

# THE EFFECT OF FEAR OF COVID-19 ON SMOKING BEHAVIOR



## COVID-19 korkusunun sigara içme davranışına etkisi

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### Abstract

This study aimed to examine the effects of fear of COVID-19 disease on individuals' smoking behavior. Between April and July 2021, 384 patients who applied to family health centers in Kayseri Melikgazi district were administered a questionnaire, the fear of COVID-19 Scale (FCV-19S) and the Fagerström Nicotine Dependence Test (FNDDT). Mann-Whitney U and Kruskal Wallis tests were used to compare the groups, Spearman correlation analysis was used to evaluate the correlation of numerical data, chi-square tests were used to analyze categorical data. The median FCV-19S score of the group was 16.0 (min:7-max:35). During the pandemic, 79.1% of the participants had no change in their smoking status. The proportion of smokers who reduced the amount of cigarettes they smoked was higher in those who reported deaths in their circle of friends and relatives due to COVID-19 and in those with lower FNDDT scores ( $p<0.05$ ). Among those who thought that COVID-19 was more severe in smokers, the proportion of those who were motivated to quit smoking was higher than those who did not think so ( $p<0.001$ ). A negative relationship was found between the fear of COVID-19 and the amount of cigarettes smoked per day. It was observed that people who thought that COVID-19 was more severe in smokers were more motivated to quit smoking. The COVID-19 pandemic can be used as an opportunity to encourage people to quit smoking.

**Keywords:** COVID-19, fear of COVID-19, smoking behavior, motivation to quit smoking.

### Özet

Bu çalışmanın amacı COVID-19 hastalığı korkusunun bireylerin sigara içme davranışı üzerindeki etkilerini incelemektir. Nisan-Temmuz 2021 tarihleri arasında Kayseri Melikgazi ilçesindeki aile sağlığı merkezlerine başvuran 384 hastaya anket, COVID-19 Korkusu Ölçeği (FCV-19S) ve Fagerström Nikotin Bağımlılık Testi (FNDDT) uygulanmıştır. Grupları karşılaştırmak için Mann-Whitney U ve Kruskal Wallis testleri, sayısal verilerin korelasyonunu değerlendirmek için Spearman korelasyon analizi, kategorik verileri analiz etmek için ki-kare testleri kullanılmıştır. Grubun medyan FCV-19S skoru 16.0 (min:7-maks:35) idi. Pandemi sırasında katılımcıların %79,1'inin sigara içme durumunda bir değişiklik olmamıştır. İttikleri sigara miktarını azaltanların oranı, arkadaş ve akraba çevresinde COVID-19 nedeniyle ölüm bildirenlerde ve FNDDT skoru düşük olanlarda daha yüksekti ( $p<0,05$ ). Sigara içenlerde COVID-19'un daha şiddetli olduğunu düşünenler arasında sigarayı bırakmaya motive olanların oranı, böyle düşünmeyenlere göre daha yüksekti ( $p<0,001$ ). COVID-19 korkusu ile günlük içilen sigara miktarı arasında negatif bir ilişki bulunmuştur. Sigara içenlerde COVID-19'un daha şiddetli olduğunu düşünen kişilerin sigarayı bırakma konusunda daha motive oldukları görülmüştür. COVID-19 salgını gibi olağanüstü durumlar, insanları sigarayı bırakmaya teşvik etmek için bir fırsat olarak kullanılabilir.

**Anahtar kelimeler:** COVID-19, COVID-19 korkusu, sigara içme davranışı, sigara bırakma motivasyonu.

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## Introduction

Smokers have an increased risk of COVID-19-related hospitalization, intensive care unit admission and death (1). Although the COVID-19 pandemic offers an excellent opportunity to quit smoking in terms of public health, two opposite trends have been observed in smokers during the pandemic. The first group is those who consider the pandemic period as an opportunity to increase their motivation to quit smoking and smoking cessation rates or reduce the amount of cigarettes they smoke, and the second group is those who increase their smoking (2, 3). For some people, this may be due to a decrease in the frequency and amount of smoking due to the fear of COVID-19 development and the complications it may cause; for others, it is due to reduced access to cigarettes due to economic and social problems caused by the pandemic, or neglect of smoking cessation services during the pandemic (4-6).

