Memorial Symptom Assessment Scale (MSAS); is a multidimensional scale that is validated to measure the prevalence, characteristics, and distress of common symptoms in severe illnesses. The format of MSAS, which was developed by Portenoy et al., not only reveals symptom prevalence, but also allows for more detailed analyses of 32 physical and psychological symptoms severity and distress. 24 symptoms are evaluated for frequency, intensity and distress, and eight symptoms are evaluated in terms of severity and distress. The scale consisted of the Global Distress Index (GDI), the Physical Symptom Distress Scores (PHYS) and the Psychological Symptom Distress Scores (PSYCH). The total MSAS score (TMSAS) is the average of the symptom scores for all 32 symptoms in the MSAS.¹⁵ For the scale used in the research, permission was obtained from Yıldırım et al. to use the scale in the research.¹² The 10-item Global Distress Index (MSAS-GDI) is considered to be a measure of overall symptom distress. The GDI is the average of the frequency of four psychological symptoms (feeling sad, worrying, feeling irritable, and feeling nervous) and the distress associated with six common physical symptoms (lack of appetite, lack of energy, pain, feeling drowsy, constipation, dry mouth). The PHYS is the average score for common physical symptoms (lack of appetite, lack of energy, pain, feeling bloated, constipation, dry mouth, nausea,

vomiting, change in taste, weight loss, feeling drowsy, and dizziness). The PSYCH is the average score for six symptoms: worrying, feeling sad, feeling nervous, difficulty sleeping, feeling irritability, and difficulty concentrating.

TMSAS is the average of the symptom scores of all 32 symptoms in the MSAS. Item–total correlations ranged between 0.03 and 0.64, and the Cronbach alpha coefficient of the TMSAS and MSAS subscales ranged between 0.71 and 0.84.¹² The data were collected in face-to-face interviews with patients who were admitted to the Day Treatment Center. The researcher interviewed patients who had agreed to participate in the research after identifying patients who met the sampling criteria.

Statistical analysis

SPSS 15 and MVSP v.3.12 (Software Multi-Variate Statistical Package) were used for data analysis. Number and percentage distributions were used to determine the prevalence of symptoms, factor analysis and cluster analysis were used to identify symptom clusters in the descriptive data of the patients. Ward's in-cluster formation method was used. In the study, values of $p < 0.05$ were accepted as significant.

Ethical aspect of research

This study was approved by the Institutional Review Board of Dokuz Eylül University (Approval no. 2016 / 24-36). In addition, the patients were informed about the research in accordance with the Helsinki declaration and informed consent was obtained from each patient.

Results

It was determined that the mean age of the patients was 59.99 ± 8.13 years, 86% were male, 45% were primary school graduates, 91% were married and all of them had social security. 73% had moderate income levels and were unemployed. Moreover, 77% of the patients did not know their disease type and 79% did not know the disease stage. Of the patients, 62% had a level of ECOG performance status, 71% had another chronic disease, and 22% have received over six cycles

of chemotherapy treatment (Table 1). Table 2 shows the frequency, intensity and distress experienced by the patients in the last seven days. When the prevalence of the symptoms experienced by the patients was examined, the most common complaints were lack of energy (82%), loss of appetite (71%), change in taste of food (62%), anxiety, and feeling irritable (69%). When the frequency of the symptoms was examined, the most common symptoms were weakness (8%), loss of appetite (14%), anxiety (20%) and feeling sad. When the intensity of symptoms was questioned, the severity of symptoms, including lack of energy (37%, 26%), feeling sad (20%), anxiety (22%), dry mouth, nausea and vomiting (20%), was higher in most of the patients in comparison to the other symptoms. Patients were most frequently suffered from lack of energy and fatigue (Table 2). When the occurrence and severity ratings from the MSAS scale were examined, the symptoms could be grouped into five groups; the gastrointestinal system cluster, the psychology cluster, the respiratory cluster, the neurology cluster, and the cluster of skin changes. The Root Mean Square Error of Approximation (RMSE) of these sub-dimensions was 0.070 and was acceptable (Figure 1).

Table 1. Sociodemographic characteristics of patients.

