

Depression Rates Before Diagnosis and After Treatment in Patients With Advanced Lung Cancer

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Abstract

The aim of the study was to assess, in advanced lung cancer patients, the frequency of depression and the related demographic and biomedical factors before diagnosis and after the initial treatment period. Seventy nine patients from among 105 advanced lung cancer patients diagnosed between July 2001 and April 2002 in the Division of Chest Disease, Oncology Education and Research Hospital in Ankara, were included in the study. Each patient's demographic and biomedical features were recorded and all patients underwent a baseline interview by consultant psychologists for assessment of a depressive state prior to diagnosis. The evaluation was repeated after completion of initial treatment. Symptoms of depression were assessed using the Beck Depression Inventory adapted for Turkey.

The overall frequency of depression before diagnosis and after initial treatment was 50.6% and 21.5%. Mean depression score was 16 ± 11 and 12 ± 9.7 , respectively, before diagnosis and after initial treatment. Patients with small-cell lung cancer had significantly

higher depression scores than those with non-small-cell lung cancer. Severe breathlessness, cough, pain, tiredness, poor malnutrition and performance status were associated with an increased risk of depression. Logistic regression analysis confirmed that pain was the most important predictor of depression prior to diagnosis and after initial treatment.

Our results indicate that depression may be present prior to diagnosis in patients with advanced lung cancer and it does not necessarily increase over time. The most important risk factor in the development of depression was pain and its management is therefore essential during the clinical course. Psychological screening and evaluation of subjective physical symptoms should be part of the initial evaluation of patients with advanced lung cancer.

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Introduction

Depression is a common and important problem in patients with cancer and may occur any time during the course of the disease. It has been reported that 47% of patients with cancer experience periods of anxiety or depression or both. Depression may develop in association with an organic brain lesion or, more commonly, may be a reaction to the news of the diagnosis (1-3). A state of depression may cause an added burden during treatment by leading to difficulties in the management of the patient, to difficulties in compliance and consequently, to difficulties in controlling the symptoms. It may prolong the length of the hospital stay and may also lead to a reduced survival rate (4-9). There is a good general evidence that depression is a significant problem in patients with advanced malignancy. It has been estimated that the prevalence of affective disorders varies

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from 23% to 47% and increases with advanced disease, more severe illness, and poorer physical status (10). Indeed, in patients with advanced and incurable cancer the emphasis in treatment is on controlling the symptoms and maintaining the quality of life (11).

Depression is common also in lung cancer patients and seems to increase with the progression of the disease (12). It has been suggested that the burden of the physical symptoms including intense pain, fatigue and poor performance were risk factors for depression in lung cancer patients (11-12).

To date, few studies have focused on depression prior to diagnosis in cancer patients and research has usually been undertaken in heterogeneous groups which included patients in all stages of the disease. The effects of disease type, physical symptoms, performance, nutritional status and previous illnesses of the patient, such as anorexia, have not been fully evaluated (13-14).

The aims of this study were to evaluate the frequency of depression and compare the frequency of risk factors in patients with advanced lung cancer at initial evaluation and also following treatment.

Materials and Methods

Subjects were consecutively recruited from suspected lung cancer patients who had presented to the Division of Chest Diseases, Ankara Oncology Education and Research Hospital, between July 2001 and April 2002. They were included in the study according to the following criteria: 1) aged 18 years or above, 2) well enough to participate in an interview and complete a questionnaire, 3) to have advanced lung cancer, 4) to have no concomitant cancer or other severe medical or mental disorder.

