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Original Article

# Evaluation of anxiety and depression levels due to COVID-19 pandemic stress on operating room personnel on the eve of the first anniversary of the pandemic

Mehrdad Jowkar [1] ✉, Arvin Hedayati [1], Afshin Amini [2] Farzaneh Masihifar [1]

[1] MD, Department of Medicine, Rajaiee (Emtiaz) Trauma Hospital, Shiraz University of Medical Sciences, Shiraz, Iran

[2] MD, Assistant Professor of psychiatry, Department of Psychiatry, School of Medicine Research Center for Psychiatry and Behavior Science. Shiraz University of Medical Sciences, Shiraz, Iran

**Corresponding Author:**
Tel: +987136254206
**Email:** jowkarmehrdad.md@gmail.com

## Abstract

**Introduction:** The outbreak of the novel coronavirus disease 2019 has caused tremendous physical and psychological pressure on healthcare workers, particularly those working in departments that provide care for patients with coronavirus disease 2019 (COVID-19). This research aimed to assess the anxiety and depression levels among healthcare professionals working in operating theaters (anesthetic technicians and nurses) during the COVID-19 outbreak.

**Methods:** This is a cross-sectional and multi-center study was conducted from May to June 2021. The study population included 219 operating room personnel. Data were collected using the Hospital Anxiety and Depression Scale (HADS), Emotional functioning and global quality of life (EORTC QLQ-C30), and demographic characteristics. Statistical analysis was performed using the SPSS V. 19.0 independent-samples t-test, and Chi-square test. The p-value less than 0.05 is considered a significant level.

**Results:** The findings of this study showed that the frequency of female participants was 133 (54.2%) and the participant's age was 32.15 ± 8.54. Also, the score range of anxiety (12.0-22.0) and depression (12.0-24.0) and mean ± SD score of anxiety and depression among 83 anesthesia nurses and 116 surgical technicians are respectively 17.07 ± 2.09 and 18.04 ± 2.37, based on the HADS questionnaire. Also, according to the EORTC QLQ-C30 questionnaire, it is observed that there was no statistically significant difference between anesthesia nurses and operating room surgery technicians in the average score of anxiety (17.04 ± 2.05 vs. 17.12 ± 2.09, P = 0.78) and depression (17.87 ± 2.31 vs. 18.11 ± 2.43, P = 0.49). Moreover, According to our results, the level of anxiety and depression in our healthcare professionals working in operating theaters is so high (HADS scores ≥ 11) that is considered to be a significant “case” of psychological morbidity.

**Conclusion:** As a result, it can said that providing healthcare professionals with psychological support has a main role against depression and anxiety during pandemics, and it could help healthcare workers to manage the current situation. Therefore, psychological intervention and efficient resource consumption are desirable to relieve the special psychological effects of the pandemic. It is crucial to increase the observation and detection of early cases of depressive and anxiety symptoms to prevent disastrous events.

