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ARAŞTIRMA / RESEARCH

Is the diagnosis of lung cancer effective in decision of smoking cessation period?

Sigarayı bırakma kararında akciğer kanseri tanısı etkili midir?

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Abstract

Purpose: Lung cancer is one of the most common cancers worldwide and smoking plays an important role in the development of lung cancer. The study aims to determine the impact of a lung cancer diagnosis on the period of smoking habits. Also, we aimed to find out the factors affecting smoking cessation in patients after being diagnosed with lung cancer.
Materials and Methods: Our study is a descriptive study with 410 patients diagnosed with lung cancer and who had a history of smoking in a training and research hospital in Izmir between April and December 2018. The socio-demographic characteristics of the patients, smoking history, smoking status after the diagnosis, the duration of smoking cessation after the diagnosis, the relationship between smoking and lung cancer disease were investigated.
Results: The mean age of the participants was 60.41±14.85 and 62.7% of the patients were male. Quitting smoking rate was significantly increased and the number of cigarettes smoked daily was decreased after the diagnosis of lung cancer. The rate of quitting smoking after the diagnosis was higher in male patients compared to female patients and the smoking cessation rate was found to be higher in employees. The smoking cessation rate of those who do not use alcohol is significantly higher. The smoking cessation rate was higher in the first year after the diagnosis of lung cancer.
Conclusions: This study showed that the majority of the patients had quit smoking after the diagnosis of lung cancer.
Keywords:. Lung cancer, smoking, smoking cessation

Öz

Amaç: Akciğer kanseri dünyada en sık görülen kanserlerden biri olup, kanser gelişiminde en önemli rolü sigara oynamaktadır. Çalışmamızda akciğer kanseri tanısı almış ve aktif sigara içen hastalarda kanser tanısı aldıktan sonra sigara içme durumlarının nasıl etkilendiği ve bırakma üzerine etkili faktörlerin belirlenmesi amaçlanmıştır.
Gereç ve Yöntem: Çalışmamız Nisan-Aralık 2018 tarihlerinde İzmir'de bir eğitim ve araştırma hastanesinde akciğer kanseri tanısı almış ve sigara öyküsü olan 410 kişi ile yapılmış tanımlayıcı ve kesitsel bir araştırmadır. Hastaların sosyo-demografik özellikleri, sigara öyküsü, tanı sonrası sigarayı bırakıp bırakmadığı, sigarayı tanı aldıktan ne kadar surer sonar bıraktığı, sigara kullanımı ile akciğer kanseri hastalığı arasında ilişki incelenmiştir.
Bulgular: Yaşlarının ortalaması 60.41±14.85 olan hastaların %62.7'si erkektir. Hastaların akciğer kanseri tanı sonrasında sigarayı bırakmaları anlamlı olarak artmış ve günlük içtikleri sigara sayısı anlamlı olarak azalmştır. Sigara bırakmada erkeklerin kadınlara göre ve çalışanların sigara bırakma oranları oranı yüksek bulundu. Alkol kullanmayanların sigara bırakma oranı anlamlı şekilde fazladır. Sigara bırakma zamanı ilk bir yıl içinde fazladır.
Sonuç: Bu çalışma ile aktif sigara içicilerinin büyük bir kısmının akciğer kanser tanısı aldıktan sonra sigarayı bıraktıkları tespit edilmiştir.

Anahtar kelimeler: Akciğer kanseri, sigara içimi, sigara bırakma

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INTRODUCTION

Lung cancer is one of the most common cancers worldwide. Smoking plays an important role especially in the development of lung cancer. Due to the highly addictive effect of nicotine in a cigarette, people face various difficulties in quitting smoking. In lung cancer, the age of starting smoking, the duration of smoking, and the number of cigarettes smoked daily are important factors, as well.

Tobacco addiction is one of the important public health problems. It plays a role in the etiology of most diseases, especially lung and heart diseases. The relationship between smoking and respiratory diseases has been demonstrated in many epidemiological studies worldwide[1]. Cigarette smoking leads to lots of clinical conditions such as deterioration of physiological functions of the respiratory system, influence of the lung volume and capacity, and the pathogenesis of lung cancer[2].

According to the data from the World Health Organization, more than 5 million people die due to smoking per year, and one out of ten adults dies due to smoking[1]. Lung cancer is an important public health problem in terms of being the second most common cause of death after cardiovascular diseases in our country[3].