All suspected lung cancer cases were identified by the chest physicians. If these physicians considered that lung cancer was a diagnostic possibility in a particular patient, that patient's demographic and biomedical features were recorded and, to be able to evaluate the psychological state before the diagnosis of cancer, all these patients underwent a baseline interview by two consultant psychologists. Prior to the interview, the patients were informed about the suspicion of a lung cancer by a psychologist. The study was approved by the local ethics committee and all patients gave informed consent. Symptoms of depression were assessed using the Beck Depression Inventory (BDI) adapted for Turkey (15-16). At baseline, both patient and interviewer were blind to the final diagnosis. The respondents answered the BDI questions on their own or, if they were illiterate, the questions were read to them and their verbal answers were written down by the interviewer. If the diagnosis of lung cancer was confirmed, the patient was informed about the diagnosis and a follow-up assessment was scheduled for a date 2-3 months after completion of the initial treatment. In this study, "initial treatment" was defined as the first cycle of the cytotoxic chemotherapy (CT) or of the combined therapy (chemoradiotherapy) and completion of radiotherapy (RT) or palliative therapy.

Demographic and biomedical factors

Demographic factors including sex, age, education level, smoking history and marital status as well as biomedical factors such as physical performance, nutritional status and clinical symptoms were evaluated in suspected lung cancer patients during their first visit to the chest physicians. Performance status was assessed by the Karnofsky scale (17). Clinical symptoms expressed by the patients, such as general or chest pain, dyspnea, cough, sputum production and tiredness were graded during interview on a four-level scale: 1 (absent); 2 (mild); 3 (moderate or tolerable); 4 (severe or intolerable). Nutritional status was defined by using subjective global assessment (SGA) as described by Detsky et al (18-21) and each patient was graded as a) well nourished (SGA A), b) moderately malnourished or suspected of being malnourished (SGA B), or c) severely malnourished (SGA C). The diagnosis of lung cancer was based upon a cytologic or histologic examination in all cases. The presence of lymph node metastases was evaluated by chest computed tomography (CT). Distant metastases were examined by brain, chest, and abdominal CT, and bone scintigraphy. The newly adopted American Joint Committee on Cancer (AJCC) criteria was used for the TNM (tumour node metastasis) staging of all patients. Small-cell lung cancer (SCLC) patients were classified as having "limited" (stage I, II or III) or extensive disease (stage IV). Clinical staging was used for all patients. We considered stage IIIB and IV for non-small-cell lung cancer (NSCLC) patients and stage IV for SCLC patients as advanced disease (22).

After staging, each case was discussed by the oncology group and individual therapeutic strategy was defined. Patients with a poor performance status or accompanying disease (cardiac, renal, etc) making treatment toxicity intolerable were given supportive care which included some palliative measures. All other patients had antineoplastic treatment. Those with stage IIIB, local advanced disease, usually underwent a combined therapy program (three cycles including a platinum compound followed by radiotherapy and three more cycles) and some patients underwent only radiotherapy. Patients with stage IV metastatic disease were usually submitted to chemotherapy.

Antineoplastic therapy was administered to 64 (81%) patients. The number of patients who received the first cycles of chemotherapy or chemoradiotherapy was 57 (72.1%) and 7 patients (8.8%) received only radiotherapy. Fifteen patients (18.9%) received only supportive care. Pain relief measures, nutritional support and psychological support were offered to all patients when necessary. After the second interview, 17 with depressive symptoms were referred to the Division of Psychooncology for antidepressive treatment.

Statistical analysis

Overall depression frequency and frequency within SCLC

		No. of patients
Total patients		79
Age		
Mean±SD		58±10
(Range)		22-78
Sex	Male	74
	Female	5
Marital status		
Married		70
Unmarried		9
Smoking status		
Nonsmokers		6
Current smoker		60
Exsmoker		13
Education		
Primary school		61
High school		18
Histological type		
NSCLC		64
SCLC		15
SD: Standard deviation, NSCLC: Non-small-cell lung cancer, SCLC: Small-cell lung cancer.		

and NSCLC subgroups were calculated using a cut-off score of 17 to 21 for a "borderline case" and 22+ for a "probable case" of depression, as recommended by the authors of the scale (16). Persistence of depressive symptoms was determined by comparing patients with complete BDI inventory data before diagnosis and after initial treatment. Wilcoxon's matched pairs signed rank test was used to compare before diagnosis and after treatment depression scores. Analyses were carried out for the whole sample and by disease subgroups. Mann-Whitney U and Chi-square tests were

