

Evaluation of the effect of the COVID-19 pandemic on the depression, anxiety and stress levels of anesthesiology and reanimation doctors, and their work and social lives

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Received: 03/04/2024

Accepted: 08/05/2024

Published: 07/06/2024

ABSTRACT

Aims: To measure the effects of the coronavirus disease-19 (COVID-19) pandemic on the social and economic status and their depression, anxiety and stress scores of anesthesiology and reanimation specialists, using the depression, anxiety and stress scale-21 (DASS-21).

Methods: The study was conducted with an online questionnaire directed to the participants online, following the approval of Uludağ University Ethics Committee labeled 2020-16/1. The questionnaire was prepared on SurveyMonkey and distributed via a specially acquired link. Participants were prevented from submitting the questionnaire more than once. 38 questions were asked to the participants. At the end of the questionnaire, the participants were asked to fill the DASS-21. Questionnaire has been distributed through social media and mobile communication applications.

Results: 198 volunteers participated in the study. 122 of the participants were female (61.62%) and 76 (38.38%) were males. 75 of the participants (37.88%) were trainees, 113 (57.07%) were anesthesiology and reanimation specialists, 2 (1.01%) were specialist physicians undergoing intensive care training, 4 (2.02%) were intensive care specialists, 1 was a specialist physician receiving algology training, and 3 (1.52%) were algologists. 42 participants were (21.21%) in a training-research hospital, 87 participants (43.94%) in a university hospital, 35 participants (17.68%) in a state hospital, 13 participants (6.57%) in city hospitals, and 21 participants (10.61%) were working in private hospitals. 81.6% of all physicians participating in the survey show depression symptoms, 62% of participants were showing symptoms of anxiety and 71.1% of participants described stress symptoms. All scores were higher in female physicians ($p < 0.05$). Depression scores of residents were higher than specialists ($p < 0.05$). All scores of physicians working in training-research hospitals are higher than physicians working in other institutions ($p < 0.05$).

Conclusion: Almost all physicians have experienced changes in workload, income and workplaces during the pandemic. High DASS-21 scores in all physicians were thought-provoking and highlighted the psychological pressure that anesthesiology and reanimation physicians had been under.

Keywords: COVID-19, anesthesiology and reanimation, DASS-21 scale

INTRODUCTION

Despite its geographical location and its place in international transportation, Türkiye has not disclosed any COVID-19 cases for a long time. The first case of COVID-19 was reported by the Minister of Health at a press conference on March 10, 2020.

In the days following the first case reported during the pandemic, a rapid increase in number was recorded. In April and May of 2020, as in many countries of the world, dramatic increases were seen in the number of cases. Healthcare system has been reorganized by the Ministry in response to the pandemic in

line with the suggestions and recommendations from the scientific committee. Healthcare workers were organized in this sense, financial incentives were offered to encourage them, and hospitals were tried to be brought to the fore in the fight against the pandemic. Regulations were enforced on transportation and curfews, restrictions on international transportation came first, and intercity travel restrictions and additional quarantine measures were taken due to the increase in number of cases. There was some slowdown in the pace of the epidemic in May 2020.

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Cite this article as: Soylu NB, Başağan Moğol E, Eker SS, Akesen S, Sezer Soylu H. Evaluation of the effect of the COVID-19 pandemic on the depression, anxiety and stress levels of anesthesiology and reanimation doctors, and their work and social lives. *Kastamonu Med J.* 2024;4(2):39-44.

Number of new cases were relatively low during summer, and restrictions were lifted in part, but as of September, an increase in the number of patients began; and especially in December 2020, Türkiye has been one of the countries with the highest number of new cases in the world.

The fight against the pandemic has affected health workers in almost all fields. Employees have served in pandemic clinics, other clinics, intensive care units, pandemic intensive care units and operating rooms with and without a pandemic unit. Services were also provided in the fields like emergency departments, primary care clinics, emergency transportation services and filiation services. In the early period of the pandemic, as of April 29, 2020, the number of infected healthcare workers in Türkiye was 7428. This corresponded to 6.5% of all COVID-19 cases.