	Min/Max score	X±SD
Age	42-78	59.99±8.13
Duration of diagnosis (month)	1-84	13.07±13.41
	N	%
Gender		
Female	14	14.0
Male	86	86.0
Educational Background		
Primary Education	45	45.0
Secondary Education	29	29.0
University	26	26.0
Marital Status		
Married	91	91.0
Single	9	9.0
Social Security		
Present	100	100
Absent	0	0

Income Status		
Good	23	23.0
Moderate	73	73.0
Low	4	4.0
Employment Status		
Employed	27	27.0
Unemployed	73	73.0
Disease type		
Non-small cell	14	14.0
Small cell	9	9.0
Unknown	77	77.0
Disease stage		
Stage 2	3	3.0
Stage 3	13	13.0
Stage 4	5	5.0
Unknown	79	79.0
Duration of chemotherapy		
1 cycle	8	8.0
2 cycles	22	22.0
3 cycles	17	17.0
4 cycles	18	18.0
5 cycles	13	13.0
6 or more cycles	22	22.0
Other chronic disease		
Yes	29	29.0
No	71	71.0
ECOG		
0	33	33.0
1	62	62.0
2	5	5.0
TOTAL	100	100.0

Table 2. Summarized values for the Memorial Symptom Assessment Scale.

Items	Prevalence		Frequency				Intensity				Distress				
	n	%	1 Rarely	2 Sometimes	3 Often	4 Always	1 Mild	2 Moderate	3 Severe	4 Very severe	0 Never	1 Some	2 A little	3 A lot	4 Too much
1) Difficulty in concentrating	19	19.0	10	7	2	-	10	8	1	-	81	13	3	3	-
2) Pain	47	47.0	18	21	8	-	21	19	7	-	1	28	11	6	1
3) Weakness or lack of energy	82	82.0	14	33	27	8	13	37	26	6	2	23	25	27	5
4) Cough	40	40.0	20	11	7	2	23	13	3	1	3	27	7	2	1
5) Feeling nervous	63	63.0	18	31	13	1	20	29	13	1	3	28	19	12	1
6) Dry mouth	49	49.0	21	21	6	1	21	20	8	-	3	23	18	4	1
7) Nausea	51	51.0	19	19	10	3	19	20	9	3	1	21	18	8	3
8) Feeling drowsy	39	39.0	13	16	9	1	10	20	8	1	-	23	9	6	1
9) Numbness/tingling in hands or feet	28	28.0	9	12	5	2	9	11	6	2	1	16	5	4	2
10) Difficulty in sleeping	51	51.0	20	8	16	7	20	8	16	7	3	19	8	14	7
11) Feeling bloated	21	21.0	8	8	3	2	8	8	3	2	-	13	3	2	3
12) Difficulty in urinating	12	12.0	3	5	3	1	3	7	2	12	-	4	6	2	-
13) Vomiting	39	39.0	21	15	1	2	21	15	1	2	1	23	12	1	2
14) Shortness of breath	28	28.0	16	7	4	1	15	8	5	-	2	16	6	4	-
15) Diarrhea	33	33.0	25	5	3	-	26	4	3	-	1	25	4	3	-
16) Feeling sad	71	71.0	19	30	18	4	19	28	20	4	-	27	21	19	4
17) Sweating	39	39.0	15	11	11	2	15	11	11	2	4	15	9	9	2
18) Anxiety	69	69.0	19	27	20	3	18	26	22	3	2	26	17	19	5
19) Problems with sexual desire or activity	2	2.0	-	1	1	-	-	1	1	-	-	1	1	-	-
20) Itching	14	14.0	9	2	3	-	9	2	3	-	-	9	3	2	-
21) Lack of appetite	71	71.0	25	27	14	5	25	28	15	3	-	36	19	13	3
22) Dizziness	27	27.0	14	10	3	-	14	10	3	-	2	15	7	3	-
23) Difficulty in swallowing	31	31.0	16	10	5	-	16	10	5	-	-	20	7	4	-
24) Being/feeling irritable	69	69.0	15	35	16	3	15	33	18	3	1	21	28	16	3

25) Mouth sores	29	29.0	-	-	-	-	16	10	2	1	2	14	10	3	-
26) Change in the taste of food	62	62.0	-	-	-	-	23	23	14	2	3	24	22	10	3
27) Weight loss	56	56.0	-	-	-	-	33	19	3	1	-	36	15	4	1
28) Hair loss	63	63.0	-	-	-	-	35	15	5	8	1	37	12	5	8
29) Constipation	58	58.0	-	-	-	-	30	16	7	2	-	30	17	6	2
30) Swelling in arms or legs	12	12.0	-	-	-	-	9	2	1	-	1	9	1	-	1
31) "I do not look like myself"	17	17.0	-	-	-	-	11	5	1	-	1	11	4	1	-
32) Changes in skin	22	22.0	-	-	-	-	14	7	1	-	-	15	6	1	-