	Before diagnosis n (%)	After treatment n (%)
Normal	39 (49.3)	62 (78.4)
Borderline	14 (17.7)	8 (10.1)
Case	26 (32.9)	9 (11.3)
Total depressive patients	40 (50.6)	17 (21.5)
Mean depression	16 ±11.04	12 ±9.7
score*(mean±SD) (min-max)	(2-53)	(1-61)
* p< 0.0001, SD: Standard deviation.		

carried out to compare associated factors in depressed and non-depressed patients and also to compare disease subgroups before diagnosis and after initial treatment. Change in the factors associated depression whole samples from before diagnosis to after treatment was tested using Wilcoxon's matched pairs signed rank.

A stepwise logistic regression analysis was performed to determine the association of independent factors with depression before diagnosis and after initial treatment.

For all statistical evaluations, P values of 0.05 or less were considered to indicate significance. All data analyses were conducted using SPSS 10.0.

Results

One hundred and five patients with suspected lung cancer were interviewed and a diagnosis of lung cancer was confirmed in 100 patients. Ninety five of these patients were alive at the follow up period. Fourteen of the 95 patients had limited disease while 81 had advanced disease. Two patients refused to participate in the first follow-up interview and the final group therefore consisted of 79 patients. The mean age ±SD of the 79 patients who participated in the study was 58±10 years (ran-

	NSCLC		SCLC	
	Before diagnosis n (%)	After treatment n (%)	Before diagnosis n (%)	After treatment n (%)
Normal	36 (56.2)	52 (81.2)	2 (13.3)	10 (66.6)
Borderline	12 (18.7)	5 (0.07)	4 (26.6)	3 (20)
Case	16 (25)	7 (10.9)	9 (60)	2 (13.3)
Total depressive patients	28 (43.7)	12 (23.4)	13 (86.6)	5 (33.3)
Mean depression	14.8 ± 1.3	10.8 ± 0.9	24.3 ± 2.7	18.7 ± 3.7
scores (mean±SD) (min-max)	(1-48)	(1-35)	(8-53)	(2-61)
		P< 0.001	P= 0.02	
NSCLC: Non-small-cell lung cancer, SCLC: Small-cell lung cancer, SD: Standard deviation.				

Variables	Depression (+) (n=40[%]*)	Depression (-) (n= 39 [%]*)	P value
Performance status (KPS)			
80-90	5 (17.8)	23 (82.1)	0.009
60-70	27 (65.8)	14 (34.1)	
40-50	8 (80)	2 (20)	
Nutritional status (SGA)			
A	4 (15.3)	22 (84.6)	0.001
B	19 (55.8)	15 (44.1)	
C	17 (90)	2 (10)	
Pain			
Absent	2 (0.06)	29 (93.5)	0.001
Mild	2 (22.2)	7 (77.7)	
Tolerable	13 (86.6)	2 (13.3)	
Intolerable	23 (95.8)	1 (0.04)	
Cough			
Absent	4 (17.3)	19 (82)	0.001
Mild	14 (50)	14 (50)	
Tolerable	19 (86.3)	3 (13.6)	
Intolerable	3 (50)	3 (50)	
Dyspnea			
Absent	4 (14.8)	23 (85.1)	0.001
Mild	8 (40)	12 (60)	
Tolerable	20 (90.9)	2 (0.09)	
Intolerable	8 (80)	2 (20)	
Tiredness			
Absent	2 (12.5)	14 (87.5)	0.001
Mild	3 (17.6)	14 (82.3)	
Tolerable	12 (60)	8 (40)	
Intolerable	23 (88.4)	3 (11.5)	

(+): present, (-): absent, KPS: Karnofsky performance scala, SGA: Subjective global assessment, NSCLC: Non-small-cell lung cancer, SCLC: Small-cell lung cancer, *row percent.

