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Evaluation of whether smoking cessation among advanced lung cancer patients has a significant effect on anxiety and depressive symptoms

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Abstract:

BACKGROUND AND AIM: Continued smoking has a detrimental effect on lung cancer patients, which may already be associated with anxiety and depression. There is a belief among some that smoking cessation will further increase anxiety and depression in these patients, reducing their quality of life. In this study, we aimed to determine whether there was a difference in anxiety, depression, and quality of life scores between ex-smokers after the diagnosis of lung cancer and current smokers.

METHODS: One hundred patients with advanced lung cancer were included in the study. Demographic characteristics were recorded, and the smoking status of patients was questioned. The Hospital Anxiety and Depression Scale and European Organization for Research and Treatment of Cancer Quality of Life tests were performed to evaluate anxiety, depression, and quality of life.

RESULTS: The mean age was 61±8 years. Adenocarcinoma was the most common type of cancer, and 64% of the cases were at stage 4. Of the total 100 patients, 8 had never smoked, 23 were smokers, and 69 were ex-smokers. After the diagnosis of lung cancer, 17 patients quit smoking. No statistically significant difference was found between smoking status and anxiety or depression and quality of life scores ($p>0.05$). There was no difference between anxiety or depression and quality of life scores between patients who quit smoking after the diagnosis and those who continued ($p>0.05$).

CONCLUSIONS: Patients with lung cancer should not be abstained from smoking cessation because of the possibility of increased anxiety or depression; rather, patients should be supported for smoking cessation at any stage.

Keywords:

Anxiety, depression, lung cancer, smoking cessation

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Introduction

Lung cancer is the second most common cancer type in the world and is the first in Türkiye.^[1,2] Although various factors play a role in the development of lung cancer, smoking is the most important risk factor. The risk of lung cancer is increased 10–30 times in heavy smokers compared with nonsmokers.^[2] Smoking accounts for 30% of all cancer-related mortality and 87% of lung cancer-related deaths.^[3]

Studies have shown that motivation and desire to quit smoking increase after a cancer diagnosis. However, 1/3 of patients continue to smoke.^[4] The rate of smoking is much higher in patients with cancer related to smoking. About 15%–20% of lung cancer patients continue to smoke.^[5] While the importance of smoking cessation has been understood in the primary prevention of cancer, its importance in diagnosing or treating cancer is ignored.^[3,4,6] There is increasing evidence of the detrimental effects of continuing smoking after a cancer diagnosis. Anxiety and depression are common in patients with lung cancer due to short life expectancy after the diagnosis despite treatment. It has been shown that quitting smoking alone causes anxiety and depression.^[5]

In this study, it was aimed to determine whether there was a difference in anxiety, depression, and quality of life levels between smokers, ex-smokers, and never smokers in advanced lung cancer patients and to determine whether there was a difference in anxiety, depression, and quality of life scores between ex-smokers after the diagnosis of lung cancer and current smokers.

Materials and Methods

Selection of the study population

A total of 100 patients diagnosed with lung cancer between January 2018 and December 2018 and staged as locally advanced and advanced (stages 3A, 3B, and 4) were included in the study. Inclusion criteria for patients were: (a) pathological diagnosis of lung cancer; (b) no psychiatric disorder before cancer diagnosis; (c) not using psychiatric drugs; and (d) having enough intelligence, cooperation, and education level so that the Hospital Anxiety and Depression Scale (HADS) and European Organization for Research and Treatment of Cancer Quality of Life (EORTC QLQ-C30) could be read and filled on their own.

Gender, age, marital status, education level, and annual household income were recorded. Smoking status [never-smokers, ex-smokers smoking status; (never-smokers, ex-smokers, or smokers) was examined.