The high rate of infection and related deaths among health care workers adversely affected the mental health of healthcare staff and caused the situation of those who already have a psychological disorder to progress. Negative reports from various countries, increasing death toll, loss of loved ones, fear of infecting family members, death of colleagues, and having to work for a long time with protective equipment were the potential triggers for psychological problems.

Anesthesiology and reanimation specialists and residents have played a key role in the fight against the pandemic, especially in the treatment of patients with severe disease and therefore faced with high mortality rates and the psychological burden of deceasing patients despite intensive treatment. Additionally, the increased need for airway interventions such as high-flow O₂ treatments, non-invasive and invasive mechanical ventilation, and intubation of patients with COVID-19 infection indisputably increased the coronavirus exposure of physicians in this specialty.

Some studies have been carried out on the healthcare personnel who are at the forefront of the fight against the pandemic in Türkiye, and with these studies, lifestyle changes, how they are affected socially and economically, as well as their psychological state are examined. However, this study is the first to be conducted on anesthesiology and reanimation physicians. The aim of our study is to evaluate how anesthesiology and reanimation physicians are affected socially, economically and psychologically during the pandemic.

METHODS

Preliminary research was carried out on the most appropriate method in which psychological measurements could be made. To this purpose, consultancy was received from Uludağ University, Department of Psychiatry, similar local and international publications were scanned, and in the end, we decided to use the depression, anxiety and stress scale-21 (DASS-21), which is the most appropriate scale for the purpose of the study (See Appendix).

The survey was created on the website www.surveymonkey.com (Copyright © 1999-2021 SurveyMonkey, Dublin, Ireland) following the approval of Uludağ University Faculty of Medicine Clinical Researches Ethics Committee (Date: 16.09.2020, Decision No: 2020-16/1). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki. The questionnaire created on this site was distributed via a special link (<https://tr.surveymonkey.com/r/PandemiAnesReak>). Participants received this weblink via e-mail and internet-based mobile communication applications.

Participants were prevented from filling out the questionnaire more than once, thus ensuring the authenticity and reliability of the data. 38 questions were asked in the survey. Demographic data were collected in the first 16 questions. In the following 21 questions, the volunteers were asked about their social habits and the way they were affected economically during the pandemic period. In addition, they were asked to indicate their sources of information in this process. In the 38th question, the participants were asked to fill in the DASS-21 scale and to mark the option that best suited them without thinking too long on each item.

The grouping, comparison and collection of the data was done with the response analysis engine provided by the survey site (www.surveymonkey.com). Kruskal-Wallis and Mann-Whitney U tests were used in the analysis of statistical data, and Pearson's chi-square test was used for data in which multiple categories were evaluated. SPSS 23.0 (IBM, Armonk, New York, United States) was used for statistical analysis. Confidence level for statistical significance was determined as 95% ($p < 0.05$).

RESULTS

The demographics of the participants are as shown in Table 1. A total of 198 participants joined the survey. Average completion time was 6 minutes and 57 seconds. Survey completion rate of participants was 77%.

Data on the Effects of the Pandemic on Social and Economic Life

23 (11.61%) of all participants stated that they were infected with coronavirus at least once during the pandemic. There is no proportional difference between physicians who have had COVID-19 infection, according to the branches of specialist physicians, or between assistants and specialist physicians. In addition, no significant difference was observed when the rates of COVID-19 infections were compared according to the institution where the physicians work.

176 (89.34%) of the physicians stated that they were worried about transmitting diseases to those living at home during the pandemic. Among the physicians who expressed this concern, married people (130 married people, 97.01%) had a higher level of concern than those who were single (46 single people, 73.02%) ($p < 0.05$). 64 of all participants (32.49%) stated that they accommodated in a place different from their families.

