

ORIGINAL PAPER

PSYCHIATRY

Evaluation of the effect of the Covid-19 pandemic on smoking addiction levels

İzzet Fidancı¹  | Hilal Aksoy¹  | Duygu Yengil Taci²  | Duygu Ayhan Başer¹  | Mustafa Cankurtaran³ 

¹Department of Family Medicine, Faculty of Medicine, Hacettepe University, Ankara, Turkey

²Department of Family Medicine, Ankara Education and Research Hospital, Ankara, Turkey

³Division of Geriatric Medicine, Department of Internal Medicine, Faculty of Medicine, Hacettepe University, Ankara, Turkey

Correspondence

İzzet Fidancı, Department of Family Medicine, Faculty of Medicine, Hacettepe University, Ankara, Turkey.
Email: izzetfidanci@gmail.com

Abstract

Aims: This study aims to evaluate the changes in smoking addiction levels during the on-going Covid-19 pandemic.

Methods: This study included 104 participants, ≥18 years old who were previous patients of family health clinics for a variety of reasons in the months preceding the onset of the Covid-19 pandemic. The Fagerström Test for Nicotine Dependence was administered to these patients as part of their initial intakes. The participants were asked to complete a questionnaire related to socio-demographic information and the Fagerström Test for Nicotine Dependence after obtaining agreement to participate during the pandemic period. In addition, written informed consent was obtained. The Statistical Package for the Social Sciences, version 20, was used to analyse the acquired data.

Results: The participants were 48.1% and 51.9% women and men, respectively. The pre-pandemic and Covid-19 pandemic mean smoking addiction scores were 5.03 and 5.6, respectively. The smoking addiction levels before and during the Covid-19 pandemic significantly differed ($P < .001$). Of the individuals with low smoking addiction levels before the pandemic, 17.6% and 29.4% became moderately and highly addicted, respectively. Of the individuals with moderate smoking addiction level, 6.3% and 43.9% became lowly and highly addicted, respectively.

Conclusion: The smoking addiction level may change based on various factors including behavioural changes. While increases in smoking addiction during the pandemic can be observed caused by behavioural changes and anxieties that may arise because of the pandemic, a decrease in addiction levels and even smoking cessation can also be observed during these times because of the more progressive course of Covid-19 in smokers. Health institutions should therefore take advantage of this period and focus more efforts on the cessation of smoking and other substance abuse issues.

1 | INTRODUCTION

Smoking is one of the most significant preventable reasons for mortality and morbidity in the world¹⁻³ and is defined by the World Health Organization (WHO) as *the world's fastest-spreading and longest on-going epidemic*. Current studies on the relationship between

smoking and Covid-19 suggest that smokers are 1.4 times more likely to have more severe Covid-19 symptoms than non-smokers. The same research also shows that the possibility of smokers needed to be ventilated and dying is 2.4 times higher compared with non-smokers. Moreover, viral infections progress more aggressively in smokers, particularly during this pandemic, which may cause behavioural changes in smokers. As the negative correlation between the

spread and mortality of Covid-19 infections and smoking becomes clearer, the WHO has emphasised that other tobacco-related products such as hookahs, e-cigarettes and heated tobacco products may also produce the same negative effects as regular smoking related to Covid-19.⁴⁻¹³ Those who are isolated because of pandemic restrictions may increase their addiction levels caused by anxiety and fear.^{14,15} However, this and other types of addiction maybe positively affected by behavioural modification. Thus, behaviour modification therapy in combination with medication is the most common treatment in the first stages of addiction therapy.¹³ Also, viral infections progress more aggressively in smokers, particularly during this pandemic, which may also cause behavioural changes in smokers.¹²⁻¹⁸

It is expected that the global Covid-19 pandemic will result in addiction level changes because it is typical to observe changes in smoking addiction levels (as well as other types of addiction) as well during times when societal behaviours change. Therefore, this study aims to evaluate the possible changes in smoking addiction levels during this pandemic period.

2 | MATERIAL AND METHODS

This observational, analytic and prospective study was conducted with individuals, ≥ 18 years old who were patients of family health centres for a variety of reasons between May and November 2020. As part of their initial intake procedures, these patients were given the Fagerström Test for Nicotine Dependence 3 months (between December 2019 and March 2020) before the Covid-19 pandemic period and who agreed to participate in the study during the pandemic after obtaining their written informed consent. Approval for the study was obtained from the Republic of Turkey Ministry of Health-Scientific Research Platform (form number 2020-05-17T18_01_49) and Hacettepe University Non-interventional Clinical Studies Ethics Committee (project number GO-20/487 dated 22.05.2020 and decision number 2020/10-44).