Lung cancer is a rare disease at the beginning of the 20th century, but its frequency has increased in parallel with the increase in smoking habits and has become the most common cancer in the World [4].

The main cause of lung cancer is smoking. Despite the increased awareness of the risks of smoking, this behavior continues to pose a serious public health problem and is one of the most common preventable morbidity and mortality causes[5]. The smoking cessation rate was significantly higher in patients with different types of cancer than in non-cancer patients, even though there was no strong correlation between cancer type and smoking[6]. Diagnosis of cancer to a smoker or a relative may lead to increased motivation to quit smoking. This increase in motivation is associated with cancer prevention behavior. Correct orientation and support of motivation increase the chances of smoking cessation. A cancer diagnosis has been shown to increase the likelihood of smoking cessation after diagnosis[6,7].

Smoking addiction is a serious condition. Most individuals need help to quit smoking. It is known that smoking increases the severity of the disease in individuals diagnosed with lung cancer. Also, there are difficulties in the cancer treatment of lung cancer patients who continue to smoke. Quitting smoking can prolong life expectancy and reduce the risk of recurrence in patients with lung cancer. In literature, there are few studies on smoking behavior and related factors after the diagnosis of lung cancer. For this reason, our study will contribute to the literature.

In this study, we investigated the hypothesis of whether a diagnosis of lung cancer is effective in quitting smoking and to determine the factors affecting the smoking cessation period.

MATERIALS AND METHODS

Sample

Our study was a retrospective and descriptive study with 410 patients diagnosed with lung cancer and who had a history of smoking in Health Science University Izmir Dr. Suat Seren Chest Diseases and Surgery Training and Research Hospital between April and December 2018.

6855 patients diagnosed with lung cancer between 01.01.2017-31.12.2017 in a chest diseases training and research hospital in Izmir were included in the study. The sample size (n) of the study was calculated as 364 patients using the known population sampling method; considering possible losses, a total of 410 volunteers diagnosed with lung cancer and having a history of smoking were included in the study.

Procedure

The data of the patients included in the study were taken from the hospital information system. Research has been done in line with the data in the system. The smoking cessation status and time were asked by phone after the diagnosis was made. Patients who could not be reached during the research process or who died were excluded from the study.

Patients aged 18 and over, communicable, literate, of both genders, who agreed to participate in the study and who gave written informed consent and were diagnosed with lung cancer were included in the study. Those who did not smoke when diagnosed with lung cancer, those under the age of 18, those who could not communicate, and those who had any mental illness that prevented them from participating in our study (schizophrenia, bipolar disorder, and other psychotic disorders) were excluded from the study.

The socio-demographic characteristics of the patients, the number of cigarettes smoked daily, alcohol use, smoking status after diagnosis, the time

of quitting smoking, accompanying diseases, family history of cancer, and the presence of lung surgery were collected from the questionnaire.

Ethical permission was obtained from the ethics committee of a university on February 21, 2018/32. In addition, written permission was obtained from the institution where the study was carried out (09.04.2018/667722934-4337). Written consent was obtained from the participants for the study, and our research was conducted by following per under ethical rules.

Statistical analysis

Data analysis was performed using IBM SPSS 21.0 (Statistical Package for the Social Sciences, Chicago, Illinois). Descriptive statistical methods were applied in the evaluation of the data. The compatibility of the obtained data with the normal distribution was first examined with the Kolmogorov-Smirnov test.

The population of this cross-sectional study consisted of 6855 patients diagnosed with lung cancer in a training and research hospital in Izmir. The sample size (n) of the study was calculated as 364 patients by equating the probability of occurrence and non-occurrence of the event under 0.05 error and ± 0.5 sampling error using the sampling method whose universe is known; Considering the possible losses, the data of a total of 410 people with a history of smoking with 10% reserve were examined.

The descriptive features of the patients were expressed as numbers, percentages, and arithmetic mean values (Table 1). Standard deviation, arithmetic mean and median values of the patients' smoking habits were expressed (Table 2).