The Fagerstrom Nicotine Dependence Test (FNDT) was used to detect cigarette dependence.^[7] The HADS is a fourteen-item scale with 7 items related to anxiety and 7 to depression. Each item on the questionnaire is scored from 0 to 3. This means that a person can score between 0 and 21 for either anxiety or depression. For both anxiety and depression, a score of 0–7 represents normal, 8–11 denotes borderline, and >11 represents anxiety or depression.^[8,9] Quality of life was assessed using the EORTC QLQ-C30. The EORTC QLQ-C30 Version 3.0 is a widely used quality of life scale in cancer patients worldwide. The EORTC QLQ-C30 includes three subheadings: general well-being, functional difficulties and symptom control, and 30 questions. Functional scales evaluate physical, role, cognitive, emotional, and social functions. Symptom scales are evaluated for fatigue, pain and nausea, and vomiting. In addition, dyspnea, insomnia, loss of appetite, constipation, diarrhea, and financial difficulties are measured by one question each. The first 28 of the 30 items in the scale are 4-point Likert-type scale, and the items are evaluated as follows: none (1 point), slight (2 points), quite (3 points), and very (4 points). Questions 29 and 30 are questions of general well-being. In the 29th question of the scale, the patient is asked to evaluate his/her health on a scale from 1 to 7 (1 represents very poor and 7 being excellent). In the 30th question, the overall quality of life is asked. When a patient's functional and general health status scores were higher and the symptom scale scores were lower, the quality of life scores were higher.^[10]

Statistical analysis

The Statistical Package for the Social Sciences (IBM SPSS, Inc., version 22, Chicago, IL, USA) was used to analyze statistical data. We compared HAD and EORTC QLQ-C30 scores among smokers, never smokers, and ex-smokers after diagnosis. The characteristics of patients in the smoker, never smoker, and ex-smoker categories were compared with two-sample t-tests (or the Wilcoxon rank-sum test) for continuous variables and a Chi-squared test (or Fisher's exact test) for categorical variables. Differences in smoking cessation duration were calculated with nonparametric tests. When the data had normal distribution, the number was defined as mean± standard deviation. If the data were not in the normal

range, the number was defined as the median (quarter interval). To study the association between HAD scores and EORTC QLQ scores and age and FNBT scores, Pearson's correlation test was used. The comparison of the mean scores of the EORTC QLQ-C30 functioning scales was made using a student test at a 0.05 significance level.

For all statistical comparison tests, the type I error was set at $\alpha=0.05$ and tested as two-tailed. Intergroup difference was considered statistically significant when the p-value was less than 0.05.

Results

A total of 100 patients were included in the study. The mean age was 61 ± 8 years. Of the patients, 80% were males and 57% of the patients were primary school graduates. Adenocarcinoma (49%) was the most common type of cancer. Of the cases, 64% were in stage 4. Among the patients, 8 were nonsmokers, 23 were active smokers, and 69 were ex-smokers. After the diagnosis of lung cancer, 24% of smokers quit smoking. The average yearly packet of smokers was over 20 packs per annum. The level of cigarette dependence was high (Table 1).

The HAD depression and anxiety score and the EORTC score did not correlate with age and cigarette dependence (FNBT) and did not differ between genders (Table 2). No statistically significant difference was found between smoking habits (smoker and ex-smoker) and anxiety depression and quality of life scores (Table 3).

Seventeen ex-smokers stopped smoking when after the diagnosis of cancer, while 23 continued to smoke. No statistically significant difference was detected between HAD and EORTC scores between the ex-smokers after the diagnosis and smokers (Table 4).

Discussion

This study showed that smoking cessation and continuing smoking in patients with advanced stage lung cancer did not make a difference in terms of anxiety or depression levels and quality of life.

In a meta-analysis evaluating 20 studies, it was associated with continued smoking after diagnosis, increased risk of all-cause mortality, and reduced survival in patients with early stage lung cancer. Continuing smoking