Fifty-three people (27.04%) stated that they had at least one of their relatives infected with COVID-19, and 14 participants (7.07%) reported that at least one of their relatives died. All physicians whose relatives passed away are physicians working in university and state hospitals.

Effects on Worklife

179 (90.4%) of all physicians stated that their work routine changed in March, April, and May 2020, when the first virus spread in Türkiye was seen (Table 2). 176 people answered in the survey how the nature of the change in the way they work and how their income was affected. Participants were able to choose more than one option. Of those who stated that their working style has changed, 95 (54%) stated that their workload has increased, 48 (27.3%) stated that their workload has decreased, and 33 (18.7%) stated that their workload has not

changed. 61 people (34.7%) stated that their income increased in this period, 34 people stated that their income decreased (19.3%), and 81 people (46%) stated that their income did not change.

Table 1. Demographics of the participants

	n	%
Average Age (year)	36.50±9.71	
Gender		
Male	76	38.38
Female	122	61.62
Marital status		
Married	135	68.18
Single	63	31.82
Children		
1 or more	112	56.56
None	86	43.44
Accommodating with		
Single	48	24.4
Nuclear family	129	65.15
Extended family	21	10.61
Chronic disease		
Yes	34	17.17
No	164	82.83
Cigarette-alcohol consumption		
Cigarettes only	48	25.4
Alcohol only	62	32.8
Both	18	9.09
None	106	56.08
Title		
Resident-trainee	75	37.88
Anesthesiology and reanimation specialist	113	57.07
Algology resident	1	0.5
Algology specialist	3	1.52
Intensive care specialist	4	2.02
Intensive care resident	2	1.01
Institution		
University hospital	87	21.21
Research and education hospital	42	43.94
State hospital	35	17.68
City hospital	13	6.57
Private healthcare institution	21	10.61

Table 2. Changes in the work routine

Changes	Amount (%)	n
I worked in a different clinic than i normally work in	8.6%	15
I worked at the pandemic clinic	18.3%	32
I worked in a different intensive care unit where i don't normally work	14.3%	25
I worked in the pandemic intensive care unit	57.1%	100
I was assigned to another institution	11.4%	20
Other	19.4%	34

Percentage of residents (16 physicians, 22.53%) who were sent to another institution were significantly higher than those of specialists (4 physicians, 3.80%) ($p<0.05$). The proportion of specialists who stated that their workload increased (68

physicians, 64.70%) was significantly higher than that of residents (27 physicians, 38%) ($p<0.05$). The rate of specialists who stated that they lost more income in this period (26 physicians, 24.77%) was higher than that of research assistant physicians (8 physicians, 11.52%) ($p<0.05$). In addition, it is seen that most of the physicians working in university hospitals are assigned to different institutions. 20 physicians stated that they were sent to different institutions, and 17 of them (85%) were physicians working in university hospitals. Physicians working in public hospitals (20 physicians, 64.52%) reported the highest increase in workload compared to physicians in other institutions ($p<0.05$).

In this period, the group with the highest income increase was the physicians working in training-research hospitals (21 physicians, 52.5%) ($p<0.05$). Among the physicians who stated that their working style did not change, there was not enough response to examine the statistical significance in terms of income or workload. It is obvious that the working routine of most of the participants was affected.

When questioned how their income was affected, 47 participants (25.7%) stated that their income increased relatively, 46 participants (24.9%) stated that their incomes decreased, and 92 participants (49.7%) stated that their income did not change. There is no statistical difference between institutions. However, income of the anesthesiology and reanimation specialists decreased more than the other groups ($p<0.05$).

Participants were also asked whether they would receive a vaccine if it was ever developed. There was no vaccine developed at the time the question was asked. 94 of the participants answered yes (50.5%) to this question. 171 (92%) of the physicians do not think that the pandemic would end soon, and life would return to normal. Among residents, percentage of those who do not want to receive a vaccine to be released is higher than other physician groups ($p<0.05$).