Table 1.Descriptive characteristics of the patients (n=410)

Patient characteristics		**n**	**%**
Mean age (X±SD)		60.41±14.85	
Gender	Female	153	37.3
	Male	257	62.7
Education level	Literate/ Not literate	56	13.7
	Primary School	233	56,8
	High School	98	23.9
	Undergraduate and postgraduate	23	5.6
Working status	Employee	225	54.9
	Non-employee	119	29.0
	Retired	66	16.1
Residence	Village / Town	70	17.1
	District	169	41.2
	Province	171	41.7
Alcohol drinking	Yes	69	16.8
	No	218	53.2
	Quit drinking	123	30.0
Smoking cessation status after lung cancer diagnosis	Yes	255	62.2
	No	155	37.8
Smoking cessation time after lung cancer diagnosis	0-12 month	190	46.3
	After one years-3 years	65	15.9
Comorbidities	Yes	256	62.4
	No	154	37.6
	-COPD	111	27.1
	-Cardiac diseases	38	9.3
	-Hypertension	42	10.2
	-Diabetes mellitus	32	7.8
	-Other	9	8.0
Family history	Yes	255	62.2
	No	155	37.8
Lung surgery history	Yes	139	33.9
	No	271	66.1

COPD: Chronic obstructive pulmonary disease

Table 2. Smoking related features of patients (n=410)

	Mean +SD
Age of starting smoking	14.54±4.10 (7-24)
Smoking time (years)	44.89±15.04 (7-83)
Number of cigarettes per day	20.35±8.71 (10-40)

Table 3. Comparison of patient characteristics and smoking cessation status after lung cancer diagnosis

Patient characteristics	Smoking cessation status after lung cancer diagnosis							p-value
		Yes		No		Total		
		n	%	n	%	n	%	
Gender	Female	121	47.5	32	20.6	153	37.3	<0.001*
	Male	134	52.5	123	79.4	257	62.7	
Education level	Literate/ Not literate	34	13,3	22	14.2	56	13.7	0.202*
	Primary School	140	54,9	93	60,0	233	56,8	
	High School	62	24,3	36	23,2	98	23,9	
	Undergraduate and postgraduate	19	7,5	4	2,6	23	5,6	
Working Status	Employee	126	49.4	99	63.9	225	54.9	0.003**
	Non-employee	89	34.9	30	19.4	119	29.0	
	Retired	40	15.7	26	16.8	66	16.1	
Residence	Village / Town	47	18.4	23	14.8	70	17.1	0.101*
	District	112	43.9	57	36.8	169	41.2	
	Province	96	37.6	75	48.4	171	41.7	
Alcohol drinking	Yes	28	11.0	41	26.5	69	16.8	<0.001**
	No	155	60.8	63	40.6	218	53.2	
	Quit Drinking	72	28.2	51	32.9	123	30.0	
Smoking cessation time after lung cancer diagnosis	Active smokers	0	0	155	100	155	37.8	<0.001**
	0-12 month	190	74.5	0	0	190	46.3	
	After one years(year)- 3 years	65	25.5	0	0	65	15.9	
Comorbidities	Yes	175	68.6	81	52.3	256	62.4	0.001*
	No	80	31.4	74	47.7	154	37.6	
	-COPD	74	29.0	37	23.9	111	27.1	0.431*
	-Cardiac disease	25	9.80	13	8.40	38	9.3	
	-Hypertension	26	10.2	16	10.3	42	10.2	
	-Diabetes Mellitus	26	10.2	6	3.9	32	7.8	
	-Other	24	9.40	9	5.8	33	8.0	
	-No additional disease	80	31.4	74	47.7	154	37.6	
Family history of cancer	Yes	153	60.0	102	65.8	255	62.2	0.240*
	No	102	40.0	53	34.2	155	37.8	
Lung surgery history	Yes	78	30.6	61	39.4	139	33.9	0.069*
	No	177	69.4	94	60.6	271	66.1	
Age of starting smoking	7-17	159	62.4	121	78.1	280	68.3	0.001*
	18-28	96	37.6	34	21.9	130	31.7	
Smoking time (years)	7-30	45	17.6	31	20.0	76	18.5	0.576*
	31-60	174	68.2	98	63.2	272	66.3	
	61 and over / ≥61	36	14.1	26	16.8	62	15.1	
Number of cigarettes per day	10 and below / ≤10	114	44.7	86	55.5	200	48.8	0.009*
	11-20	30	11.8	25	16.1	55	13.4	
	21 over / ≥21	111	43.5	44	28.4	155	37.8	

COPD: Chronic obstructive pulmonary disease

Chi Square Test*, Exact Test**, p value of <0.05 was considered to be statistically significant.