Table 1: Demographic characteristics of 100 study subjects

Characteristic	n	%
Age (years)	61±8	(37–83)
Gender		
Male	80	80
Female	20	20
Education		
Illiterate	8	8
Primary school	57	57
Middle school	11	11
High school	19	19
University	5	5
Median follow-up time (months)		16
Median number of hospitalizations after diagnosis	2	
Type of cancer		
Squamous cell carcinoma	33	33
Adenocarcinoma	49	49
Small cell carcinoma	12	12
Non-small cell carcinoma and others	3	3
Large cell carcinoma	3	3
Cancer stage		
3A	6	6
3B	30	30
4	64	64
Smoking status		
Never smokers	8	8
Smokers	23	23
Ex-smokers	69	69
Smoking history in packs/year (total=92)		
≤10	3	3.3
11–20	5	5.4
≥20	84	91.3
Time (min) from awakening to smoking the first cigarette of the day (total=92)		
<5	47	51.1
5–30	8	8.7
30–60	17	18.5
≥60	20	21.7
FNBT score mean (median)	7.4±1.9	(1–10)
HAD-anxiety score mean (median)	7.28±4.92	(1–19)
HAD-depression score mean (median)	8.07±4.46	(1–19)
EORTC QLQ		
Physical functioning score mean (median)	52.0±24.4	(0–95)
Social functioning score mean (median)	75.8±28.4	(0–100)
Cognitive functioning score mean (median)	30.9±18.6	(2.5–76.9)
Emotional functioning score mean (median)	56.1±28.0	(0–100)
Global health status score mean (median)	57.4±27.6	(0–100)

FNBT: Fagerstrom Nicotine Dependence Test, HAD: Hospital Anxiety and Depression, EORTC QLQ: European Organization for Research and Treatment of Cancer Quality of Life

Table 2: Association between HAD score and EORTC QLQ scores and age and FNBT scores

Variable	HAD-anxiety score	HAD-depression score	Physical functioning score	Social functioning score	Cognitive functioning score	Emotional functioning score	Global health status score
Age	p=0.667 r=-0.095	p=0.674 r=-0.043	p=0.691 r=-0.043	p=0.723 r=-0.040	p=0.653 r=-0.036	p=0.223 r=-0.045	p=0.944 r=-0.123
FNBT	p=0.106 r=-0.169	p=0.981 r=-0.002	p=0.908 r=-0.012	p=0.086 r=-0.180	p=0.265 r=-0.117	p=0.569 r=-0.060	p=0.386 r=-0.092

HAD: Hospital Anxiety and Depression, EORTC QLQ: European Organization for Research and Treatment of Cancer Quality of Life, FNBT: Fagerstrom Nicotine Dependence Test, r: Pearson's correlation coefficient

in advanced lung cancer was also associated with negative results in new targeted therapies such as erlotinib. It was found that smoking in patients with gastric and lung cancer is also associated with an increased risk of developing secondary/primary tumors. Smoking cessation after lung cancer diagnosis has been associated with better performance status, patients who continue to smoke despite cancer diagnosis report more severe pain in pain-related functional disorders, and worsening overall quality of life. In conclusion, it was found that smoking continued after the cancer diagnosis, decreased efficacy of treatment and decreased survival, increased risk of secondary/primary malignancy, and poor quality of life.^[6] For this reason, it is important to stop smoking after the diagnosis of cancer. Despite the studies showing the benefits of smoking cessation in cancer, some studies claim that the depression already existing in these patients due to the disease will increase with the cessation of smoking. Therefore, it has been suggested that smoking cessation may be difficult in these patients.^[11] However, in our study, there was no increase in anxiety or depression levels and no deterioration in the quality of life when patients quit smoking after the diagnosis of lung cancer when compared with patients who continued smoking.

While a significant proportion of all smokers have a history of depression, the rate of smoking among people with depression is twice the general population.^[12-14] There are associations between depression and smoking cessation. Earlier research reported that cessation may lead to increased symptoms of depression,^[15-17] which is one reason why clinicians did not force patients with mental health problems to quit smoking.^[18] As cessation may have effects on depression, depression also affects cessation. Based on the studies investigating the relationship between depression and smoking cessation, studies were conducted on the effect of smoking cessation on the patient's mental state after being diagnosed as a cancer patient.

Table 3: Anxiety depression scores and quality of life scores between smokers and ex-smokers

	Smoker (n=23)	Ex-smoker (n=69)	p
HAD-anxiety (mean)	6.43±4.70	7.59±5.05	0.336
HAD-depression (mean)	8.04±4.86	8.19±4.37	0.894
Physical functioning (mean)	53.3±24.6	51.4±23.9	0.745
Social functioning (mean)	75.3±33.6	76.3±25.7	0.886
Cognitive functioning (mean)	35.5±20.3	30.2±18.2	0.246
Emotional functioning (mean)	55.5±28.6	57.4±27.4	0.773
Global health status (mean)	57.6±27.5	57.7±27.4	0.985