	Depression (+) n (%)*	Depression (-) n (%)*	P value
Performance status (KPS)			
80-90	1 (3.33)	29 (96.6)	0.001
60-70	10 (25.6)	29 (74.3)	
40-50	6 (60)	4 (40)	
Nutritional status (SGA)			
A	0	32 (100)	0.001
B	12 (28.5)	30 (7.14)	
C	5 (62.5)	3 (37.5)	
Pain			
Absent	0	33 (100)	0.001
Mild	0	25 (100)	
Tolerable	11 (73.3)	4 (26.6)	
Intolerable	6 (100)	0	
Cough			
Absent	3 (0.09)	30 (90.9)	NS
Mild	7 (16.6)	25 (59.5)	
Tolerable	7 (50)	7 (50)	
Intolerable	0	0	
Dyspnea			
Absent	1 (3.33)	29 (96.6)	0.001
Mild	5 (15.6)	27 (84.3)	
Tolerable	9 (60)	6 (40)	
Intolerable	2 (100)	0	
Tiredness			
Absent	0	24 (100)	0.001
Mild	6 (16.6)	30 (90.9)	
Tolerable	7 (46.6)	8 (53.3)	
Intolerable	4 (100)	0	

(+): present, (-): absent, KPS: Karnofsky performance scala, SGA: Subjective global assessment, NS: nonsignificant, *row percent.

ge, 22-78). Seventy (92%) of the patients were married and 9 (8%) were living alone. Most of the patients had only primary school education and were from severely deprived areas. Smoking status was as follows: current smokers, 60 (75.9%); ex-smokers, 13 (16.4%); nonsmokers, 6 (7.6%). Sixty-four (85%) patients had NSCLC and 15 (19%) SCLC (Table 1).

Figures on the overall frequency of depression before diagnosis and after initial treatment in the total group and in SCLC and NSCLC patients are given in Tables 2 and 3.

The demographic and biomedical factors in patients with and without depression were compared before diagnosis. Potential variables related to depression were poor performance status ($p=0.009$), malnutrition ($p<0.001$), pain ($p<0.001$), breathlessness ($p<0.001$), cough ($p<0.001$) and tiredness ($p<0.001$) (Table 4). The other variables (age, sex, smoking status, marital status) were not related to depression before diagnosis.

The demographic and biomedical factors of patients with and without depression were compared also after treatment. After initial treatment, performance status ($p<0.001$), malnutrition

($p<0.001$), pain ($p<0.001$), breathlessness ($p<0.001$) and tiredness ($p<0.001$) were found to be related to depression. Cough and other variables (age, sex, smoking status, marital status) were not related to depression after initial treatment (Table 5).

We compared the biomedical factors in NSCLC patients with and without depression before diagnosis. The difference between pain ($p<0.001$), cough ($p<0.001$), dyspnea ($p<0.001$), malnutrition ($p<0.001$) was significant in patients with depression and without depression. After treatment, all these biomedical factors, except for cough were statistically different in patients with and without depression (Table 6-7). A comparison of biomedical factors in SCLC patients with and without depression before diagnosis showed that the potential variables related to depression were pain ($p=0.008$) and dyspnea ($p=0.014$). After treatment, pain ($p=0.005$), dyspnea ($p=0.031$) and tiredness ($p=0.01$) were related to depression (Table 6-7).

There was a significant difference between NSCLC and SCLC subgroups before diagnosis with regard to biomedical factors