The sample group was formed from patients whose smoking addiction levels were calculated in the 3 months before the pandemic. This study desired to minimise the duration of the participants' addiction levels from being affected by different factors. Likewise, the first 6 months was chosen as the pandemic period to minimise the effects of the different factors on the addiction levels in the long run. The polyclinics are located on the university campus and provide health services as institutional physicians. Consequently, the patient population of this study consists of university students and university staff. Therefore, the patient population in this study had no systematic differences. Similarly, no significant percentage differences were noted between the groups of participants included and not included in the study. Thus, the same patients were constantly seen for their health checks. Smoking cessation counselling and patient inquiry about their smoking status were also done at each examination. Smokers were followed up with the Fagerström Test for Nicotine Dependence. The smoking addiction levels of 229 patients were examined in the 3 months before the pandemic. Consequently,

What's known

- Pandemics can cause behavioural changes, and smoking addiction is affected by behavioural change patterns.

What's new

- **Attention should be given to addicted people, addiction increases and other addictions during pandemic periods.**

109 of these patients were reached in the 6 months after the pandemic. Five of these participants did not give consent. Thus, 104 participants were included in this study.

After agreeing to take part in the study, participants were given a short questionnaire. The first and second sections of the questionnaire were related to socio-demographic information and the re-administered Fagerström Test for Nicotine Dependence, respectively. All necessary permissions related to the use of the questionnaires were obtained.

2.1 | The Fagerström Test for Nicotine Dependence

The Fagerström Test for Nicotine Dependence, which was developed by Karl O. Fagerström in 1991 as a revised version of the 1978 Fagerström Tolerance Questionnaire (FTQ), is generally administered only to smoking adolescents. The test was designed to measure nicotine dependence through a series of six self-evaluating questions loaded on a single factor. Scores on the test range from 0 to 10 (<5, indicates low nicotine dependence; between 5 and 6, moderate dependence; ≥ 7 , high dependence).¹⁷ The Turkish validity and reliability study of the test were conducted by Uysal et al¹⁸, and its reliability was found to be moderate ($\alpha = 0.56$).¹⁷ The test-retest correlation of this test was found to be 0.85 and 0.88, respectively, in studies conducted in France and the USA. Additionally, the internal validity coefficient of 0.61 was determined.¹⁸⁻²³

2.2 | Statistical method

The data were analysed using the Statistical Package for the Social Sciences, v20 (IBM, Armonk, NY, USA). The conformity to normal distribution was assessed with the Shapiro-Wilk test. The independent and dependent samples *t*-tests were used in the comparison of independent data with normal distribution and dependent data, respectively. The data conforming to normal distribution are presented as mean \pm standard deviation. The McNemar-Bowker test was used to compare the dependent categorical data, which are presented as frequency (percentage). The significance level was $P < .050$.

3 | RESULTS

Of the research participants, 48.1% and 51.9% were women and men, respectively. The participants' socio-demographic characteristics and smoking addiction classifications before and during the Covid-19 pandemic are presented in Table 1.

The mean age of the participants was 37.4 years. The mean smoking addiction score before and during the Covid-19 pandemic was 5.03 and 5.6, respectively (Table 2).

The smoking addiction scores before and during the Covid-19 pandemic are compared in Table 3. The smoking addiction scores before and during the Covid-19 pandemic differed among women ($P < .001$) and men ($P = .003$). Similarly, the smoking addiction scores before and during the Covid-19 pandemic differed in the groups with high school and lower education ($P = .004$), undergraduate education ($P = .003$) and postgraduate and higher education ($P = .024$).

TABLE 1 Frequency distributions

	Frequency (n)	Percentage (%)
Gender		
Female	50	48.1
Male	54	51.9
Educational status		
High school and lower education	50	48.1
Undergraduate	35	33.7
Postgraduate and higher education	19	18.3
Profession		
Student	13	12.5
Healthcare personnel	26	25.0
Engineer-architect	15	14.4
Academician	12	11.5
Teacher	17	16.3
Other	21	20.2
Smoking addiction levels before Covid-19 pandemic		
Very low dependence	28	26.9
Low dependence	17	16.3
Moderate dependence	16	15.4
High dependence	19	18.3
Very high dependence	24	23.1
Smoking addiction levels during Covid-19 pandemic		
Very low dependence	15	14.4
Low dependence	21	20.2
Moderate dependence	15	14.4
High dependence	24	23.1
Very high dependence	29	27.9

A comparison of smoking addiction levels before and during the Covid-19 pandemic can be seen in Table 3. A difference was noted between smoking levels pre- and during the pandemic for women ($P < .001$) and men ($P = .003$). A difference was also seen pre- and during pandemic for those with high school or lower education ($P = .004$), undergraduate education ($P = .003$) and postgraduate or higher education levels ($P = .024$). In terms of the career demographic, smoking addiction scores pre- and during the Covid-19 pandemic differed for healthcare personnel ($P = .007$), academicians ($P = .009$) and other professions ($P = .004$).