Chi-square and Fisher Exact tests were used to investigate the difference between smoking cessation status after lung cancer and patient characteristics (gender, education status, employment status, place of residence, alcohol, time to quit smoking after lung cancer, another disease status in addition to lung cancer, family history of cancer, lung surgery status). P values less than 0.05 were considered statistically significant (Table 3).

RESULTS

Our study consisted of 410 active smokers who were diagnosed with lung cancer. The mean age of the patients was 60.41±14.85. One hundred fifty-three (37.3%) patients were female and 257 (62.7%) were male. 56.8% of the patients were primary school graduates, 54.9% of them were employed. 41.7% of them lived in the province and 53.2% of them did not use alcohol. 62.4% of the patients had one or more comorbidities, 62.2% of them had a family history of cancer and 66.1% of them had no lung surgery (Table 1).

Considering smoking-related features; the mean age of starting smoking was 14.54±4.10 years, the average smoking time was 44.89±15.04 years, and the average number of cigarettes smoked daily was 20.35±8.71 pieces (Table 2). When we look at the characteristics of smoking by gender; the median age for starting smoking was 6 years younger in males (median: 12) than females (median: 18) (Figure 1). The median duration of smoking in males (duration: 48 years) was 8 years more than in females (duration: 40 years) (Figure 2). There was no difference between the number of cigarettes smoked per day and gender (Figure 3).

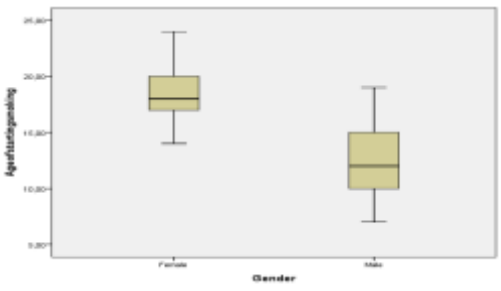

Figure 1.Age of starting to smoke.

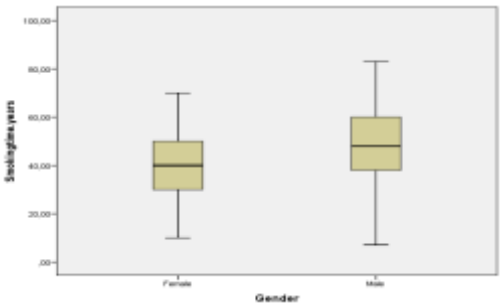

Figure 2. Smoking duration by gender (years).

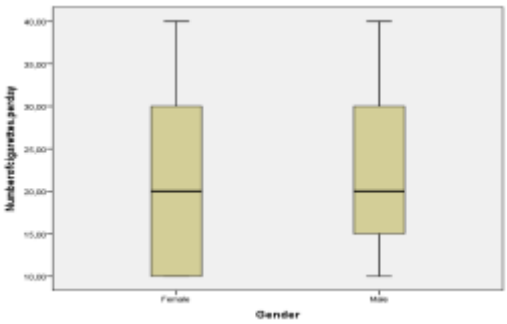

Figure 3. Number of cigarettes smoking by gender.

Quitting rate of smoking was 62.2% after the diagnosis of lung cancer. The number of people who quit smoking in the first year after diagnosis was 190 (46.3%) (Table 1). The majority of patients stopped smoking within three years after being diagnosed with lung cancer ($p<0.001$). The smoking cessation rate was high in the first year ($p<0.001$). There was a statistically significant relationship between smoking cessation and smoking cessation time after lung cancer diagnosis ($p<0.001$) (Table 3). The rate of smoking cessation was higher in the male population than in the female population. There was a statistically significant relationship between smoking cessation and gender ($p<0.001$) (Table 3). The rate of smoking cessation was higher according to the working status ($p=0.003$). There was a statistically significant relationship between smoking cessation and working status ($p=0.003$). The rate of smoking cessation was higher among non-alcohol users ($p<0.001$). The rate of smoking cessation was higher in patients with comorbidities ($p<0.001$). There was a statistically significant relationship between smoking cessation and comorbidities ($p=0.001$) (Table 3).

There was a significant relationship between smoking cessation and starting age of smoking after the diagnosis of lung cancer (p=0.001). No difference was found between the patients who quit smoking and those who did not, in terms of smoking duration (p = 0.576). There was a significant relationship between smoking cessation and the number of cigarettes smoked after the diagnosis of lung cancer (p=0.009). The rate of smoking cessation of those who smoke 10 or less per day was high compared to those who smoke > 10 cigarettes per day (Table 3).