Table 6. Biomedical factors of the disease subgroups with depression and without depression before diagnosis						
Variables	NSCLC			SCLC		
	Depression (+) n (%)*	Depression (-) n (%)*	P	Depression (+) n (%)*	Depression (-) n (%)*	P
Performance status (KPS)						
80-90	4 (14.8)	23 (85.1)	NS	1 (50)	1 (50)	NS
60-70	19 (65.5)	10 (34.4)		8 (80)	2 (20)	
40-50	5 (62.5)	3 (37.5)		3 (100)	0	
Nutritional status (SGA)						
A	1 (0.04)	21 (95.4)	0.001	2 (66.6)	1 (33.3)	NS
B	16 (53.3)	14 (46.6)		4 (80)	1 (20)	
C	11 (91.6)	1 (0.08)		6 (85.7)	1 (14.2)	
Pain						
Absent	1 (0.03)	27 (96.4)	0.001	1 (33.3)	2 (66.6)	0.008
Mild	0	6 (100)		0	1 (100)	
Tolerable	8 (80)	2 (20)		5 (100)	0	
Intolerable	19 (86.3)	3 (13.6)		6 (100)	0	
Cough						
Absent	2 (16.6)	10 (83.3)	0.001	2 (66.6)	1 (33.3)	NS
Mild	10 (43.4)	13 (56.5)		4 (80)	1 (20)	
Tolerable	13 (81.2)	3 (0.18)		6 (85.7)	1 (14.2)	
Intolerable	3 (75)	1 (25)		0.0010		
Dyspnea						
Absent	4 (14.8)	23 (85.1)	0.001	0 (100)		0.014
Mild	4 (28.5)	10 (71.4)		3 (60)	2 (40)	
Tolerable	12 (85.7)	2 (16.6)		8 (100)	0	
Intolerable	8 (88.8)	1 (11.1)		1 (100)	0	
Tiredness						
Absent	2 (12.5)	14 (87.5)	0.001	0	0	NS
Mild	1 (0.07)	13 (92.8)		1 (50)	1 (50)	
Tolerable	8 (57.1)	6 (42.8)		5 (71.4)	2 (28.5)	
Intolerable	17 (73.9)	3 (15)		6 (100)	0	

(+): present, (-): absent, KPS: Karnofsky performance scala, SGA: Subjective global assessment, NS: nonsignificant, NSCLC: Non-small-cell lung cancer, SCLC: Small-cell lung cancer, *row percent.

such as performance status ($p=0.009$) and dyspnea ($p=0.039$). Changes in factors associated with depression in the whole sample with treatment were also assessed by comparing before and after treatment data. There were significant differences in symptoms such as performance status ($p=0.025$), cough ($p<0.001$), tiredness ($p<0.001$), dyspnea ($p<0.001$), malnutrition ($p<0.001$), and pain ($p<0.001$) before diagnosis and after initial treatment (Table 8).

The stepwise logistic regression analysis performed to determine the association of independent factors including age, sex, cell type (SCLC v NSCLC), stage of disease (III v IV), smoking habits, performance status, malnutrition, breathlessness, tiredness, pain and cough before diagnosis and after treatment confirmed that pain was the most important risk factor prior to diagnosis and also after treatment (Table 9).

Discussion

Depression is not routinely assessed in lung cancer patients at initial presentation to a hospital. It is well documented that doctors and nurses fail to detect emotional distress in their patients and patients themselves do not disclose it unless asked (23-26). In a study of more than 1000 cancer patients, physicians and nurses were more likely to agree on the absence of depression. It was also found that the oncologist frequently assessed their patients' levels of depressive symptoms inaccurately (23). This makes it difficult to comment precisely on the effect of diagnosis and treatment on the patients' emotional status. To our knowledge, few studies to date have focused on depression in advanced lung cancer patients before diagnosis. This is the first study of depression in