Emotional distress, stress and anxiety are important factors that play a role in changing smoking behaviors at the individual level. Sources of stress include fears about the development of infection,

job loss or uncertainty, social isolation, and changing dynamics at home (6). Due to the occurrence of severe symptoms and sudden deaths in the early stages of the pandemic, fear of COVID-19 has increased, and concerns have been expressed about the possibility of an increase in smoking behavior as a result of social isolation and possible stress (3, 7). However, in the limited number of studies examining the effect of fear of COVID-19 on the change in smoking behaviors, the results have been varied, and it has been found that increased stress level has a bidirectional effect by causing a decrease in smoking or smoking cessation in some smokers, while causing an increase in smoking in others (8-10). Clarifying the changes in smoking behavior and its determinants during the pandemic period is very important in terms of identifying risk groups and developing effective strategies for tobacco control (11).

This study aimed to examine the factors affecting the fear of COVID-19 in the SARS-CoV-2 pandemic and the effects of COVID-19 fear on individuals' smoking behavior.

## Material and Method

### Study design and sample selection

The population of this cross-sectional study consisted of individuals over 18 years of age who applied to family health centers (FHCs) between April and July 2021 in the Kayseri Melikgazi region. The frequency of COVID-19-induced fear causing a change in smoking behavior was taken as 50% (unknown frequency), the level of error ( $\alpha$ ):0.05, test power ( $1 - \beta$ ):0.80, deviation level (d):0.05, and the minimum sample size was calculated as 384, assuming an unknown population size. The FHCs included in the study were selected by lot among 35 FHCs. A questionnaire was administered to 384

individuals aged 18 years and over who applied to the FHC and agreed to participate in the study by face-to-face interview.

A questionnaire form consisting of 36 questions questioning the sociodemographic characteristics of the participants, their exposure to COVID-19, their fear of COVID-19, their smoking habits and the level of their smoking addiction was used as a data collection tool. In further analyses related to changes in smoking behavior during the pandemic, those who did not smoke before the pandemic and did not smoke during the pandemic were excluded from

the analysis because they did not show smoking behavior during the pandemic.

The fear of COVID-19 Scale (FCV-19S) used to assess the fear of COVID-19 was developed by Ahorsu et al., and the Turkish validation study was conducted by Bakioğlu et al. The scale consists of a single dimension and seven items, with no reverse items. The total score obtained from the scale shows the level of COVID-19 fear experienced by the individual. Scores to be obtained from the scale vary between 7 and 35, and there is no cut-off point. A high score on the scale means experiencing a high level of fear of COVID-19 (14).

The Fagerström Nicotine Dependence Test (FNDT), which is used to assess smoking addiction, was developed by Fagerström and the Turkish validation study was conducted by Uysal et al. There are six questions on the scale, and the total scores obtained from the scale are evaluated as 0-2 points (very mild addiction), 3-4 points (mild addiction), 5-6 points (moderate

addiction), 7-8 points (severe addiction), 9-10 points (very severe addiction) (15).

The study was initiated after obtaining application permission from the Ministry of Health, administrative permission from the Kayseri Provincial Health Directorate, and ethical approval from Erciyes University Clinical Research Ethics Committee with the year and number 2021/202.

### Statistical analysis

Jamovi 2.3.0 program was used for statistical analysis of the data. Mean  $\pm$  standard deviation, median (min-max), percentage and frequency were used for descriptive data. Shapiro-Wilk test, kurtosis and skewness values were used to evaluate the conformity to normal distribution, Mann-Whitney U and Kruskal Wallis tests were used as non-parametric tests in the comparison of groups, Spearman correlation analysis was used to evaluate the correlation of numerical data. Chi-square tests were used to analyze categorical data, and  $p < 0.05$  was considered statistically significant.