DASS-21 Scoring Data

In the DASS-21 scoring, the presence and severity of stress, anxiety or depression are evaluated with the scores in Table 3, according to the responses of the individuals.

Table 3. Evaluation of the severity of depression, anxiety and stress according to the total scores in the DASS-21 scale

Severity	Depression	Anxiety	Stress
Normal	0-4	0-3	0-7
Mild	5-6	4-5	8-9
Moderate	7-10	6-7	10-12
Severe	11-13	8-9	13-16
Very severe	14+	10+	17+

At the end of the survey, participants were asked to fill DASS-21 scale and 152 participants (84 specialists, 68 residents) completed the DASS-21 questionnaire. Accordingly, the scores according to the answers given by the participants on the DASS-21 scale are summarized in Table 4. The scoring values given in the depression, anxiety and stress columns are average values. Participants were analyzed by dividing into groups, and the depression, anxiety and stress scores of each group were calculated separately.

Table 5 presents the distribution of depression, anxiety and stress symptoms. According to this table, 81.6% of all physicians participating in the survey had some level of depression, 62% had some level of anxiety and 71.1% had some level of stress.

Table 4. Distribution of severity of symptoms among all physicians

Severity	Depression (n, %)	Anxiety (n, %)	Stress (n, %)
Normal	28 (18,4%)	58 (38,0%)	44 (28,9%)
Mild	16 (10,5%)	29 (19,1%)	16 (10,5%)
Moderate	31 (20,4%)	16 (10,6%)	26 (17,1%)
Severe	28 (18,4%)	18 (11,8%)	40 (26,4%)
Very severe	49 (32,3%)	31 (21,5%)	26 (17,1%)
Residents			
Normal	13 (%19,1)	24 (%35,2)	18 (%26,5)
Mild	5 (%7,4)	12 (%17,6)	7 (%10,3)
Moderate	13 (%19,1)	9 (%13,2)	10 (%14,7)
Severe	9 (%13,2)	9 (%13,2)	18 (%26,5)
Very severe	28 (%41,2)	14 (%20,6)	15 (%22,0)
Specialists			
Normal	15 (%17,9)	34 (%40,5)	26 (%31,0)
Mild	11 (%13,1)	17 (%20,2)	9 (%10,7)
Moderate	18 (%21,4)	7 (%8,3)	16 (%19,0)
Severe	19 (%22,6)	9 (%10,7)	22 (%26,2)
Very severe	21 (%25,0)	17 (%20,2)	11 (%13,1)

Table 5. Evaluation of the severity of depression, anxiety and stress according to the total scores according to the DASS-21 scale

By groups	Depression score	Anxiety score	Stress score
All groups (n=152)	10.35	5.63	10.85
Female (n=97)	11.47	6.66	11.47
Male (n=55)	8.76	3.86	8.35
Residents (n=68)	11.31	5.83	10.75
Specialists (n=84)	10.46	5.49	10.01
By institution			
University hospital (n=75)	10.24	5.06	9.97
Research and training hospital (n=31)	12.16	6.81	11.53
City hospital (n=9)	14.32	5.94	11.39
State hospital (n=24)	10.84	6.5	11.01
Private healthcare institution (n=13)	8.98	4.38	7.68

DISCUSSION

The pandemic has undoubtedly brought about changes in the existing orders in many areas all over the world. Chaos caused by the virus, turmoil in the economies, shutdown measures, heavy burden faced by the healthcare systems, problems experienced by the political administrations and social explosions have made 2020 an extraordinary year. Undoubtedly, the most prominent ones have been healthcare professionals as they have completely shouldered the burden brought by the virus, adapted quickly and battled with the pandemic. Healthcare professionals were confronted with an unprecedented situation, forcing them to make tough decisions or work under severe pressure. Factors such as moral and ethical dilemmas, being a decision maker in the optimum distribution and use of limited resources, trying to protect the physical and mental wellbeing of patients, and balancing work and social life can be counted among the pressure elements.