DISCUSSION

The relationship between smoking and lung diseases has been demonstrated by epidemiological studies worldwide, and it has been emphasized that smoking is the primary cause of lung cancer death and cancer[8]. In our study, we showed that having a diagnosis of lung cancer has an impact on smoking cessation, especially in the first one-year period.

Although cancer affects the patient's quality of life negatively, one-third of the patients who smoke before the diagnosis of lung cancer continue to smoke after the diagnosis. The effectiveness of the treatment decreases in those who continue to smoke and complications occur more frequently. In addition, the risk of second primary tumor increases and survival is shortened[9]. The prevalence of smoking is quite different between the male and female groups, and 80% of the smokers are male[10]. According to the 2012 Global Adult Tobacco Survey smoking prevalence among men in Turkey is 41.4% while in women is 13.1%[11].

Similar to the literature[12,13], the majority (62.7%) of the smokers included in our study were male. In a study by Marqueta et al. smoking cessation rates were similar in both sexes[14]. In our study, 62.2% of patients quit smoking, the rate of smoking was parallel with the existing literature [12, 15] (Table 1). The rate of smoking in male patients was higher than in female patients. There was a significant difference between smoking status and gender in lung cancer patients (p<0.001).

In the study of Janson et al.[16], which examined the effect of educational status on smoking cessation success, it was reported that the rate of smoking cessation was high among the groups with high educational level, whereas the study of Monso et al.[17] found no difference between the educational groups. Demirbas et al[13] found a statistically significant difference between the education level of the participants and their smoking status (p<0.001) while there was no difference in the educational status between quitting and non-quitting smoking groups in the study of Uzer et al[18]. In our study, no significant relationship was found between the education level and smoking cessation after diagnosis of lung cancer (p= 0.202). This may be due to the high number of primary school level patients in our study. The majority of the participants were primary school graduates and nearly half of the primary school graduates quit smoking. Since the distribution of educational status of the participants was very different from each other numerically, so we could not find any correlation between smoking cessation and educational status in our study.

In the study of Demirbas et al[13], a statistically significant difference was found between smoking status and working status of the participants (p<0.001). Also, there was a statistically significant relationship between smoking cessation and working status, and the smoking cessation rate of the employees was higher than the other groups (p=0003) in our study. It can be thought that people in working life are more conscious about quitting smoking after being diagnosed with lung cancer. The professions of the employees were not examined in our study so we could not compare the professions.

Alcohol and drug use disorders are also mostly dependent on nicotine, with rates of current smoking ranging from 60-95%, and alcohol treatment should be done for the success of smoking cessation[19]. In the study of Raherison et al.[20], smoking cessation success was negatively related to alcohol dependence and it was reported that patients with alcohol dependence had a higher risk of relapse. In the study of Fidancı et al.[21], alcohol use was found to be statistically significantly higher in those who did not quit smoking (p<0.05) and found that the smoking cessation rate is lower in people with alcohol and smoking dependence together. In this study, there was a statistically significant relationship between smoking cessation and alcohol use (p<0.001), and 53.2% of the patients did not use alcohol. Since the usage of alcohol and smoking together is high, smoking cessation rates are lower in alcohol users. In our study, the smoking cessation rate of non-alcohol users was higher than other groups.

In a study, conducted by Cox et al. on lung cancer patients, it was found that 96% of the participants had a history of smoking, 40% of these participants

smoked at the time of diagnosis and 29% of the participants were continued smoking during the study period [22]. In another prospective study of 526 patients who underwent surgery for early-stage lung cancer, 49% of patients quit smoking during a 2-year follow-up period time[23]. In the study of Uzer et al.[18], the majority of the people quit smoking in the first year. In our study, 62.2% of the patients quit smoking after they were diagnosed with lung cancer. 46.3% of them quit smoking within the first year after diagnosis of lung cancer. In our study, there was a statistically significant relationship between smoking cessation and smoking cessation time in the first year after lung cancer diagnosis ($p<0.001$). Smoking cessation should be targeted with the programs to be applied to these patients, with the correct and effective planning to be made on smoking cessation recommendations, the success of smoking cessation can be maximized.