**Key words:** COVID-19, Operating Rooms, Anxiety, Depression

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## Introduction

COVID-19 was identified in late 2019 as the cause of coronavirus disease 2019 that has been spread rapidly all around the world and resulted in a worldwide pandemic as declared by the World Health Organization (WHO) in February 2020 (1, 2). The coronavirus is chiefly transmitted through the respiratory system, but it may also be transmitted through touching the mouth, nose, or eye mucosa of sick individuals through coughing and sneezing (3, 4). Healthcare workers, particularly those working in operating theaters (anesthetic technicians and nurses) who provide care for patients with COVID-19, are at a high risk of this contagious disease as they are at the frontline (4, 5). During the novel coronavirus disease outbreak of 2019 to 2021, healthcare workers accounted for 32% of the infected cases across the world (6). During the coronavirus COVID-19 epidemic, the Centers for Control and Prevention Diseases recommends decreasing the number of individuals and increasing personal protective equipment for the protection of workers in operating theaters (7, 8). In the health care system, anesthetic technicians and nurses are generally involved in the care of patients during the operation and provide care for the patients in the post-anesthesia care unit immediately after surgery (9, 10). Healthcare workers, particularly those working in departments providing care for patients with COVID-19, are at a high risk of this contagious disease as they are at the frontline. Thus, they experience high stress because of the fear of transmitting the illness to their families and coworkers.Thus, they experience high stress because of the fear of transmitting the illness to their families and coworkers. In addition, the rapidly increasing number of cases with morbidity and mortality has faced healthcare workers worldwide under enormous pressure (11, 12). This shows that the medical staff experience higher levels of anxiety and depression compared to the general population, with a prevalence of 20.9% to 43.2% (13-15). High levels of depression and anxiety along with personal distress result in a low quality of patient care and elevated levels of medical errors. (16-18). also, in high levels of depressive and anxiety symptoms, urgent psychological interventions are needed to prevent the risk of burnout and suicide in physicians and health care workers and decrease the risk of medical errors (19, 20). However, few studies have addressed the mental health of healthcare workers during the outbreak of the COVID-19 pandemic (21, 22). Although several investigations were conducted about the effect of the COVID-19 pandemic on the mental health of care workers, our study measured the anxiety and depression levels resulting from COVID-19 pandemic stress for the first time in Iran. Accordingly, the aim of this study was to determine the scores of depressive and anxiety symptoms among healthcare workers in operating rooms in hospitals affiliated with Shiraz University of Medical Sciences during the COVID-19 pandemic.

## Materials and Methods

This is a cross-sectional and multi-center study. The study population consisted of healthcare professionals (anesthetic technicians and nurses) working in operating theaters at various healthcare centers, affiliated with Shiraz University of Medical Sciences who covered multiple centers and several hospitals, including Namazi, Rajaee, Khalili, Fahihi, and Peyvand. The number of participants required in the study was 219, and data were gathered using a specifically designed questionnaire to assess the scores of anxiety and depression among the participants. The data were collected from Jan 30 to May 30, 2021, through an online survey form. Healthcare professionals who volunteered to participate in the study were asked to answer the survey questions via social media. Participants who submitted incomplete questionnaires or had a history of mental illness were excluded from the analysis. In addition, those who did not work during the outbreak period (Jan and Feb 2021) were excluded from the study. The questionnaire was designed, conducted, and confirmed by specialist researchers and all of the study co-investigators. The specifically designed questionnaire was distributed among the participants. It has seven parts and 38 questions including sociodemographic characteristics, socioeconomic data, mental health assessment, risks

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associated with COVID-19, data on the workplace using the Hospital Anxiety and Depression Scale (HADS) and Emotional functioning and global quality of life (EORTC QLQ-C30). The HADS, is a self-report scale developed by Zigmond and Snaith and used to determine anxiety and depression levels among healthcare workers (9, 23-25). The HADS, which has been used in more than 700 studies, has been validated with a Cronbach's alpha of 0.83 in several languages and settings, with a sensitivity and specificity of 0.8 for the instrument to determine the presence of a disorder (26). The self-reported HADS is a 14-item questionnaire with seven questions for anxiety and depressive symptoms each. According to Zigmond and Snaith, the cut off value is 8-10 for borderline or doubtful cases of depressive or anxiety symptoms, ≥11 for depressive or anxiety symptoms, and < 7 for normal cases (9).