Self-evaluated levels of addiction before and during the Covid-19 pandemic also showed significant differences ($P < .001$). Table 4 shows a summary of the addiction level results. Of the individuals who proclaimed *very low* addiction levels on the Fagerström Test for Nicotine Dependence pre-pandemic, 53.6% continued at the same level during the pandemic. However, 39.3% and 7.1% moved to *low* and *moderate* addiction, respectively. Of the individuals who self-evaluated at *low* addiction levels before the pandemic, 17.6% and 29.4% moved to *moderate* and *high* levels during the pandemic, respectively. Of the individuals with *moderate* smoking addiction before the Covid-19 pandemic, 6.3% and 43.9% moved to *low* and *high* levels, respectively. Of those proclaiming a *high* level of addiction prepandemic, 10.5% and 31.6% moved down to *moderate* and *high* levels, respectively. Finally, those who self-evaluated at a *very high* level of addiction prepandemic, 95.8% and 4.2% continued at the same level and moved down to *high* during the pandemic, respectively.

4 | DISCUSSION

Smoking addiction is common in adults, especially in adolescents, and is defined as a public health issue because it concerns both the individual and the people around them. Thus, this study aims to examine the effect of social behaviour changes experienced during the pandemic on smoking addiction. Moreover, the general increase in the addiction levels may generally be as a result of the effect of behavioural changes and anxiety during the pandemic.¹⁶ The relationship between smoking addiction and mental health is clear, and almost all behavioural changes can affect them. In particular, cigarette addiction can be perceived as an escape from prohibitions. Furthermore, smoking is already among mental health problems caused by addiction, which also affects body health. It also causes permanent damage to the body over time. This situation causes a vicious cycle and puts the patient in a difficult situation.^{13,14,24,25} Consequently, in this study, the pandemic had a more progressive course among smoking addicts, which caused an increase in mean addiction scores in general by falling behind social pandemic behaviour changes. Inaccurate implementation of the behaviour change model (transtheoretical model) used in smoking cessation therapy during particular periods (eg, pandemic period) may cause an increase in addiction levels.¹⁴⁻¹⁶

While the rate of smoking and addiction levels are generally higher among men compared with women, gender-based differences in the

	Mean	Standard deviation	Median	Minimum	Maximum
Age	37.4	10.7	40	18	57
Smoking addiction score before Covid-19 pandemic	5.03	3.10	5	0	10
Smoking addiction score during Covid-19 pandemic	5.60	2.57	6	1	10

TABLE 2 Descriptive statistics

	Before	After	Test statistic	P
Gender				
Female	5.16 ± 2.83	5.8 ± 2.56	$t^a = -4.039$	<.001
Male	4.91 ± 3.34	5.41 ± 2.59	$t^a = -3.120$.003
Test statistic	$t^b = -0.414$	$t^b = -0.766$		
P	.680	.439		
Educational status				
High school and lower education	4.78 ± 2.98	5.2 ± 2.5	$t^a = -3.059$.004
Undergraduate	5 ± 3.24	5.74 ± 2.55	$t^a = -3.186$.003
Postgraduate and higher education	5.74 ± 3.16	6.37 ± 2.73	$t^a = -2.467$.024
Test statistic	$F = 0.656$	$F = 1.523$		
P	.521	.223		
Profession				
Student	4.85 ± 3.02	4.85 ± 2.7	$t^a = 0.000$	1.000
Healthcare personnel	5 ± 2.91	5.62 ± 2.45	$t^a = -2.957$.007
Engineer-architect	5.53 ± 3.42	5.87 ± 2.53	$t^a = -1.000$.334
Academician	5.08 ± 2.75	6 ± 2.45	$t^a = -3.188$.009
Teacher	5.59 ± 3.16	6.12 ± 2.47	$t^a = -1.705$.108
Other	4.33 ± 3.45	5.19 ± 2.93	$t^a = -3.286$.004
Test statistic	$F = 0.401$	$F = 0.546$		
P	.847	.741		

TABLE 3 Comparison of smoking addiction scores before and during the Covid-19 pandemic

^a Dependent samples *t* test.