## Results

The mean age of the 384 participants was  $42.8 \pm 14.7$  years (min:18 - max:65); 58.9% were female, and 74.7% were married. 47.9% of the participants have high school education and above. 34.1% of the participants had at least one chronic disease. The most common chronic diseases were hypertension (35.8%), diabetes (29.7%) and heart disease (23.6%). 21.6% of the participants reported having had COVID-19, 16.7% had been exposed at any time, and 61.7% had no exposure to COVID-19. 78.1% of the group stated that at least one of their friends or relatives had at least one person with COVID-19, 23.7% stated that at least one of their friends or relatives had died due to COVID-19, 25.5% stated that at least one of the

individuals living in the same household had a history of COVID-19, and 0.3% stated that at least one of the individuals living in the same household had a death due to COVID-19.

Among the participants, 28.1% were current smokers, 13.0% had smoked in the past and quit, and 58.9% had never smoked before. Among all participants, 83.1% thought that COVID-19 was more severe in smokers, while 96.4% thought that COVID-19 caused damage to the lungs. During the pandemic, 79.1% of the participants had no change in their smoking status. The distribution of participants according to the change in their smoking behavior during the COVID-19 pandemic is given in Table 1.

**Table 1:** Distribution of individuals in the study group according to changes in smoking behavior during the COVID-19 pandemic\*.

Feature	Number	%
No change		
Previously a smoker and likewise those who continue to smoke	79	50.0
Those who quit smoking before COVID-19	46	29.1
Those who quit smoking	4	2.5
Those who have increased the amount of cigarettes they smoke	5	3.2
Those who have reduced the amount of cigarettes they smoke	24	15.2
<b>Total</b>	<b>158</b>	<b>100.0</b>

\*Current smokers and former smokers are included.

Of the 158 current smokers or former smokers, 105 (66.5%) stated that they had attempted to quit smoking in the pre-pandemic period. The median number of quit attempts in the pre-pandemic period was 1.0 (min:1 - max:9). One hundred eight of the participants stated that they continued to smoke during the pandemic, and 28 of those who stated that they continued to smoke stated that they tried to quit smoking during the pandemic. The median number of attempts to quit smoking during the pandemic was 1.0 (min:1 - max:8).

The median FNDT score of smokers was 4.0 (min:0 - max:8). 34.2% of the participants were very mildly nicotine dependent. To the statement, "I am more motivated to quit smoking during the COVID-19 pandemic", 39.8% of current smokers answered "disagree", and 23.1% answered, "strongly disagree".

The mean FCV-19S score of the participants was  $16.5 \pm 6.3$ , and the median FCV-19S score was 16.0 (min:7-max:35). It was observed that women (FCV-19S score median: 18.0, min:7-max:33) had a higher level of fear of COVID-19 than men (FCV-19S score median: 14.0, min:7-max:35) ( $p < 0.001$ ). No significant correlation was found between the scores obtained from FCV-19S and age, education level, chronic disease status, and the presence of

individuals over 65 or under 18 years of age at home. A negative correlation was found between COVID-19 fear level and daily cigarette smoking (Sperman's  $\rho = -0.156$ ,  $p = 0.025$ ). No significant correlation was found between FCV-19S scores and FNDT scores and years of smoking.

Among the participants, the fear level of those who reported smoking some days was higher than those who smoked every day and those who had quit smoking ( $p = 0.013$ ) (Table 2). The comparison of the scores obtained from the FCV-19S according to COVID-19 history and some characteristics is given in Table 2.

Among the participants, those who stated that there were deaths in their circle of friends and relatives due to COVID-19 were significantly higher than those who did not, those who smoked their first cigarette of the day after 30 minutes after waking up were significantly higher than those who smoked in the first 30 minutes, and those who stated that they were motivated to quit smoking during the pandemic period were significantly more likely to reduce the amount of cigarettes they smoked than those who were not motivated. A comparison of the change in smoking behavior in participants during the pandemic period according to some characteristics is shown in Table 3.

