Investigation of the effect of smoking on depression and stress in healthcare workers during a pandemic

Smoking on COVID-anxiety

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Abstract

Aim: In the COVID-19 pandemic, healthcare workers suffer from significant stress and anxiety disorders. The importance of smoking in the mortality and morbidity of COVID-19 disease is obvious. In this study, we aimed to investigate the effects of smoking on depression and perceived stress in healthcare workers who served at the forefront during the pandemic period.

Material and Methods: In our study, participants were asked questions on the Depression Severity Scale (PHQ-9), the Perceived Stress Scale (PSS 14), and the Fagerström Test for Nicotine Dependence (FTND) using aquestionnaire method, and the results were evaluated.

Results: Depression and stress symptoms were most often found in the healthcare workers included in our study. However, there was no statistically significant difference in depression and perceived stress scale between smoking and non-smoking groups.

Discussion: Previous studies have demonstrated that smokers are more affected by COVID-19 and that their morbidity rate is higher. Because of this information, smoking healthcare professionals are more symptomatic in terms of mental health disorders, but no statistical difference was reported between smokers and non-smokers in this study in terms of being symptomatic. Although smoking was revealed as a comorbidity for COVID-19, there was no significant difference between smoking and non-smoking healthcare professionals in terms of mental health disorders.

Keywords

Smoker; COVID-19; Depression; Stress; Healthcare workers

Introduction

Coronavirus disease 2019 (COVID-19) was first identified in Wuhan, China, in December 2019 [1]. It first led to an epidemic in China and began to spread rapidly worldwide [2]. In March 2020, the World Health Organization declared the COVID-19 outbreak a global epidemic. The World Health Organization reported 36 000 000 cases worldwide on October 8, 2020. COVID-19 is basically a disease of the respiratory system, characterized by acute respiratory distress syndrome. COVID-19 is caused by a a variant of the SARS-CoV-2 coronavirus [3]. SARS-Cov-2 enters the body through mucosal tissues, i.e. the nose, mouth, upper respiratory tract, and less frequently, through the conjunctival mucosa. The S protein of SARS-CoV2 connects to the human body through the ACE 2 receptor [4]. The virus can rapidly manifest symptoms of acute respiratory distress syndrome (ARDS), acute respiratory failure, and other severe acute respiratory infections resulting in severe complications [5].

Exposure to tobacco products causes an inflammatory response and blockage in the lungs, increases mucosal inflammation, as well as the expression of inflammatory cytokines and tumor necrosis factor -alpha. It increases the permeability in epithelial cells, and the excessive increase of mucus decreases or impairs mucociliary clearance [6]. The number of ACE2 receptors increases among smokers. When comparing respiratory samples of smokers and non-smokers, an additional ACE 2 gene expression was reported among smokers [4]. It appears that smokers are more susceptive to SARS-CoV-2 [7].

It has been observed that healthcare professionals experience anxiety and stress disorders during the pandemic [8]. Smokers also face more severe complications during the course of COVID-19 [9]. Based on this information, the purpose of our study was to investigate the effects of smoking on depression and perceived stress among healthcare professionals working during the pandemic.

Material and Methods

This study was performed over the internet using a questionnaire survey after obtaining the consent of the participants. The identities of the participants were kept confidential. The survey items inquired their age, gender (male, female), profession (physician, nurse, anesthesia technician, estates staff), the department they were working at (operating rooms, the intensive care unit), a Patient Health Questionnaire-9 (PHQ-9), the Fagerström test for nicotine dependence (FTND), and a perceived stress scale 14.

Our study adopted an epidemiological design and was approved by the Ethics Committee at Kastamonu University on September 15, 2020.

The study was planned as a monocenter study, and the participants were healthcare professionals at a pandemic hospital, aged 18–63, who provided complete answers to the research questions. Those who did not fully answer the questions were excluded.

The measurement instruments in the study were as follows:

1. The Patient Health Questionnaire-9 (PHQ-9, score range: 0-27) [10];
2. Overall scoring: normal (0-4), mild (5-9), moderate (10-14), and severe (15-27) depression;

3. The Perceived Stress Scale 14 (PSS 14, score range: 11-56) [11];
4. Overall scoring: low perceived stress (11-26), moderate perceived stress (27-41), high perceived stress (42-56);
5. The Fagerström Test for Nicotine Dependence (FBNT, score range: 0-10) [12];
6. Overall scoring: low addiction rate (0-4 points), moderate addiction rate (5-6 points), high addiction rate (7-10 points).

The cutoff scores for the Patient Health Questionnaire-9 and the perceived stress scale were 10 and 27, respectively [11, 14]. The participants who scored above the cutoff threshold were accepted as having positive symptoms.

