

RESEARCH ARTICLE

Smoking and quitting behavior of hospitalized COVID-19 patients

Ayşe ÖNDER¹ , Erkan Melih ŞAHİN¹ , Mehmet Göktuğ KILINÇARSLAN¹ 

¹Çanakkale Onsekiz Mart University Faculty of Medicine, Department of Family Medicine. Çanakkale, Türkiye

ABSTRACT

Objective: The relationship between Covid-19 and smoking is controversial. In this study, our aim was to determine the association between smoking and hospitalization duration and to demonstrate how smoking habits change following COVID-19 disease.

Methods: This prospective cohort study conducted on patients hospitalized at pandemic services of a university hospital between 01.10.2020-30.11.2020. Sociodemographic variables and smoking habits were assessed through a face-to-face interview. Individuals who were still smoking were contacted by phone six months after discharge, and their smoking habits were re-evaluated.

Results: Total of 373 patients were included in the study with average age of 63.0±15.0 and 175 (46.9%) were female. Of the participants, 192 (51.5%) had never smoked, 148 (39.7%) had quit smoking, and 33 (8.8%) were still smokers. Length of hospitalization of smokers, never-smokers and quitters were not statistically different. There was no statistically significant difference in terms of worsening status between smokers, ex-smokers and never smokers. Of the total 33 current smoker, 10 (33.3%) quit smoking and did not start again, 13 (43.3%) quit smoking but started again, and 7 (23.3%) did not quit smoking at the follow up.

Conclusion: In our study, it was observed that smoking did not affect the course of COVID-19 disease and length of stay. Also, history COVID-19 can affect smoking habits and may lead to smoking cessation.

Keywords: COVID-19; Smoking; Smoking Cessation; Length of Stay

ÖZET

Hastaneye yatırılan COVID-19 hastalarının sigara içme ve bırakma davranışları

Amaç: COVID-19 ile sigara içiciliği arasındaki ilişki tartışmalıdır. Biz bu çalışmada sigara ile hastane yatış süresi arasındaki ilişkiyi saptamayı ve COVID-19 hastalığı sonrası sigara içme alışkanlıklarının nasıl değiştiğini göstermeyi amaçladık.

Yöntem: Bu prospektif kohort çalışması, 01.10.2020-30.11.2020 tarihleri arasında bir üniversite hastanesinin pandemi servisinde yatan hastalarda gerçekleştirildi. Sosyodemografik değişkenler ve sigara içme alışkanlıkları yüz yüze görüşmelerle değerlendirildi. Hala sigara içen bireyler, taburculuktan altı ay sonra telefon ile arandı ve sigara içme alışkanlıkları tekrar değerlendirildi.

Bulgular: Çalışmaya ortalama yaşları 63.0±15.0 olan toplam 373 hasta dahil edildi ve bunlardan 175'i (46,9%) kadındı. Katılımcıların 192'si (51,5%) hiç sigara içmemiş, 148'i (39,7%) sigarayı bırakmış ve 33'ü (8,8%) hala sigara içiyordu. Sigara içenlerin, hiç sigara içmeyenlerin ve sigarayı bırakanların hastanede kalma süreleri istatistiksel olarak farklı değildi. Sigara içenler, bırakanlar ve hiç sigara içmeyenler arasında kötüleşme durumu açısından istatistiksel olarak anlamlı bir fark bulunmadı. Toplam 33 mevcut sigara içicisinden 10'u (33,3%) sigarayı bıraktı ve tekrar başlamadı, 13'ü (43,3%) sigarayı bıraktı ancak tekrar başladı ve 7'si (23,3%) takipte sigara içmeyi bırakmadı.

Sonuç: Çalışmamızda, sigaranın COVID-19 hastalığının seyrini ve hastanede kalma süresini etkilemediği gözlemlendi. Ayrıca, COVID-19 geçmişi, sigara içme alışkanlıklarını etkileyebilir ve sigara bırakmaya yol açabilir.