Thus, the HADS contains 14 items and consists of two subscales: Anxiety and depression. Each item is rated on a four-point scale, yielding maximum scores of 21 for anxiety and depression. Scores of 11 or more on either subscale are considered as a significant 'case' of psychological morbidity, while scores of 8-10 represent 'borderline', and 0-7 as 'normal' (6). The EORTC QLQ-C30 is a patient-reported outcome measure. The Emotional Functioning (EF) scale of the EORTC QLQ-C30 consists of four items involving feeling tense, worrying, feeling depressed, and being irritable, scored on a 4-point Likert scale ranging from 'not at all' to 'very much'. Thus, the EF scale measures aspects of anxiety depression, and general distress, and is supposed to demonstrate an unidimensional construct. (27). A linear transformation was performed to standardize the row scores. Scores of each subscale range from 0 to 100 and the higher values indicate a higher (better) level of functioning and global quality of life) during COVID-19 in Shiraz governmental hospitals, 83 anesthesia nurses and 116 surgical technologists. The data were collected through an online survey form with the approval of the Shiraz University of Medical Sciences University Clinical Research Ethics Committee. This project has been approved by the research ethics committee with number IR.SUMS.REC.1399.642 by Shiraz University of Medical Sciences in Shiraz, Iran. Statistical analysis was performed using SPSS software version 25.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics in terms of frequency, mean, and standard deviation (SD) were used to describe the data. An independent-sample t-test was run to determine if there were differences in working hours per week and the number of shifts per month between the depressive or anxiety symptoms group (HADS 11–21) and no depressive or anxiety group (HADS < 11). Categorical variables such as having or not having depressive or anxiety symptoms (HADS 11–21) were compared with those without depressive or anxiety symptoms (HADS < 11) and differences between the two groups in terms of demographic information were conducted using the Chi-square test. The p-value less than 0.05 is considered a significant level.

## Results

Demographic characteristics and professional knowledge of the participants, including marital status, number of children, smoking, life status, the feeling of stigma, and life status are illustrated in Table 1 based on the HADS questionnaire, displaying the mean age of participants was 32.15 ± 8.54 and the frequency of females 133 (54.2%) was higher than males 86 (35.8%). Our results in w 2 illustrate the number of shifts per week, as well as per month, year, work experience, and the average score of anxiety and depression between the two study groups based on the EORTC QLQ-C30 questionnaire. According to the findings of this Table, there were no significant differences in demographic features (P > 0.05), and scores of anxiety (17.04 ± 2.05 vs. 17.12 ± 2.09, P = 0.78) and depression (17.87 ± 2.31 vs. 18.11 ± 2.43, P = 0.49) between anesthesia nurses and operating room surgery technicians, although there were high levels of anxiety (48.8% in Anesthesia Technician Nurse vs. 49.7% in Surgical Technician Nurse, P > 0.05) and stress (57.5% in Anesthesia Technician Nurse vs. 61.3% in Surgical Technician Nurse, P > 0.05) We also observed that the anxiety and depression score in the staff of operation rooms were 11 or more. Notably, the scores on either subscale introduce a

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**Table 1.** Demographic characteristics of the participants

| Variables | Value |
|---|---|
| Age (Mean ± SD) | 32.15 ± 8.54 |
| Gender, N (%) | |
| Female | 133 (54.2) |
| Male | 86 (35.8) |
| Marital status, N (%) | |
| Single | 108 (45) |
| Marital | 109 (45.4) |
| Divorced | 2 (6) |
| Child Number N (%) | |
| One | 45 (18.8) |
| Two | 28 (11.7) |
| Three | 3 (1.3) |
| Living Status, N (%) | |
| With Parents | 50 (20.8) |
| Alone | 58 (24.2) |
| Married | 105 (43.2) |
| Position, N (%) | |
| Anesthesia Technician Nurse | 88 (36.7) |
| Surgical Technician Nurse | 121 (50.6) |
| Secretory | 6 (2.4) |
| Hospital name, N (%) | |
| Namazi | 66 (27.5) |
| Khalili | 59 (24.7) |
| Rajaee | 21 (8.8) |
| Peyvad | 44 (18.3) |
| Faghihi | 27 (11.3) |
| Type of Employment, N (%) | |
| Official | 65 (26.8) |
| One year contract | 104 (43.3) |
| Contractual | 2 (8) |
| Obligatory | 48 (20.0) |
| Cigarette smoking, N (%) | |
| Yes | 53 (22.1) |
| No | 164 (67.9) |
| Feeling stigmatized, N (%) | |
| Yes | 528 (86.6) |
| No | 108 (17.7) |