Discussion

Patients diagnosed with lung cancer have many symptoms depending on the nature of the disease and the treatment process. The synergistic interaction of these symptoms reduces the quality of life of the patient.¹⁰ Dodd et al. defined a symptom cluster as "three or more concurrent symptoms (e.g., pain, fatigue, sleep insufficiency) that are related to each other."⁷ In the present study, when the prevalence of the symptoms experienced by the patients with lung cancer in the last seven days was examined, the most common symptoms were lack of energy (82%), loss of appetite (71%), change in food taste (62%) and anxiety and irritability (69%). These symptoms vary depending on the clinical condition of the patient. In a study conducted by Akin et al. investigating the experiences of patients with chemotherapy-induced lung cancer, it was determined that the most common symptoms were lack of energy, pain, cough, feeling nervous, nausea and dry mouth, respectively.¹⁶ Our findings are similar to those in the literature.^{3, 16} The symptoms of fatigue, anxiety and respiratory distress experienced by lung cancer patients negatively affect their general performance.³ In our study, the most common symptom was lack of energy/fatigue (82%). The incidence of fatigue was 80% in lung cancer patients receiving therapy, whereas it was 57% after treatment.¹⁷⁻¹⁸ Fatigue in cancer patients might develop as a result of the nature of the disease, accompanying comorbidities, nutritional status, treatment, poor performance, and pain and depression.¹⁹ Nowicki et al.

found that patients with lung cancer had a moderate level of general fatigue in their study; Nogueira et al. reported high levels of fatigue in their study.^{18,20} Our results are similar to those in the literature. Patients should be informed about how to use energy-saving techniques in managing their fatigue, and the use of Erythropoiesis-stimulating agents (ESA) may be recommended in anemic patients.^{3,36}

In our study, loss of appetite (71%) and change in the taste of food (62%) were common symptoms. Lung cancer and the ongoing treatment process can reduce the appetite of the patients, leading to results that may become cachexia. Approximately half of newly diagnosed patients and 75% of advanced cancer patients experience weight loss and loss of appetite.^{17,21}

Emotional distress, and the anxiety and depression associated with cancer and its process are symptoms that have adverse psychosocial consequences and negatively affect the quality of life of the patient. Patients might be anxious about their social interaction and potential loss of employment, and may fear of being physically or physically dependent on others.²² In the studies of Hamada et al. and Khamboon et al., the most significant symptoms experienced by the patients were sadness and anxiety.²³⁻²⁴ These findings support our findings. Pharmacological treatment can be given to patients with sleep disorders, and anxiety and depression, and cognitive behavioral treatment

approaches, psychoeducation, individual counseling, acupuncture, acupressure, hypnosis, massage therapy and interventions

specific to their current symptoms can also be recommended to these patients.^{3,23-24}