Trying to overcome so many factors have of course caused "moral trauma" or mental health problems.⁵ Moral trauma can roughly be defined as moral hardening or loss of ethical sensitivity because of actions taken or being under psychological stress.^{5,6} This is not a psychological disorder or

mental illness, but a response to the stress. In general, it may result in post-traumatic empowerment such as increase in self-confidence, acquiring different perspectives, and increase in psychological resistance; but can sometimes cause depressive mood and even suicidal ideation.⁵

In the COVID-19 pandemic, many healthcare workers faced increased workload, economic and moral difficulties, limited social interaction, witnessed severe disease and therefore increased mortality and morbidity. It would be reasonable to say that the ground for moral trauma was formed for the healthcare workers who had to say to the relative of a deceased patient "we could only do so much in line with the information and possibilities at our disposal" instead of "we did everything we could".⁵ Due to the difficulties experienced during the pandemic, it can be interpreted that almost all healthcare workers were under similar stress and have been prone to moral trauma.

The DASS-21 scale (depression, anxiety and stress scale-21) is a 21-item short version of the DASS scale, also known as the Self-Analysis Questionnaire. It aims to quickly measure short-term depression, anxiety and stress scores. Seven of the twenty-one questions score depression, seven questions score anxiety, and seven questions score stress. It is an easy scale to apply and answer. Although this scale is a self-consistent and reliable scoring system, there are also publications suggesting that it gives contradictory results in some races or individual groups.^{7,8} However, in general, we can state that DASS-21 is a scale that provides fast and reliable results.

In our study, we preferred the DASS-21 scoring system because it would give us an idea about depression, anxiety and stress levels, and it would be easy to place into the questionnaire. We think that we made the right choice because of the high completion rate of the DASS-21 scales in our survey, as we also observed the expected results in different groups at first glance.

In their study, Mak et al.,⁹ reported stress response like depression, anxiety, somatization and aggression in 10% of healthcare personnel in the period following the epidemic of severe acute respiratory syndrome (SARS) in 2008. In another study conducted by Liu et al.,¹⁰ depressive symptoms were noticed in 23% of all healthcare personnel in 3 -year follow-up after the SARS epidemic. Lai et al.¹¹ also reported that during the COVID-19 epidemic, the proportion of symptoms associated with depression, anxiety and stress in Chinese healthcare personnel was 50.7%, 44.7% and 73.4%, respectively. A study conducted by Elbay et al.¹² reported that 64.7% of the healthcare professionals working on the front lines in the fight against the pandemic had high depression scores, 51.6% had high anxiety scores and 41.2% had high stress scores. In our study, 81.6% of anesthesiology and reanimation physicians had high depression scores, 62% had high anxiety scores and 71.1% had high stress scores. In another study conducted on all teams (anesthesiologists, anesthesia technicians, and operating room nurses) working in the operating room, Li et al.¹³ showed that depression and anxiety scores were high, although they used different scales and evaluated groups other than physicians. In our study, when the average of all scores of the anesthesiology and reanimation physicians participating in the study was taken, depression, anxiety and stress scores were higher than the normal levels. Due to the fact that anesthesiology and reanimation physicians offer treatment to patients with advanced disease, especially in intensive care

units, they have to work long hours with personal protection equipments (overalls, visors, gloves...) and the high mortality and morbidity of the disease in the intensive care stage, the excess amount of treatment processes that fail, and situations such as high risk of contact with the virus may have caused this high scoring.¹⁴ And it should be noted that all scores were higher in women. Women's more intense response to stressful stimuli may have contributed to the emergence of these results.¹⁵ Another remarkable result is that depression scores of residents are higher than those of specialist physicians. Reasons such as increased workload of resident doctors, being assigned to different places from where they normally work during the pandemic, more exposure to organizational changes, or the psychological pressures created by the hierarchical position can be counted as factors that create these results.¹⁶⁻¹⁸