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**Table 1.** The comparison of demographic information, and the average score of anxiety and depression between "anesthesia Nurse" and "surgical technologist" groups according to the EORTC QLQ-C30 questionnaire

| Variable | Position | N | Mean ± SD | P-value |
|---|---|---|---|---|
| Age | Anesthesia Nurse | 86 | 32.96 ± 8.99 | 0.17 |
| | Surgical Technologist | 120 | 31.34 ± 8.09 | |
| Body mass index | Anesthesia Nurse | 90 | 23.93 ± 2.89 | 0.92 |
| | Surgical Technologist | 119 | 23.97 ± 3.18 | |
| Hours per week | Anesthesia Nurse | 85 | 48.83 ± 6.96 | 0.73 |
| | Surgical Technologist | 120 | 49.28 ± 10.48 | |
| Shifts per month | Anesthesia Nurse | 82 | 27.71 ± 16.88 | 0.38 |
| | Surgical Technologist | 116 | 26.15 ± 7.62 | |
| Years of work experience | Anesthesia Nurse | 83 | 7.33 ± 5.90 | 0.92 |
| | Surgical Technologist | 114 | 7.24 ± 6.95 | |
| Score of Anxiety | Anesthesia Nurse | 83 | 17.04 ± 2.05 | 0.78 |
| | Surgical Technologist | 116 | 17.12 ± 2.09 | |
| Score of Depresion | Anesthesia Nurse | 78 | 17.87 ± 2.31 | 0.49 |
| | Surgical Technologist | 116 | 18.11 ± 2.43 | |
| Anxiety rate, N(%) | Anesthesia Nurse | 88 | 43 (48.8) | 0.44 |
| | Surgical Technologist | 119 | 59 (49.7) | |
| Stress rate, N(%) | Anesthesia Nurse | 88 | 48 (57.5) | 0.29 |
| | Surgical Technologist | 119 | 73 (61.3) | |

operation rooms were 11 or more. Notably, the scores on either subscale introduce a significant 'case' of psychological morbidity.

## Discussion

The prevalence of COVID-19 pneumonia is a serious threat to the physical health. The Probability of rapid spread and high mortality of the disease have further triggered various psychological problems such as anxiety and depression (28). Mental health is determined by social, psychological, behavioral, and biological factors. Thereby, depression and anxiety in individuals, especially in health care professionals, affect their daily and working lives and they probably experience negative emotions because of heavy workload, high transmission risk, and patient complaints(26, 29). According to the results of this study, the score of depression was found to increase significantly in both groups. The score of anxiety and depression in the staff of operation rooms is so high. Scores of 11 or more on either subscale are considered to be a significant 'case' of psychological morbidity, and it seems psychological intervention and observation should be performed for these individuals (30). The results of our study show that the scores of depression and anxiety in participants were observed as greater than the cutoff values for both depression and anxiety (31, 32). Other studies were in line with our results. In one study conducted on 348 physicians, anxiety rate with HADS score of ≥ 1) demonstrated that 237 had borderline anxiety (HADS score of 8–10); also, the anxiety and stress rates among the subjects of this study were between 45-60%. Notably, in a study conducted among physicians in China, the anxiety rate was 25.6% (33, 34). Another study using