Independent samples t-test was used. HAD: Hospital Anxiety and Depression

Table 4: HAD and EORTC values among smokers and ex-smokers

	Ex-smoker after the diagnosis (n=17)	Smoker (n=23)	p
HAD-anxiety	6.65±4.62	6.43±4.70	0.888
HAD-depression	9.00±4.67	8.04±4.86	0.536
Physical functioning	46.1±28.6	53.3±24.6	0.400
Social functioning	68.6±24.2	75.3±33.6	0.488
Cognitive functioning	31.3±22.1	35.5±20.3	0.539
Emotional functioning	56.2±25.9	55.5±28.6	0.941
Global health status	61.2±23.7	57.6±27.5	0.662

Independent samples t-test was used. HAD: Hospital Anxiety and Depression, EORTC: European Organization for Research and Treatment of Cancer

Berg et al.^[19] showed that people continuing smoking instead of quitting after the diagnosis of cancer were more likely to show significant signs of depression ($p < 0.001$). This supports the fact that the presence of previous depression may be an obstacle to smoking cessation. Compared with all other cigarette-related cancers, those who were diagnosed with lung, head, and neck cancer were found to have a lower rate of continued smoking after diagnosis. The physical and emotional quality of life of those who continued smoking was found to be lower. The significant depressive symptom rate among patients continuing smoking was 26.8% vs 26.7% among patients who quit smoking after the diagnosis of cancer. In addition,

tion, the rate of smokers after cancer diagnosis was 27.1% among lung, and head–neck cancer survivors, while it was 72.9% among survivors of other smoking-related cancers. These findings emphasize the need to deal with depressive symptoms in cancer survivors, especially in those who continue to smoke, and the importance of examining the messages given to cancer survivors about the need to quit after cancer diagnosis.^[19–21] In the smoking cessation clinic, depression at the beginning of the treatment predicted a decrease in the tendency to quit smoking in 1 year. Patients without smoking reported significant improvement in depression, and this was found to be valid for all depression levels.^[11]

Global health status, physical functioning, emotional functioning, and cognitive functioning were found to be lower in patients with high nicotine dependence than those with low nicotine dependence, and some symptoms such as weight loss, dyspnea, or pain have been reported more frequently.^[22,23] The concern that smoking cessation increases anxiety and depression precludes sufficient persistence of smoking cessation, especially in advanced cancer cases. However, the obstacle to quitting smoking is the existing depression. Especially in advanced cancers, the success of smoking cessation will increase with depression treatment. Thus, a strong correlation was detected between smoking and depressive symptoms. Findings show that cancer patients might not be aware of the association between smoking and cancer and might not be informed about the negative effect of smoking on disease progression. When the patient is told that smoking will continue to cause damage after the cancer diagnosis, the motivation for quitting will increase.

The main limitation of this study was the number of cases. We involved all of the cases who had accepted to sign the questionnaire. Therefore, a priori power analysis could not be done. However, the post hoc power analysis, with an alpha error of 0.05, provided a power of 0.15.

Conclusion

This study showed that smoking cessation and continuing smoking in patients with advanced lung cancer did not make a difference in terms of anxiety or depression levels and quality of life. Therefore, patients with lung cancer should not be abstained from smoking cessation because of the possibility of increased anxiety or de-

pression, and patients should be supported for smoking cessation at any stage. If patients have difficulty quitting smoking, the treatment for depression must be planned, considering that smoking may be caused by existing depression.

Conflicts of interest

There are no conflicts of interest.

Ethics Committee Approval

The study was approved by the University of Health Sciences İzmir Tepecik Training and Research Hospital Ethics Committee (No: 16, Date: 10/01/2018).

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Peer-review

Externally peer-reviewed.

Authorship Contributions

Concept – F.G., G.P., C.A.; Design – F.G.; Supervision – F.G., M.B.; Funding – G.K., M.G., M.A.T.; Materials – G.K., M.G., M.A.T., M.Y.Y.; Data collection &/or processing – A.A., M.Y.Y., A.O.Y., F.D.Ü., Ö.B.; Analysis and/or interpretation – C.A., G.P., G.K., M.B.; Literature search – C.A., F.G., A.O.Y.; Writing – F.G., C.A., G.P.; Critical review – F.G., M.B.

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