^b Independent samples *t* test and *F* test statistic of the analysis of variance.

Bold values are statistically significant.

prevalence of smoking have greatly decreased since the 1960s because of changes in social norms and the increase in advertisements and marketing targeting women in particular.²⁶ All participants in this study smoked. A significant difference in the addiction levels exists in both genders compared with their addiction levels before the pandemic while no significant difference was found between genders in terms of addiction levels before and during the pandemic.

Smoking habits and addiction levels are similar among healthcare personnel and are also lower compared with the general population in the same age group.²⁷ Although the rates of smoking and addiction are high among general practitioners in France, physicians are still considered effective for smoking cessation.²⁸ A significant increase in smoking addiction of healthcare personnel during the pandemic was noted compared with before the pandemic, although no significant difference was found between professions in terms of smoking addiction.

This increase may be caused by the difficulty of the working conditions of healthcare personnel during the pandemic and anxiety induced by the risk of contamination and of contaminating family members.

Although no increase was noted in the addiction levels of those with *very low* and *low* addiction in this study, it is remarkable that the addiction levels of those with *moderate* and *high* addiction levels increased. This result can be interpreted to mean that environmental factors are less effective on individuals with *very low* and *low* addiction levels. The high increase in individuals with *moderate* and high addiction levels may be that these people are already more affected by environmental events and increased smoking as negative reinforcement.

This condition shows that the psychological well-being of a society should be evaluated by specialists during times of extreme stress, ie, a pandemic. Necessary practices and precautions should be carried out by decision-makers. Thus, it is important to evaluate

TABLE 4 Comparison of smoking addiction levels before and during the Covid-19 pandemic

		Smoking addiction levels during the pandemic n (%)					Total	Test statistic ^a	P
		Very low	Low	Moderate	High	Very high			
Before the pandemic	Very low dependence	15 (53.6)	11 (39.3)	2 (7.1)	0 (0)	0 (0)	28	25.349	<.001
	Low dependence	0 (0)	9 (52.9)	3 (17.6)	5 (29.4)	0 (0)	17		
	Moderate dependence	0 (0)	1 (6.3)	8 (50)	7 (43.8)	0 (0)	16		
	High dependence	0 (0)	0 (0)	2 (10.5)	11 (57.9)	6 (31.6)	19		
	Very high dependence	0 (0)	0 (0)	0 (0)	1 (4.2)	23 (95.8)	24		
	<i>Total</i>	15	21	15	21	29			

^aMcNemar-Bowker Test statistic.

the negative psychological consequences of being alone and to conduct follow-up in instances of social isolation or quarantine.

The increase was higher among healthcare personnel and academicians. Indeed, healthcare professionals were the most affected by this pandemic because they had to manage both physically and psychologically difficult processes.²⁹ Also, academicians had to completely relearn how to teach as they moved to online lessons, an approach that is quite different from conventional educational models, and which could be especially difficult for more elderly academicians to adapt.

Reaching the participants was difficult because of the pandemic period and the isolation of the participants. The low number of participants and the short duration of the research period are the limitations of this study. When all difficulties in reaching the participants are over, more reliable results will be obtained at a longer time with more participants.

5 | CONCLUSION

Changes in addiction levels are often observed in behaviour changes. Consequently, an increase or decrease in addiction levels can be seen because of withdrawal from social life and anxiety caused by a pandemic. Thus, necessary planning should be made by relevant health institutions to end smoking addiction and other substance abuse habits by taking advantage of the pandemic periods.

RESEARCH INVOLVING HUMAN PARTICIPANTS AND/OR ANIMALS

This study only involved human participants.

INFORMED CONSENT

Informed consent was obtained from all individual participants included in the study.

DISCLOSURES

All of the authors declare no conflict of interest concerning the research, authorship or publication of this article.

ETHICAL APPROVAL

All procedures performed in studies involving human participants followed the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Approval for the study was obtained from the Republic of Turkey Ministry of Health-Scientific Research Platform (form number 2020-05-17T18_01_49) and Hacettepe University Non-interventional Clinical Studies Ethics Committee (project number GO-20/487 dated 22.05.2020 and decision number 2020/10-44).

DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

ORCID

İzzet Fidancı  <https://orcid.org/0000-0001-9848-8697>

Hilal Aksoy  <https://orcid.org/0000-0002-3330-9317>

Duygu Yengil Taci  <https://orcid.org/0000-0003-2978-6863>

Duygu Ayhan Başer  <https://orcid.org/0000-0002-5153-2184>

Mustafa Cankurtaran  <https://orcid.org/0000-0002-8213-7515>

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