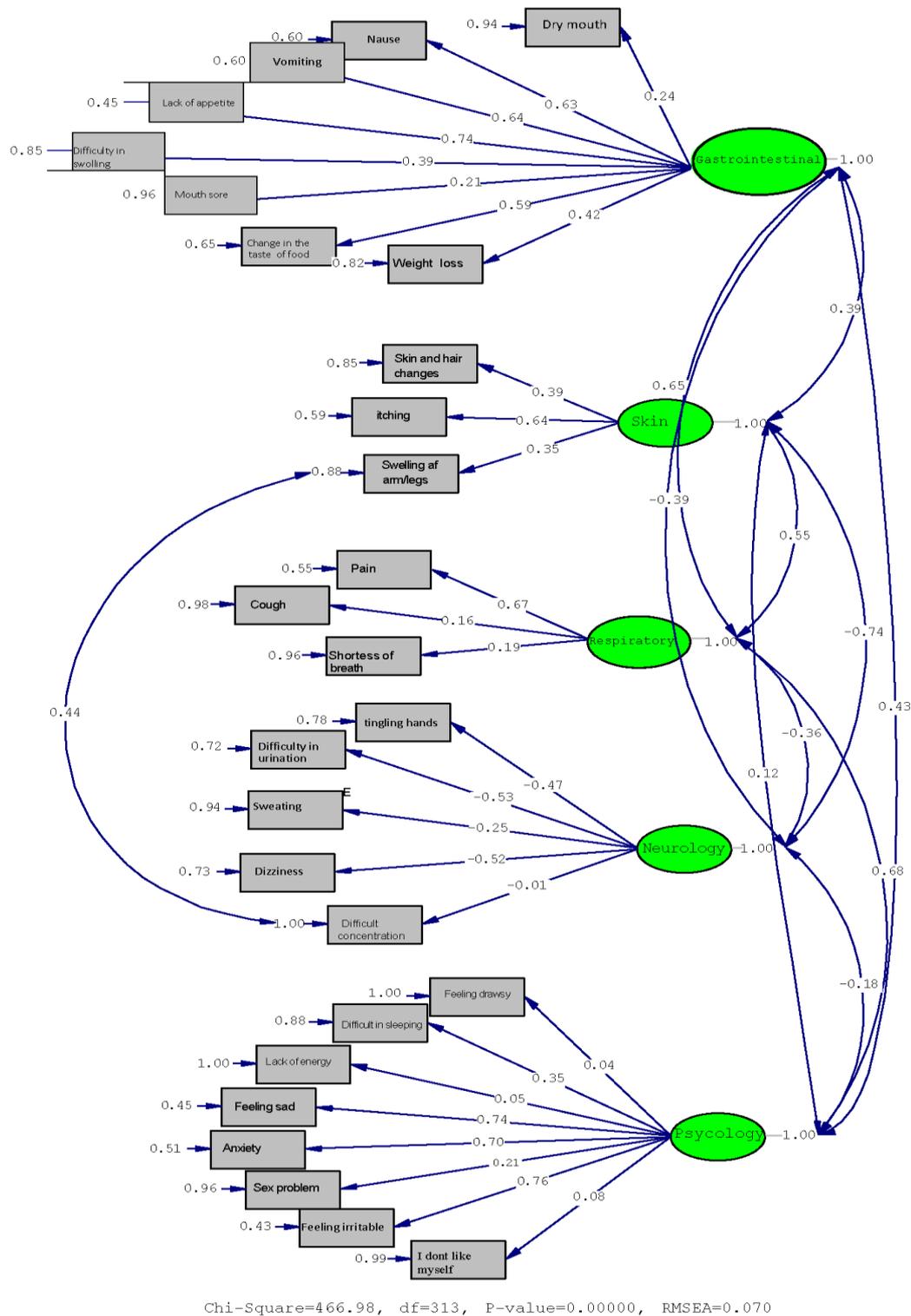


Figure 1. When the degree of emergence and severity from the MSAS scale is examined, the symptoms can be grouped into five groups. Groups; gastrointestinal system cluster (Dry mouth, Nausea, Vomiting, Anorexia, Difficulty Swallowing, Mucositis, Taste change, Weight loss), psychology cluster (difficulty sleeping, not feeling energetic, feeling bad, anxiety, sex problems, dislike, feeling nervous, sleepy feeling), respiratory cluster (Pain, Cough, respiratory distress), neurology cluster (tingling in hands, difficulty urinating, dizziness, sweating, difficulty in concentration) and skin changes cluster (Skin and nail changes, Itching, Arm/leg swelling). . The Mean Square Root Error of Approximation (RMSE) of these sub-dimensions was found to be 0.070 (Chi-Square=466.98, df=313, P-value=0.00000).

In this study, when the occurrence and severity ratings on the MSAS were examined, the symptoms were found to fall into five groups: the gastrointestinal system (GIS) cluster, the psychology cluster, the respiratory cluster, the neurology cluster, and the skin changes cluster. The GIS cluster is characterized by changes in taste, loss of appetite, nausea and vomiting, weight loss, mouth sores, difficulty in swallowing, and dry mouth. In the literature, the GIS cluster was defined by Wang and Fu, Khamboon et al., and Hamada et al. in patients with lung cancer, by Sullivan et al. in patients with breast cancer, and by Süren in end-stage cancer patients.²³⁻²⁷ This condition may develop due to the sensitivity of the GIS to chemotherapy.²⁸ Kim et al. also identified the upper gastrointestinal tract cluster in a study of breast cancer patients.²⁹

Our study had a psychology cluster involving symptoms including the sense that 'I don't look like myself', difficulty in sleeping, feeling drowsy, feeling sad, feeling irritable, anxiety, lack of energy, decreased sexual desire, and feeling nervous. Cancer and its treatment process, increase the production of proinflammatory cytokines production, and the attendant lifestyle changes can lead to the development of negative emotions and thoughts in patients.³⁰ Khamboon et al. determined what they called "emotional-elimination" in their study of advanced lung cancer patients, while Sullivan et al. found a cluster of psychological symptoms among breast cancer patients receiving chemotherapy.^{24, 26}