Anahtar kelimeler: COVID-19; Sigara; Sigara Bıraktırma; Yatış Süresi

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Corresponding author: Mehmet Göktuğ KILINÇARSLAN

Address: Prof. Dr. Sevim Buluç Sokak No:2 Aile Hekimliği Polikliniği, 17020, Merkez/Çanakkale

E-mail: goktugmk@gmail.com

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INTRODUCTION

COVID-19 is a broad clinical picture caused by the SARS-Cov-2 virus, which can range from asymptomatic infection, upper respiratory tract infection, viral pneumonia, respiratory failure, acute respiratory distress syndrome and death [1,2]. The first case was reported from Wuhan province of China on December 31, 2019, and the epidemic quickly turned into a pandemic [3]. Although information about the factors determining the prognosis of the disease is limited, it is thought that the use of tobacco and tobacco products negatively affects the course of COVID-19 disease [4]. It is thought to cause this because it has negative effects on lung health and the immune system, is associated with many respiratory diseases, and makes the body more susceptible to infectious diseases. It has been determined that COVID-19 patients who smoke have more severe symptoms and higher rates of intensive care admission than patients who have never smoked [5,6].

Smoking is still one of the leading causes of preventable health problems in Turkey, as in the world. According to 2019 data, 28% of the population in Turkey, 41.3% of men and 14.9% of women use tobacco [7]. Mortality and morbidity caused by smoking increase not only for the user, but also for the passive smoker who is exposed to environmental tobacco smoke even though he does not use it [8]. 70% of tobacco users state that they want to quit, but only one third try to quit. Professional help is often not sought when quitting smoking and relapses are common. Even when help is received, the quit rate may be low, but it is known that professional help increases the success of quitting smoking [9].

In this study, our aim was to determine the association between smoking and hospitalization duration and to demonstrate how smoking habits change following COVID-19 disease.

MATERIALS and METHODS

Study Setting and Sampling

This prospective cohort study conducted at University Hospital. The research population is the patients hospitalized in group 1 and group 2 pandemic wards at the hospital. The sample of the research is individuals aged 18 and over who were hospitalized in Group 1 and Group 2 pandemic services between 01.10.2020-30.11.2020. Group 1 consists of patients with no or less than 50% lung involvement and oxygen saturation above 93% in room air, and group 2 consists of patients with lung involvement greater than 50% and oxygen saturation below 93% in room air. Intensive care patients and patients with diseases or disabilities that would prevent compliance with the study method (such as those with psychiatric diseases that would disrupt the assessment of reality, dementia patients) were excluded. Of the 442 patients hospitalized in these wards between the specified dates, 373 (84.3%) were included in the study, and 69 patients were ex-

cluded from the study because they did not meet the specified criteria.

Variables

For non-smokers: Socio demographic variables, duration of hospitalization, transfer status to higher or lower level of care.

For former smoker: Addition to non-smokers; participation history of any smoking cessation program, age of starting to smoke, total cigarette smoking (pack/year).

For current smokers: Addition to former smokers; level of nicotine addiction measured by the Fagerström Test for Nicotine Dependency scale (FTND), level of concern for smoking in relation with COVID-19 (scored from 1 to 10) and smoking status 6 months after discharge [10].

Application

All participants were viewed by face to face in pandemic wards. All preventive measures to prevent contamination had been taken by the researchers. First part of data form was completed at this stage.

Patients who stated that they have been smoking were contacted by phone after 6 months of discharge. Questions were asked about smoking cessation status after discharge, participation in smoking cessation programs, the relationship between the level of anxiety about smoking and COVID-19, and the effect of the pandemic on the amount of smoking.

Statistical Analysis

Descriptive data consisting of frequency and percentage for categorical variables, mean and standard deviation for continuous variables were calculated and presented. The relationships between variables were analyzed with tests selected in accordance with the variable characteristics. In cases where the number of samples is larger than 30, the requirement for normal distribution in parametric tests is ignored based on the central limit theorem [11]. Test constants absolute p values are reported for all analyses. $P < 0.05$ was accepted as the general statistical significance limit.

Ethical Approval

Approval was received from Çanakkale Onsekiz Mart University clinical research ethics committee with the decision numbered 12-09 dated 23/09/2020. Approval of Ministry of Health for scientific research studies on COVID-19 was received on 07.08.2020. Patients participating in the study were given verbal and written information about the study and their consent was obtained.

RESULTS

Total of 373 patients were included in the study and 175 (46.9%) were female. The average age was calculated as 63.0 ± 15.0 . The sociodemographic data of the participants with details are given in Table 1.