**Table 2:** Comparison of FCV-19S scores according to COVID-19 history and some characteristics.

Features	FCV-19S Median	FCV-19S Min-Max	U-KW*	p-value
<b>COVID-19 exposure</b>				
Yes	16.0	7-35	16944	0.652
No	16.0	7-35		
<b>Death of a friend or relative due to COVID-19</b>				
Yes	17.0	7-35	11793	0.096
No	15.0	7-35		
<b>Smoking status in the pandemic</b>				
Unchanged	15.0	7-35	1667	0.090
Increased/Decreased	17.0	7-33		
<b>Smoking status**</b>				
Every day <sup>a</sup>	15.0	7-35	10.7	<b>0.013</b>
Some days <sup>b</sup>	22.0	18-35		
He never smoke <sup>a,b</sup>	15.0	7-24		
Quitted <sup>a</sup>	17.0	7-33		
<b>Motivation to quit smoking during COVID-19</b>				
Motivated	15.0	7-35	1133	0.485
Not motivated	17.0	7-35		

\*"U" value for variables with two groups and Kruskal Wallis "KW" value for variables with more than two groups. \*\*Associations between groups with different exponential letters are significant.

**Table 3:** Comparison of changes in smoking behavior during the pandemic period according to some characteristics\*.

Features	Smoking behavior during the pandemic**				X <sup>2</sup>	p-value
	Unchanged-Increased		Decreased			
	Number	%	Number	%		
<b>Chronic disease</b>						
Yes	44	78.6	12	21.4	0.818	0.366
No	86	84.3	16	15.7		
<b>Individual under the age of 18 at home</b>						
Yes	65	79.3	17	20.7	1.060	0.303
No	65	85.5	11	14.5		
<b>COVID-19 exposure</b>						
Yes	48	81.4	11	18.6	0.055	0.815
No	82	82.8	17	17.2		
<b>Death of a friend or relative due to COVID-19</b>						
Yes	30	71.4	12	28.6	<b>4.620</b>	<b>0.032</b>
No	100	86.2	16	13.8		
<b>Thinking that COVID-19 is more severe in smokers</b>						
Yes	95	81.2	22	18.8	0.362	0.547
No	35	85.4	6	14.6		
<b>Time for the first cigarette of the day</b>						
In the first 30 minutes	54	87.1	8	12.9	<b>7.314</b>	<b>0.007</b>
After 30 minutes	30	65.2	16	34.8		
<b>Motivation to quit smoking during COVID-19</b>						
Motivated	18	54.5	15	45.5	<b>14.840</b>	<b>&lt;0.001</b>
Not motivated	66	88.0	9	12.0		

\*Current smokers and former smokers are included. \*\*Line percentages are given.

When the relationship between the change in smoking behavior during the pandemic period and various numerical variables was examined, a significant

difference was found between the groups in terms of the number of smoking cessation attempts before the pandemic and the FNNT score ( $p < 0.05$ ) (Table 4).

**Table 4:** Comparison of the change in smoking behavior during the pandemic period according to the amount of cigarettes smoked daily, age of smoking initiation, smoking cessation attempt before the pandemic, and FNNT score\*.

Variables	Changes in smoking behavior during the pandemic		U**	p-value
	Unchanged-Median (Min-Max)	Increased-Median (Min-Max)		
Number of cigarettes smoked per day	17.0 (1-40)	10.5 (1-40)	1400	0.052
Smoking initiation age	18.0 (7-40)	20.0 (10-60)	1394	0.051
Pre-pandemic smoking cessation attempt	1.0 (0-8)	1.0 (0-9)	<b>1342</b>	<b>0.022</b>
FNNT score	5.0 (0-8)	1.5 (0-8)	<b>631</b>	<b>0.005</b>

\*: Current smokers and former smokers are included. \*\*: Mann Whitney U test

Among the participants, the proportion of those who were motivated to quit smoking among those who thought that COVID-19 was more severe in smokers was significantly higher than

those who did not think so. The comparison of thinking that they were motivated to quit smoking during the pandemic period according to some characteristics is given in Table 5.