Table 7. Biomedical factors of the disease subgroups with depression and without depression after treatment							
		NSCLC			SCLC		
Variables		Depression (+) n (%)*	Depression (-) n (%)*	P	Depression (+) n (%)*	Depression (-) n (%)*	P
Performance status (KPS)	80-90	1 (0.03)	25 (96.1)	0.002	1 (25)	3 (75)	NS
	60-70	8 (24.2)	25 (75.7)		2 (25)	6 (75)	
	40-50	3 (60)	2 (40)		2 (66.6)	1 (33.3)	
Nutritional status (SGA)	A	0	31 (100)	0.001	0	3 (100)	NS
	B	8 (27.5)	21 (72.4)		4 (36.3)	7 (63.6)	
	C	4 (100)	0		1 (100)	0	
Pain	Absent	0	30 (100)	0.001	0	3 (100)	0.005
	Mild	0	16 (100)		0	5 (100)	
	Tolerable	8 (57.1)	6 (42.8)		3 (60)	2 (40)	
	Intolerable	4 (100)	0		2 (100)	0	
Cough	Absent	2 (0.07)	26 (92.8)	NS	1 (20)	4 (80)	NS
	Mild	5 (20.8)	19 (79.1)		2 (28.5)	5 (71.4)	
	Tolerable	5 (45.4)	6 (54.5)		2 (66.6)	1 (33.3)	
	Intolerable	0	1 (100)		0	0	
Dyspnea	Absent	1 (0.03)	29 (96.6)	0.003	0	3 (100)	0.031
	Mild	7 (30.4)	16 (69.5)		3 (30)	7 (70)	
	Tolerable	3 (30)	7 (70)		2 (100)	0	
	Intolerable	1 (100)	0		0 (100)	0	
Tiredness	Absent	0	22 (100)	0.001	0	1 (100)	0.01
	Mild	6 (21.4)	22 (78.5)		1 (11.1)	8 (88.8)	
	Tolerable	4 (33.3)	8 (66.6)		3 (75)	1 (25)	
	Intolerable	2 (100)	0		1 (100)	0	

(+): present, (-): absent, KPS: Karnofsky performance scale, SGA: Subjective global assessment, NS: nonsignificant, NSCLC: Non-small-cell lung cancer, SCLC: Small-cell lung cancer.

a large, homogeneous, consecutive, prospectively designed sample of advanced lung cancer patients before diagnosis.

In this study, a significant level of depression was detected, especially in patients with pain, which indicates that the emotional status of lung cancer patients should be systematically assessed at initial presentation. Many studies have focused on the effect of diagnosis and treatment of cancer on the patient's emotional status (12, 27, 28). A higher frequency of depression has been found to be associated with a more advanced stage of malignancy (2). Our results showed that 51% of patients with advanced lung cancer had depression at initial presentation. This figure is higher than that of Hughes' study in which depressive symptoms were elicited by a combination of self-assessment questionnaire and structured clinical interview (13). In a Scottish study, in which a "Hospital Anxiety and Depres-

sion Scale" was used, depression rates were close to that of the normal population prior to diagnosis. However, most of their patients had limited disease in contrast to our study group which was composed of those with advanced disease (14). The results of our study suggest that advanced lung cancer patients may suffer from depression before diagnosis. As Bernhard and Gans suggested, it is difficult to discriminate between the underlying biological and psychological factors which cause depression (29). In our patients, the depression rate increased with the severity of physical symptoms. The pain was significantly related to depression in the regression analysis, thus it was considered appropriate to identify the impact of pain as a risk factor before diagnosis. This finding is consistent with several studies in which disease related physical variables, such as pain, dyspnea and performance status, pCO₂, FEV₁ and

Table 8. Biomedical factors of patients before diagnosis and after treatment

Variables		Before diagnosis n (%)*	After treatment n (%)*
Depressive symptoms		40 (50.6)	17 (21.5)
Performance status			
(KPS)	80-90	28 (35.4)	30 (37.9)
	60-70	41 (51.8)	39 (48.8)
	40-50	10 (12.6)	10 (12.6)
Nutritional status (SGA)			
	A	26 (32.9)	32 (40.5)
	B	34 (43)	42 (53.1)
	C	19 (24)	8 (10.1)
Pain			
	Absent	31 (39.2)	34 (43)
	Mild	9 (11.3)	25 (31.6)
	Tolerable	15 (18.9)	15 (18.9)
	Intolerable	24 (30.3)	6 (0.07)
Cough			
	Absent	23 (29.1)	33 (59)
	Mild	28 (35.4)	32 (53.4)
	Tolerable	22 (27.8)	15 (40.6)
	Intolerable	6 (0.07)	0
Dyspnea			
	Absent	27 (34.1)	30 (37.9)
	Mild	20 (25.3)	32 (40.5)
	Tolerable	22 (27.8)	15 (18.9)
	Intolerable	10 (12.6)	1 (0.01)
Tiredness			
	Absent	16 (20.2)	24 (30.3)
	Mild	17 (21.5)	36 (45.5)
	Tolerable	20 (25.3)	15 (18.9)
	Intolerable	26 (32.9)	4 (0.05)