During the pandemic, the Ministry of Health took action in all hospitals affiliated to it and introduced the concept of "Pandemic Hospital". Accordingly, hospitals with at least two branches of these three, infectious diseases, respiratory diseases and internal diseases specialists, and a third level adult intensive care bed were declared as pandemic hospitals. Although the number of hospitals that do not meet these criteria is high, most training-research hospitals and city hospitals meet these criteria. Rapidly increasing number of patients has increased the workload of these three groups of hospitals. Although not enough volunteers participated to make it statistically significant, working in a pandemic work order from the beginning of the pandemic may have been effective in the high depression scores of the physicians working in the city hospital. However, a more comprehensive study with a larger sample is needed to prove this inference. In addition, this may have caused the high DASS-21 scores of residents working in training-research hospitals.

The environment of uncertainty of the pandemic, delays in taking action by institutions, disruptions in the supply of PPE and medical equipment, and doubts about the safety of the working environment may have adversely affected the mental health of the employees. Many physicians stated that they were afraid of transmitting the illness to those living in their home, and in consequence, they accommodated in another place, parting with their families, for a while. Almost all physicians worked in a different place than the unit they normally work in. Factors such as getting used to the new environment, adaptation to new teammates, and organizational differences may have been factors that created stress, especially in physicians who were sent to different institutions.

Considering all these data, one can infer how important it is to ensure and maintain the mental well-being of the healthcare providers. Inadequate mental well-being and lack of an environmental sustainability may lead to feelings such as demotivation, despair, moral trauma, and a sense of guilt in healthcare professionals. In their study, Elbay et al.¹² stated that providing a suitable working environment for the staff and them receiving support from both team members and their superiors would contribute to their psychological well-being.

In addition, the subjective thoughts of physicians about the pandemic were evaluated in our study. At the time of this publication, there were vaccines produced by 5 different companies on the market. CoronaVac (Sinopharm, China) was the first vaccine applied in Türkiye. At the time of the study, there was no vaccine released yet. The fact that physicians were

almost split in half on whether to be or not to be vaccinated may be evidence that doubts about the vaccine have not been cleared. In addition, it is noteworthy that, among the resident physicians, those who do not want to be vaccinated are higher. Another important result is that 92% of the participants think that the pandemic process would not end soon. Some factors such as severe deviation of some data-based studies that have been done before, repetitive lock down measures and social isolation they bring along and uncertainties brought about by new variants may have caused physicians to move away from the thought that the pandemic will end soon.¹⁹⁻²⁴ The results of the vaccines in the near future, the course of the closures, the decisions to be taken by the administrations and the period of returning to normal may perhaps change the answer of physicians to this question.

Although there are similar studies conducted on frontline physicians in the fight against the pandemic in our country, as far as we know, this is the first study conducted directly on anesthesiology and reanimation residents and specialists. However, the relatively small number of samples, low participation rate of sub-specialists and low participation rate in the survey from the physicians working in private hospitals caused some data not to be analyzed statistically. In addition, the absence of face-to-face meetings due to the pandemic and the distribution of the survey with a link, although increased the freedom of the participants and eliminated possible health risks, unfortunately reduced the rates of completing the survey. A larger study in which face-to-face interviews can be conducted can increase both the participation and completion rate of the survey. A study with a large sample may also provide more up-to-date and more accurate results. Especially when the pandemic is over, the variables related to this process will also disappear (elimination of the uncertainty of the effectiveness of the vaccine, reduction of possible changes in the way of working, decrease in the risk of material loss, elimination of the risk of infection, etc.), so a healthier assessment can be made for the past.

CONCLUSION

Almost all physicians have experienced changes in workload, income and workplaces during the pandemic. High DASS-21 scores in all physicians were thought-provoking and highlighted the psychological pressure that anesthesiology and reanimation physicians had been under.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was carried out with the permission of Uludağ University Faculty of Medicine Clinical Researches Ethics Committee (Date: 16.09.2020, Decision No: 2020-16/1).

Informed Consent

All patients signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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