Of the participants, 192 (51.5%) had never smoked, 148 (39.7%) had quit smoking, and 33 (8.8%) were still smokers. There was a significant difference observed between smoking status and the mean age of the participants ($F = 5.976$; $p = 0.003$). Post-hoc analysis

		Number of case (n)	Percentage (%)
Gender	Female	175	46.9
	Male	198	53.1
Living place	Rural	79	21.2
	Urban	294	78.8
Marital status	Married	286	76.7
	Single	25	6.7
	Widowed	62	16.6
Educational status	Illiterate	37	9.9
	Primary school graduate	190	50.9
	Secondary school graduate	31	8.3
	High school graduate	61	16.4
	College/University	54	14.5
Economic status	Low	104	27.9
	Mediocre	252	67.6
	High	17	4.6

Table 1. Sociodemographic data of the participants

revealed no significant difference in the mean ages between those who had never smoked and those who had quit smoking, but the mean age of these two groups was significantly higher compared to smokers. The average amount of cigarettes smoked by ex-smokers was calculated as 27.18±21.28 [range 1 - 100] packs/year, and among current smokers was 40.76±31.37 [range 2 - 140]. 5 out of 148 ex-smokers (3.3%) stated that they participated in a smoking cessation program. Of these, 1 received psychological support, 2 received nicotine replacement therapy, and 2 received pharmacological treatment. 5 out of 33 current smokers (15.1%) stated that they participated in a smoking cessation program. Of these, 2 received psychological support, 2 received nicotine replacement therapy, and 1 received pharmacological treatment. A statistically significant difference was observed between ex-smokers and current smokers in terms of participation in the smoking cessation program ($X^2=8.205$; $p=0.042$). There was no significant difference in attempting to quit smoking between genders ($X^2=0.383$; $p=0.536$). 204 (54.6%) of the patients were hospitalized in group 1 and 169 (45.3%) were in group 2 pandemic wards. The average length of hospitalization was 11.87±10.30 [range 2 - 130] days. Length of hospitalization of smokers, never-smokers and quitters were

not different (KW $X^2=2.339$; $p=0.311$). A significant positive correlation was detected between length of hospitalization and age ($r=0.156$; $p=0.003$). A significant negative correlation was detected between length of hospitalization and education level and economic level ($r=-0.153$; $p=0.003$, $r=-0.146$; $p=0.005$, respectively). No significant correlation was found between the amount of smoking in packs/year and the length of hospitalization ($r=0.028$; $p=0.706$). No significant correlation was found between FTND score and length of hospitalization ($r=0.126$; $p=0.483$). Among the participants, 300 patients (80.4%) were discharged to home from the ward they were hospitalized, 8 patients (2.1%) were transferred from Group 1 to Group 2 wards, 31 patients (8.3%) were transferred to intensive care. 34 patients (9.1%) died. Among the deceased, 16 (47.0%) had never smoked, 16 (47.0%) had quit smoking, and 2 (5.9%) were current smokers. The rate of smokers and ex-smokers was 48.5%, and a worsening clinical course was observed in 20.4% of this group. There was no statistically significant difference in terms of worsening status between smokers, ex-smokers and never smokers ($X^2=3.798$; $p=0.704$). Deterioration data according to smoking status are given in Table 2.

	Never smoker	Ex-smoker	Current smoker
No change	156 (%81.3)	118 (%79.7)	26 (%78.8)
Transferred from group 1 to group 2	4 (%2.1)	2 (%1.4)	2 (%6.1)
Transferred to intensive care unit	16 (%8.3)	12 (%8.1)	3 (%9.1)
Deceased	16 (%8.3)	16 (%10.8)	2 (%6.1)

Table 2. Change in hospitalization conditions according to smoking status

There was a smoker at home for 116 (31.0%) participants. Of these 89 (76.7%) smoked outside the house, and 27 (23.3%) smoked inside the house. There was no statistically significant difference in terms of deterioration between those who had a smoker at home and those who did not ($X^2=7.286$; $p=0.063$).

After discharge, 1 participant (3.3%) reported receiving psychological support and 29 (96.7%) reported that they did not participate in any program. The average daily amount of cigarettes smoked by current smokers was 19.45 ± 11.90 [range 2 - 50]. The amount of cigarettes smoked by men was significantly higher than by women ($t=5.225$; $p=0.029$). 24 (72.7%) of current smokers stated that they had tried to quit smoking before.

Six months after the first interview, 30 of 33 smoker patients were contacted by phone. Of the 3 patients excluded, 2 were died and 1 was still in intensive care unit. According to the statements of interviewed patients, 10 (33.3%) quit smoking and did not start again, 13 (43.3%) quit smoking but started again, and 7 (23.3%) did not quit smoking. When the FTND score averages of these 3 groups were compared, no statistically significant difference was detected (KW $X^2=1.364$; $p=0.506$).