Results

One hundred seventy-four healthcare professionals between the ages of 18 and 63 participated in the study. Moreover, 118 (67.8%) participants were female and 56 (32.2%) were male. Almost 50% of the participants were nurses (nurse: 85 (48.9%), anesthesia technician: 25 (14.3%), estates staff: 27 (15.5%), physician: 37 (21.3%), n /%); 74 (42.5%) worked in the operating room, and the other 100 (57.5%) worked in the intensive care unit. Moreover, 68 (39%) of the 174 professionals in the study were active smokers. Among 68 smokers, ~50% (n = 32; 47%) experienced a change in their smoking habits during this period (quit, reduced, and increased). Furthermore, >50% of those who had a change in their smoking habits (n = 17; 53%) increased their amount of smoking during this period. The results of the Fagerström Test for Nicotine Dependence administered to active smokers during the pandemic suggested that 31 (50.8%) had a low addiction rate, 15 (24.6%) were moderately addicted and 15 (24.6%) were highly dependent (Figure 1).

The number of participants with positive symptoms on the PHQ 9 and PSS 14 scales was 77 (44.2%) and 102 (57.6%), respectively. There was no statistically significant difference between smokers and non-smokers on the Patient Health Questionnaire-9 (PHQ 9) and Perceived Stress Scale (PSS 14) in terms of showing symptoms (p = 0.73 for PHQ9; p = 0.30 for PSS 14) (Figure 2).
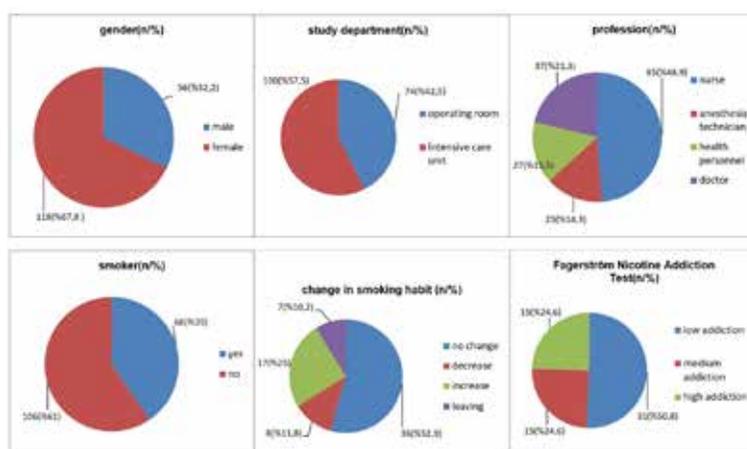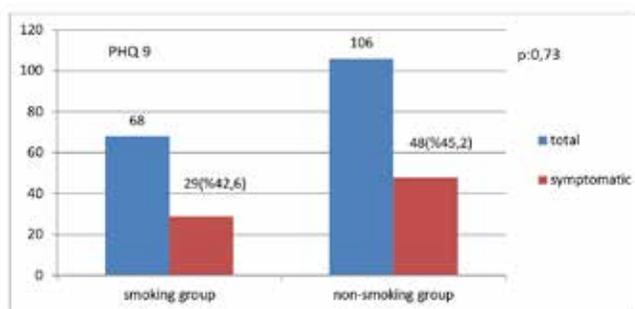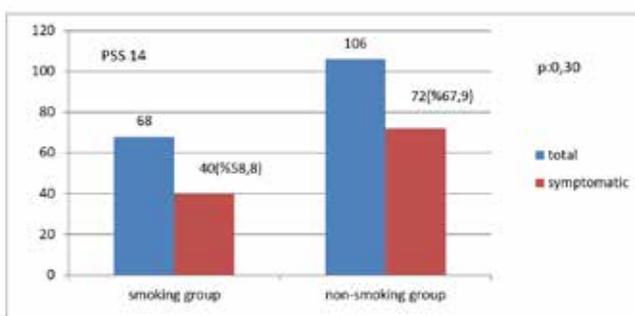

Figure 1. Demographic datas and change in smoking habit and Fagerström Nicotine Addiction Test
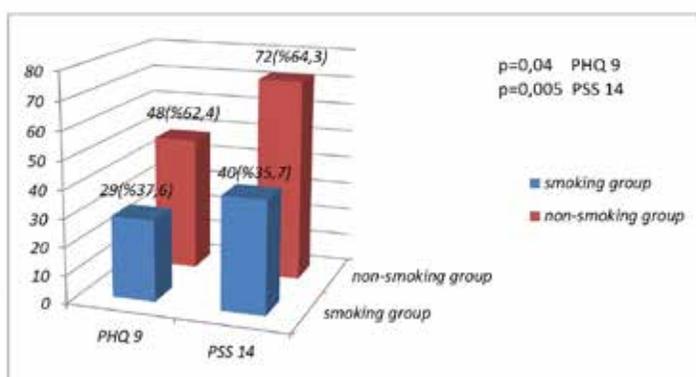
PHQ 9: The Patient Health Questionnaire