**Table 5:** Comparison of the status of feeling motivated to quit smoking during the pandemic period according to some characteristics\*.

Features	Thinking more motivated to quit smoking during the pandemic**				X <sup>2</sup>	p-value
	Disagrees		Agree			
	Number	%	Number	%		
<b>Individual over 65 at home</b>						
Yes	13	76.5	4	23.5	0.469	0.493
No	62	68.1	29	31.9		
<b>Individual with chronic disease at home</b>						
Yes	13	65.0	7	35.0	0.228	0.633
No	62	70.5	26	29.5		
<b>Individual under the age of 18 at home</b>						
Yes	30	66.7	15	33.3	0.281	0.596
No	45	71.4	18	28.6		
<b>COVID-19 exposure</b>						
Yes	25	71.4	10	28.6	0.096	0.757
No	50	68.5	23	31.5		
<b>Death of a friend or relative due to COVID-19</b>						
Yes	52	69.3	23	30.7	0.001	0.969
No	23	69.7	10	30.3		
<b>Thinking that COVID-19 is more severe in smokers</b>						
Yes	44	59.5	30	40.5	<b>11000</b>	<b>&lt;0.001</b>
No	31	91.2	3	8.8		

\*Only smokers are included. \*\*Line percentages are given.

## Discussion

In our study, the mean FCV-19S score of the participants was  $16.5 \pm 6.3$ . In 2020, in a study conducted on patients admitted to a family health center in Osmaniye, the mean score of the FCV-19S was found to be higher (12). This difference may be related to the fact that our study was conducted later in the pandemic compared to the study conducted in Osmaniye, even though it was conducted on a similar sample. As a result of the limited information about COVID-19 in the early period, the stress caused by the lack of information and uncertainty may have led to increased fear of COVID-19. The fact that uncertainty has a negative effect on human psychology and that the stress experienced against uncertainty causes an increase in the anxiety level of individuals is also supported in the literature (13, 14).

When the literature was examined, it was seen that many factors may play a role in this behavior of the group that experienced a positive change in the form of reducing or quitting smoking. Reasons such as fear of contracting COVID-19, the desire to have a milder disease in case of a possible infection, having difficulties in accessing tobacco products, being a social smoker and reducing/quitting smoking as a result of being more alone due to restrictions are the factors mentioned in the literature (10, 15-17).

A study conducted in Sweden reported that in the first wave of the pandemic, 95.4% of the participants' smoking behavior remained the same, 3.8% had a positive change, and 0.8% had a negative change (16). Although the opposite is expected due to Sweden's higher case/mortality rate and higher number of cases compared to the population in Turkey, smoking behavior was more affected by COVID-19 in our study than in the study, as mentioned earlier (18).

When the literature was examined for this behavior of the group that

increased the number of cigarettes smoked in our study, the reasons for smoking more cigarettes were reported as boredom (48.6%), high-stress level (43.2%), being alone more (36.6%) and going to places where smoking is prohibited less (23.5%) in the study conducted by Bommele et al. in 2020 (10). Stress and adverse psychological effects are known predisposing factors for an increase in the amount and frequency of smoking and for relapse in quitters (19). On the other hand, not being able to access smoking cessation services during quarantine may be a predisposing factor for increased smoking behavior or inability to quit smoking. The World Health Organization's (WHO) declaration in 2021 supports this by encouraging different service delivery methods, such as e-health and telemedicine consultations for tobacco cessation (20).

When the studies conducted during the restriction period were analyzed, it was reported that 45.8% of people increased smoking in a study conducted in Germany and 36.3% in Italy (5, 21). Compared to the increases in smoking rates found in studies conducted abroad, our study showed an increase in smoking behavior in a smaller proportion of participants (4.6%). The results of another study conducted in Turkey by Arpacioğlu and Ünübol are similar (3.2%) (22). This difference may be due to the development of social support systems and the concept of family in Turkey. Living alone during the restrictions period was found to increase the likelihood of increased smoking by 2.15 times compared to living with a spouse and/or children (23).