(+): present, (-): absent, KPS: Karnofsky performance scale, SGA: Subjective global assessment, *column percent.

severity of disease have been reported to be significantly correlated with quality of life after diagnosis in cancer, asthma and chronic obstructive lung disease patients (1,13, 30-33).

In the current study, the frequency of depression after initial treatment was not as high as in previous studies. At the follow up, the rate of depression was 22% and there was a significant improvement in depression rates with decreased physical symptoms, good nutrition and increased performance status. In logistic regression analysis, pain is the only predictive factor for depression after treatment.

The frequency of depression in SCLC was higher than that of NSCLC patients before diagnosis and after initial treatment. There was also a significant difference between NSCLC and SCLC subgroups before diagnosis with regard to biomedical factors such as performance status and dyspnea. The difference was thought to be due to a higher incidence of poor performance and increased severity of dyspnea in the SCLC group. A greater frequency of depression in SCLC patients may be explained by the fact that SCLC cases gene-

Table 9. Logistic regression analysis of factors independently associated with depression before diagnosis and after initial treatment

Variables	β	SE	Wald	P value	OR	%95 CI
Pain (before diagnosis)	2.282	1.020	5.009	0.025	9.796	1.328-72.27
Pain (after treatment)	1.492	0.378	6.668	0.01	4.443	1.433-13.792

SE: standard error, OR: odds ratio, CI: confidence interval.

rally have more widespread disease and may secrete a humoral substance which influences mood. Although, the effect of cell type was not significantly related to depression in the regression analysis, it still may be appropriate to identify the impact of cell type as a risk factor.

A significant association between pain and psychological distress has been reported in several studies (34-37). In the advanced cancer setting, pain is frequently associated with the risk of depression. However, while many studies indicate that pain is one of the most frequent and disturbing symptoms in cancer patients, it should also be pointed out that pain is a symptom that is often treated inadequately (38,39).

Our data support evidence that pain was the most significant factor in depression but also shows that other common symptoms such as dyspnea, breathlessness, cough, tiredness, poor nutrition and poor performance status are also important and that clinicians should be more aware of these issues. Doctors frequently underestimate such symptoms, and making routine use of patient self-assessment data should be mandatory.

A previous population-based epidemiological study demonstrated that the prevalence of depression varies widely across countries and that the prevalence of depression in Asian countries is much lower than in Western countries (40). In Turkey, the prevalence of depression appears to have increased during the last two decades (41-44). In a recent study performed among cancer patients in Turkey, a high prevalence of psychiatric disorders, especially depression was found (45). Although our results showed that 51% of patients with advanced lung cancer had depression at initial presentation, lower rates may reflect cultural differences. Several factors, such as the hierarchic nature of the family structure, fatalist beliefs, religious beliefs and lower educational levels may have an impact on the psychological effects of progressive disease. We should note that the majority of our patients were not covered by insurance. Admission to a hospital, where the conditions may be better than outside or at home, may mean care, good nutrition and safety for these patients, and they may feel better in hospital. Since our data were based on assessment demographics and biological parameters, we did not have information on social support, which may also be an important predictor of depression (46-48).

In conclusion, the current study suggests that, depression is not unusual prior to diagnosis of cancer and that clinical depressive disorders do not seem to increase during the clini-

cal course. Pain is one of the most frequent and disturbing symptoms in patients with advanced lung cancer disease both before diagnosis and after treatment.

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