PSS 14: The Perceived Stress Scale

Figure 2. The comparison of symptoms between smokers and non-smokers based on the patient health questionnaire (PHQ 9) and perceived stress scale (PSS 14)

Among 174 professionals in the study, 77 (44.2%) showed symptoms on the Patient Health Questionnaire-9 (PHQ 9) and 112 (64.3%) on the Perceived Stress Scale (PSS 14); 29 (37.6%) of those showing symptoms based on the Patient Health Questionnaire-9 (PHQ 9) and 40 (35.7%) of those showing symptoms based on the Perceived Stress Scale were active smokers. There was a statistically significant difference between the smokers and non-smokers who were symptomatic on both scales regarding the severity of depression and perceived stress (p = .04 for PHQ9; p = .005 for PSS 14) (Figure 3).

PHQ 9: The Patient Health Questionnaire, PSS 14: The Perceived Stress Scale

Figure 3. The comparison of depression severity and perceived stress between smokers and non-smokers who were symptomatic on both scales

Discussion

The harmful effects of smoking are well-known among community and healthcare professionals. However, smoking continues both among the community and among healthcare professionals. A study conducted by Krstev et al. reported that the smoking prevalence among healthcare professionals was 38%. Similarly, our study reported the smoking prevalence as 39% [14].

There are extensive epidemiological studies on the role of smoking in the emergence of viral infection. Blake et al. reported that the frequency of upper respiratory tract infections in 1230 soldiers in the US army was 22.7% among smokers and 16% among non-smokers, and that the relative risk was 1.5 times higher [15]. Cai et al. compared respiratory samples of smokers and non-smokers and reported higher ACE 2 gene expression among smokers [4]. Zhao et al. observed that the increase in ACE 2 gene expression increased viral reproduction and transmission. These results demonstrated that smokers are more susceptive to SARS-CoV-2 [7]. A recent study showed that the modified S protein of SARS-CoV-2 connects to the ACE2 receptor with an affinity 10–20 times higher than the first described SARS-CoV [18]. In a meta-analysis study on the COVID-19 pandemic, Patanavanich et al. stated that smoking is a risk factor for COVID-19 progression, and that COVID-19 is more likely to progress among smokers compared to non-smokers [17]. Because of these results, it is expected that smokers will have a fear of going through the disease process more severely if they are infected by COVID-19. Assuming that the awareness of this pathophysiological information is higher among healthcare professionals who are at the forefront of the fight against the pandemic, this fear and mental state may be more severe among them.

In a correlational study in the UK on the relationship between COVID-19 and anxiety, depression, and mental well-being symptoms, Smith et al. reported that the smokers in the community had lower levels of mental well-being [3]. In another study entitled ''Factors associated with mental health outcomes among healthcare workers exposed to coronavirus disease'' 2019, Lai et al. reported that the overwhelming majority of healthcare professionals had low mental well-being levels [8]. In our study, about half of the participants were symptomatic on two scales.

Previous studies have demonstrated that smokers suffer from COVID-19 more severely and their morbidity rate is higher [18]. Because of this information, smoking healthcare professionals are more symptomatic in terms of mental health disorders, but no statistical difference was reported between smokers and non-smokers in this study in terms of being symptomatic. The reason for this might be that healthcare professionals do not have sufficient information or are unaware of the relationship between smoking and COVID-19. An earlier study revealed a positive effect of smoking on depression [19], which might be a reason for this result. Moreover, when the symptomatic cases on the depression severity and perceived stress scales were compared as smokers and non-smokers, we observed more severe symptoms among the non-smoking group.

Conclusions

COVID-19 has damaged the physical health of individuals and their mental health. The physiopathological link between smoking and COVID-19 has been documented in earlier studies. Although smoking was revealed as comorbidity for COVID-19, there was no significant difference between smoking and non-smoking healthcare professionals in terms of mental health disorders. We think that the current results may change as other studies with more participants appear or as more information is available on the relationship between smoking and COVID-19.

Limitations

There were certain limitations in the present study. First, the study used a cross-sectional design and investigated the mental state of participants during the six-month pandemic process. Since the pandemic process is still ongoing, it is difficult to comment on the mental state of the participants at the following stages. The second limitation was that it was not possible to determine the mental states of the participants before the pandemic. Some participants may have had mental health disorders prior to the pandemic.

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