A study on dental students showed that fear of COVID-19 was higher in women (24). Similarly, in our study, the COVID-19 fear level of women was higher than that of men ( $p < 0.001$ ). The gender difference in favor of women in COVID-19 fear level is consistent with the finding that the COVID-19 pandemic

causes more psychological effects in women, as seen in a study conducted in China (25). It is known that women get sick more frequently than men, and this may have caused an increase in the level of fear of COVID-19 in women (26). Gender roles may also contribute to this result. Since women are seen as more vulnerable and sensitive, they can express their feelings in case of fear more quickly than men. In addition, social assumptions suggest that factors such as women taking care of children and the elderly during extraordinary periods such as pandemics and assuming domestic responsibilities in addition to their work life cause them to carry more physical and psychosocial burdens (27).

A study of university students in Vietnam found that students with higher levels of COVID-19 fear were more likely to smoke unchanged or increased amounts of cigarettes, and a 1-point increase in FCoV-19S score was associated with an 11% greater likelihood of smoking (9). In Germany, stress from the COVID-19 pandemic during lockdowns has been shown to increase the risk of smoking by 10% more (21). On the other hand, the literature is contradictory, and in a study of 103 smokers in the USA, fear of COVID-19 was found to be associated with smoking less than usual in the last 28 days (8). In our study, no statistically significant relationship was found between the COVID-19 fear level and the change in smoking status during the pandemic.

Doğan et al. found that social smokers had significantly higher scores on the FCV-19S compared to regular daily drinkers (28). This is supported by the fact that in our study, those who

reported smoking some days had higher levels of fear of COVID-19 than those who smoked every day and those who had quit smoking ( $p=0.013$ ). This may indicate that occasional smokers choose smoking as an escape route due to fear of COVID-19, even if they do not normally smoke. Alternatively, it may be related to the fact that occasional smokers smoke to cope with negative feelings and thoughts rather than addiction. Smoking is known to be used as a tool to alleviate negative emotions that cause discomfort (19, 29).

In Yılmazel's study, it was observed that FNDDT scores decreased during the pandemic period (30). In our study, although there was a negative correlation between the participants' FNDDT score and FCV-19S scores, it was not statistically significant. In our study, a significant negative correlation was found between the amount of cigarettes smoked daily by the participants and their FCV-19S scores. This may be explained by the fact that people were afraid of COVID-19 and its complications and reduced their smoking.

### Limitations

Since our study was cross-sectional, it has limitations in terms of evaluating the time of emergence of the variables examined and the relationship between them. There may be an information bias due to self-reported responses and a recall bias due to participants being asked to report their past smoking habits. Since the population of the study consisted of individuals over the age of 18 who applied to family health centers (FHC), our study has limitations in representing the general population.

## Conclusions

The majority of the participants stated that there was no change in their smoking status during the COVID-19 pandemic. It was observed that those

who attempted to quit smoking during the pandemic were fewer compared to the pre-pandemic period, suggesting that people should be directed to smoking



cessation services, especially during risky periods such as the COVID-19 pandemic.

It was observed that the majority of current smokers were not motivated to quit smoking during the COVID-19 pandemic. Among those who thought that COVID-19 was more severe in smokers, the proportion of those who were motivated to quit smoking was significantly higher than those who didn't think so.

It was observed that women had higher levels of COVID-19 fear than men. It was observed that there was a negative

relationship between the participants' COVID-19 fear level and the amount of cigarettes they smoked per day. The fact that the participants decreased the amount of cigarettes they smoked as their fear of COVID-19 increased shows that fear of COVID-19 can be turned into an advantage for individuals. Considering the pandemic period as an opportunity, it may be helpful to explain the current relationship between smoking and COVID-19 with evidence-based information through public spots, TV broadcasts or social media and encourage people to quit smoking.

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