Level of concern for smoking in relation with COVID-19 after discharge; The average score of those who quit smoking and did not start again was 8.70 ± 0.65 [range 5 - 10], of those who quit smoking and started again was 4.85 ± 0.45 [range 2 - 7], of those who did not quit smoking was 3.14 ± 0.76 [range 1 - 6] and the difference between them was statistically significant (KW $X^2=14.92$; $p=0.001$).

When the change in the number of cigarettes smoked after discharge was questioned, it was found that 17 people (85.0%) decreased the number of cigarettes they smoked and 3 people (15.0%) increased the number of cigarettes they smoked. There was no statistically significant difference between the two groups in terms of FTND score averages ($t=0.091$; $p=0.767$). The mean pre-discharge anxiety score of people who stated that they had reduced their smoking use was significantly higher than those who stated that they had increased their smoking ($t=4.895$; $p=0.040$). The average post-discharge anxiety score of people who stated that they reduced their smoking was significantly higher than those who stated that they increased their smoking ($t=5.709$; $p=0.028$).

DISCUSSION

Smoking is one of the biggest causes of preventable diseases. It is thought that smoking affects the course of lung diseases by triggering local and systemic inflammation, changing the genetic structure of the lung tissue, and disrupting the normal function of the respiratory tract epithelium [5,6] One of the diseases that smoking may negatively affect is COVID-19. The fight against tobacco continues under pandemic conditions. In order to increase the success of quitting smoking, it may be beneficial to investigate the factors affecting patients' attitudes and the effects of smoking on the course of COVID-19 disease.

373 COVID-19 patients over the age of 18 hospitalized in pandemic wards were included in the study. The average hospital stay of the patients was 11.9 days. There was a positive correlation between length of stay and age, and a negative correlation with education level and perception of income level. In a meta-analysis that included a total of 11 590 COVID-19 patients, it was determined that 6.3% of the participants were smokers or had quit smoking, and 29.8% of these patients had a worsening clinical course, significantly more than non-smokers [12]. In this study, the rate of smokers or ex-smokers was 48.5%, and a worsening of the clinical course was observed in 20.4% of this group, but there was no significant difference with the non-smoking group.

In a study conducted in Lebanon on 743 patients hospitalized with COVID-19, the effect of smoking on the course of the disease and mortality was examined. Patients who did not need oxygen were classified as having mild COVID-19 and, unlike this study, they were excluded from the study, oxygen saturation was lower than 93% and/or or patients with a respiratory rate of more than 30 breaths per minute were classified as severe, and patients requiring mechanical ventilation, organ failure, or in shock were classified as critical COVID-19. The average age of the patients was 49.7 years, which was lower than in this study. 62.3% of the patients were male, and according to this study, the proportion of men was higher. The length of stay was similarly 11.3 days. The mortality rate of the patients was 17.4%, which was higher than in this study. The smoking rate of deceased patients was 60.5%, which was significantly higher than the rate in our study. In our study, 47.0% of the deceased patients had quit smoking, 5.9% were smokers, and there was

no significant difference in smoking status between those who died and those who were discharged. In the study, the length of stay of smokers was longer than that of non-smokers, but in our study, there was no significant difference between smoking status and length of stay. Similar to our study, there was no relationship between gender and length of stay and deterioration. The reason why the smoking rate in the study is higher than in our study may be that the smoking rate of the Lebanese population is higher than in Turkey (38%-28%) and the average age in the study is lower, and the reason for the higher death rates compared to our study is that patients in need of intensive care are also included in the study [13].

In a study conducted on 767 people hospitalized in Malatya due to COVID-19, it was found that gender had no effect on the length of stay, but was correlated with age, similar to the results of our study [14]. In a thesis study conducted on 107 patients in Düzce, it was shown that the average length of stay of COVID-19 patients was 7.6 days, the average age was 56.5, and there was no relationship between length of stay and age and gender. The reason why the hospitalization period was shorter than in our study may be that the average age of the patients was younger [15].

51.5% of the participants had never smoked, 39.7% had quit smoking, and 8.8% were smokers. According to 2019 TÜİK data, 28% of the population in Turkey smokes, 14.2% have quit and 54.5% have never smoked [7]. In our study, the average age of participants who quit smoking and never smoked was higher than that of current smokers. It was thought that the significantly low number of smokers, but the high number of quitters might be due to the high average age.