In a study by Martin C et al.[15], smoking cessation rates were similar in patients with and without comorbidities. In the study of Kutlu et al.[12], the prevalence of respiratory system cancer was 30.6% (n=81) among smokers and 4.6% (n=9) among non-smokers. In our study, there was a statistically significant relationship between smoking cessation and additional disease status. In our study, 256 patients (62.4%) had one or more diseases in addition to lung cancer. However, there is no significance in additional disease groups. Seventy-four (29%) of those with COPD had quit smoking. Differences in comorbidity groups can be found by increasing the sample sizes for each disease in future studies.

Diagnosis of cancer in a smoker patient or a relative of the patient may lead to increased motivation to quit smoking. This increase in motivation is associated with cancer prevention behavior. Correct orientation and support of motivation increase the chances of smoking cessation. It has been shown that the diagnosis of cancer increases the probability of smoking cessation after diagnosis, even in cancers that are not associated with smoking and have a good prognosis. In the studies of families of individuals with lung cancer were more likely to quit smoking[7,24,25]. In our study, there was no significant relationship between smoking cessation after diagnosis of lung cancer and family history of cancer ($p>0.05$). 255 (62.2%) of the patients had a family history of cancer and their smoking cessation rate was 60.0% (Table 3). Although it can be predicted that a family history of cancer may be a source of motivation for smoking cessation, but no relationship was found in our study.

One of the features that increase the risk of lung cancer is the age of starting smoking[26]. In the study of Paik et al., tobacco users diagnosed with lung cancer have did not find a significant age in their studies[27]. In our study, there was a significant relationship between smoking cessation after the diagnosis of lung cancer and the age of starting smoking. In our study, the rate of smoking cessation was higher among those who started smoking between the ages of 7-17. We thought that this group started unconsciously in childhood and continued because it was never questioned, but when a vital diagnosis was made, they quit immediately.

The two variables that most accurately evaluate the relationship between active smoking and lung cancer are the number of cigarettes and the duration of smoking. In many European epidemiological studies, it has been determined that the risk of lung cancer tends to increase with the increase in the number of pack-years[28]. In the study of Martin C. et.al.[15], those who quit smoking were found to be shorter duration times than those who did not. In our study, no difference was found between the smoking duration of patients who quit and did not smoke. In the study Martin C. et al.[15], the number of cigarettes smoked per day was significantly higher in those who could not quit compared to those who quit. In the study of Paik et al.[27], tobacco users diagnosed with lung cancer, there was a significant difference in the number of cigarettes smoked daily in their studies investigating tobacco use disorder. In our study, quitting smoking rate was significantly increased and the number of cigarettes smoked daily was decreased after the diagnosis of lung cancer ($p=0.009$). The rate of smoking cessation was high in patients who smoked cigarettes 10 or less per day. As it is known, people who smoke less frequently have less nicotine addiction and are expected to quit smoking more easily.

The most important limitation of the research is that it is carried out only in a single center and in a certain period. The other limitation of our study no comparison was made with subtypes of lung cancer due to the lack of design.

In our study, we showed that patients diagnosed with lung cancer had a very high smoking history, started smoking at a younger age, and smoked for a long time. Most of them quit smoking within the first year

after diagnosis of lung cancer while some of the patients persistently continued smoking. In conclusion, having a diagnosis of lung cancer is an important factor in quitting smoking. Effective smoking cessation treatment should be part of lung cancer treatment.

Yazar Katkıları: Çalışma konsepti/Tasarımı: HB; Veri toplama: HB, Veri analizi ve yorumlama: HB, EY, PÇ; Yazı taslağı: HB, EY, PÇ; İçeriğin eleştirel incelenmesi: HB, EY, PÇ; Son onay ve sorumluluk: HB, EY, PÇ; Teknik ve malzeme desteği: HB; Süpervizyon: HB, EY, PÇ; Fon sağlama (mevcut ise): yok.
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Yazarın Notu: Bu çalışmanın veri toplama aşamasına yardımcı oldukları için tüm hasta ve hastane yöneticilerine teşekkür eder.

Author Contributions: Concept/Design : NÖM; Data acquisition: NÖM; Data analysis and interpretation: NÖM; Drafting manuscript: NÖM; Critical revision of manuscript: NÖM; Final approval and accountability: NÖM; Technical or material support: -; Supervision: NÖM; Securing funding (if available): n/a.
Ethical Approval: Ethical permission was obtained from the ethics committee of İzmir Katip Çelebi University on February 21, 2018/32. In addition, written permission was obtained from the institution where the study was carried out (09.04.2018/667722934-4337). Written consent was obtained from the participants for the study, and our research was conducted in accordance with ethical rules.
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