Another cluster in our study was the respiratory cluster, involving symptoms of cough, shortness of breath and pain. The shortness of breath and accompanying cough in lung cancer patients may be caused by the nature of cancer, as well as by a lack of energy/fatigue due to anemia, anxiety, and idiopathic conditions.²⁷ Khamboon et al. determined respiratory and sleep disorder clusters (shortness of breath, cough and difficulty sleeping; Süren determined a "Cluster 2", involving shortness of breath and cough.^{24,27}

In our study, there was a neurology cluster, including symptoms of difficulty in concentrating, numbness/tingling in hands or feet, difficulty in urinating, and sweating. Khamboon et al. identified neurology and body-image clusters (numbness and tingling in hands/feet), the sense that "I don't like myself", pain, anxiety, and weight loss), while Kim et al. found a psychoneurological cluster in patients with breast cancer. Our findings were thus consistent with the literature.^{24,29} Similarly, there was skin changes cluster involving skin and hair changes, itching and swelling in the arms and legs. A skin changes cluster was defined by Khamboon et al. in patients with lung cancer, and in the study Sullivan et al. that examined the symptom experiences of breast cancer patients.^{24,26} Our findings were thus similar to the literature. When we examined the results in full, it was determined that the RMSE value of the clusters was 0.070 and the clusters reflected the symptoms and their interactions in the patients during the treatment process.

Studies in the literature on symptom clustering in lung cancer have determined that various general symptoms related to chemotherapy treatment and the disease occur, and that these can generally be collected in six clusters. In our study, symptoms were grouped into five clusters. These clusters are compatible with the literature. This may be due to the nature of the disease and the similarity in the treatment formalities.³⁵ Wang et al. determined only three clusters: gastrointestinal, emotional and fatigue. Unlike in our study, fatigue was determined to be a separate cluster. This may have been due to the general condition of the patients, the treatment they received and specific cultural structures.²⁵

Health professionals' awareness of symptom management should be increased. No study has been found in the literature on nurses' awareness of cancer patients' symptom clusters. Nurses play an important role in the management of symptoms seen in patients with a diagnosis of cancer. Nursing care includes educating the patient and family about the disease, its treatment and possible symptoms, ensuring that they are properly informed about the process, and protecting

them from the side effects of the treatment. The effective management of this process is also important so that the patient to comply with their daily routines as far as possible and to preserve their social lives. It is very important for the nurse to understand and evaluate the structure of multiple and complex related symptoms seen throughout the process and to provide effective nursing care. This will provide better symptom management. For example, pain management may affect nausea and fatigue, or medication given for a single symptom may affect other associated symptoms. By defining the effects of symptom clusters on quality of life, functional status and other important parameters, a positive impact can be made on the general condition of the patient through appropriate symptom management.^{12-13,16-17}

Limitation of the study

The limitation of the study is that it was conducted in a single center and with a limited sample.

Conclusion

The most common complaints in the patients were lack of energy (82%), loss of appetite (71%), change in the taste of food (62%), and anxiety and restlessness (69%). The current study supports the grouping of symptoms into five clusters: the GIS cluster, the psychology cluster, the respiratory cluster, the neurology cluster, and the skin changes cluster. It establishes a sound basis from which to develop and evaluate management strategies for the five groups together. In line with these results, in order to best structure nursing care, it is recommended that clusters of symptoms be identified, that the functional status of patients be improved, that physical and psychological symptoms be observed, and that appropriate nursing interventions be planned. It is important that patients' symptoms are evaluated regularly, using a valid and reliable symptom assessment tool. It should not be forgotten that it is vital to diagnose symptoms in the early period and to recognize the most distressing symptoms in order to provide for the comfort of the patient and their compliance with treatment. In addition, protocols for

symptom management should be created in clinics and kept up-to-date.

Ethics Committee Approval

This study was approved by the Institutional Review Board of Dokuz Eylül University (Approval no. 2016 / 24-36). In addition, the patients were informed about the research in accordance with the Helsinki declaration and informed consent was obtained from each patient.

Informed Consent

All participants signed the Informed Consent Form to indicate their consent to participate.

Author Contributions

Idea, design, collection of resources, analysis and interpretation of results and written and critical: ÖU, HM, EK, HSK, TY and İÖ.

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Conflict of Interest

There is no conflict of interest among the authors.

Financial Disclosure

There is no financial disclosure.

Statements

This study was conducted for the purpose of determining symptom clusters in patients with lung cancer receiving chemotherapy. The article has not been published or considered for publication elsewhere.

Peer-review

Externally peer-reviewed

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