The average amount of smoking in packs/year was calculated as 29.7, and it was higher in current smokers than in those who quit. The average daily amount of cigarettes smoked by current smokers was 40.8 packs/year and 19.5 cigarettes. 72.2% of current smokers stated that they had tried to quit smoking before. 3.3% of ex-smokers and 15.1% of current smokers stated that they had previously received a smoking cessation program (psychological support, NRT, pharmacological treatment), and the difference between them was significant. In a study conducted on 320 patients who applied to the smoking cessation clinic in Ağrı, similar to our study, the average age of starting smoking was 18 and the majority were primary school graduates, but the amount of smoking in packs/year was lower (23 packs/year). 69.3% of the participants had tried to quit smoking before, and this rate was similar to that in our study. Unlike our study, the FTND score of those who quit smoking was lower than those who did not quit [16].

Although there is no study on the relationship between passive smoking and COVID-19 disease, it is thought that cigarette smoke exposure increases the risk of severe COVID-19 by increasing the production of angiotensin-converting enzyme-2 (ACE-2) in the lung

tissue. [17]. According to the Global Adult Tobacco Survey 2012 data, exposure to passive smoking at home was determined to be 38.3% in Turkey, while in our study, 31% of the participants had a smoker at home [18]. In our study, no relationship was found between passive smoking, smoking inside or outside the house, proximity of the smoker, length of stay, and worsening of the patient's condition.

In a study conducted in Ankara, smoking cessation status was examined in 111 patients with acute coronary syndrome in the six-month period after discharge [19]. Unlike our study, the average age of the patients was 53, lower than in our study, and 94.6% were male. Similar to our study, most of the patients lived in urban areas, were primary school graduates, and had low-middle income perception, and these factors had no effect on quitting smoking. Those who quit smoking and started smoking again were mostly single or widowed. In our study, there was no relationship between marital status and smoking cessation. In the study, 30.4% of the patients quit smoking in the sixth month after discharge. Similarly, in our study, 33.3% quit smoking and did not start again, and there was no relationship between FTND score and smoking cessation. Again, similar to our study, it was found that passive smoking, smoking inside or outside the house, or the proximity of the smoker did not affect quitting smoking. In a thesis study conducted in Aydın, the smoking cessation success of 126 patients followed in a smoking cessation clinic was examined at the end of six months. Similar to our study, no relationship was found between sociodemographic data and smoking cessation, but differently, it was observed that the quitting rate of those with high addiction levels was lower [20].

It is thought that the COVID-19 pandemic may directly or indirectly affect smoking habits. While the amount of cigarettes used may decrease due to concern about getting sick and complications, the amount used may increase due to factors such as the quarantine period, economic concerns, and increased stress [21]. In a study conducted with 5896 participants from seventeen Middle Eastern and North African countries, it was shown that there was no change in smoking behavior during the pandemic period [22]. In a representative study conducted in the USA, it was observed that 40% of smokers increased their consumption amount during the pandemic period [23]. In our study, in the first interview, 30.3% of the participants stated that they reduced the number of cigarettes they smoked during the pandemic, and 12.1% stated that they increased it. When questioned about the change in the amount of cigarettes smoked after discharge, 85.0% of the participants stated that they reduced the amount of cigarettes they smoked, and 15.0% stated that they increased it. The pre- and post-discharge anxiety scores of people who reported reducing their smoking were higher than those who increased their smoking. The reason for the majority of those who reduced their smoking in our study may

be that the sample was hospitalized patients due to COVID-19. It can be assumed that health anxiety in these patients will be higher than in the general population, and therefore they will be more willing to quit or reduce smoking.

Limitations of our study; The reasons were the low number of active smokers, the exclusion of intensive care patients from the study, and the lack of sufficient studies on the subject. The study can be improved in the next step by determining the parameters that can be used to evaluate disease severity and by studying on a larger sample.

CONCLUSION

In our study, it was observed that smoking or passive smoking did not affect the course of COVID-19 disease and length of stay. There are studies with conflicting results regarding the relationship between smoking, passive smoking and COVID-19.

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Hospitalization or home isolation during the pandemic should be seen as an opportunity to quit smoking, and all physicians and healthcare professionals should guide patients to quit smoking. For inpatients, it may be effective to first plan short motivational interviews by the physician who follows them in the ward. Informational documents or brochures about the harms of smoking can be prepared and given to inpatients. Especially patients with high addiction levels and withdrawal symptoms can be evaluated for pharmacological treatment. The success of patients in quitting smoking can be increased by referring them to smoking cessation clinics or family physicians in the city after discharge.

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