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the Generalized Anxiety Disorder scale revealed that generalized anxiety disorder was present in 35.6% of healthcare workers in China during the COVID-19 outbreak (34). A study on health care workers using the Hamilton Anxiety Scale revealed that 22.6% had mild to moderate anxiety, while only 2.9% had severe anxiety during the COVID-19 outbreak(35). False news and information on the social media has lowered the standard of living. On the other hand, countries have difficulty obtaining protective equipment, thus increasing the stress burden on health care workers on the front lines (36). In accordance with the study of Sprang and Silman, anxiety and depression scores in our study were higher in females during pandemics. Several factors could cause this result since they were more concerned with carrying the virus to their families and children. On the other hand, the depression scale of health care workers who had children was significantly higher than others(37). Different studies showed that anxiety and depressive disorders were more common among women than man. Moreover, in consisitent with the current study, other literatures illustrated that depression symptoms were more common in elder people. Thus, the results of this study are compatible with the critical and stressful status due to COVID-19 pandemic (38). Notably, postponing elective surgeries during the pandemic led to the performance of only emergency operations; however, patients with COVID-19 may need to be operated on urgently. This, in turn, increased anxiety and stress in the operating room staff (35, 36, 39). which could be regarded as one of the underlying causes of increasing anxiety and depression scores in our surgical technologist group. Since there is no mental health support for physicians and healthcare providers at the frontline of COVID-19, they risk their lives for patients (40). Therefore, these healthcare workers need an effective mental health support system and interventional plans, such as online meetings or telephonic counseling (which are implemented right now in Shiraz University of Medical Sciences,) which will give them the opportunity to discuss their concerns; additionally, it seems that meditation or mental exercise is required. Furthermore, living and residency status was significantly associated with depressive and anxiety symptoms (41). Social support helps to strengthen psychological resilience, which makes one feel better mentally in daily life and in the presence of psychiatric disorders (31). Social support is critical, especially during this hardship, as indicated by a previous study (25, 31).

In this study the rate of stigmatization among the invoved groups was considerably high. In line with our study some literature reviews revealed that around 31% of physicians felt stigmatized by their work with patients with COVID-19. This is an important finding as there have previously been unreliable reports about physicians' stigma resulting from their work and risk of contracting COVID-19 (9, 42-44). which can be attributed to health-workers were abandoned by family or friends owing to their risk, amplifying their psychological pressure during this pandemic. In one study, there was a statistically significant association between feeling stigmatized and the risk of both depressive and anxiety symptoms (45). On the other hand, The serious mental health issues in health care workers providing care for high-risk patients during the COVID-19 outbreak is a significant observation. It should be noted that most health care workers are employed in isolation units, and isolation combined with low resources, and a lack of training may put them at risk of higher stress and psychological effects (34). Thus, psychological intervention and efficient resource consumption are desirable to relieve the psychological special effects of the pandemic. It is critical to increase observation and detection of early cases of depressive and anxiety symptoms to prevent adverse events [26, 34, 46]. Identifying the level of depression and anxiety in operating room nurses will allow us to help them protect their mental health while working with high-risk patients in different clinics during the pandemic (26, 46, 47). Managers should represent emergency action plans and guide and test them regularly to identify areas of strength and those that need improvement under extraordinary situations, such as a pandemic (47). Regardless of the level of development, no resources in a country will

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overcome such waste. We believe that the tendency to use equipment unnecessarily may be related to the increase in depressive symptoms among healthcare professionals (48, 49).

This study can be considered one of the limited studies conducted on anesthesia Nurse and surgical technologist groups to evaluate their anxiety and depression scores during the COVID-19 pandemic. High levels of depressive and anxiety symptoms undoubtedly necessitate urgent psychological intervention plans to create burnout and suicide risk in physicians and other medical staff and increase the risk of medical errors (32). This study has some limitations. One of these is the cross-sectional design, which does not allow causal inferences, necessitating longitudinal studies with larger sample sizes to determine other possible risk factors.

The other limitation was that the questionnaire should be answered by highly educated participants who reply to the question elaborately, but in reality, it involves an insignificant number of responders. Moreover, obtaining clarified results is difficult and requires asking redundant questions that are boring for participants. We also offer that using qualitative projects in prospective studies could be resultful. We investigated the pre-pandemic psychiatric conditions of participants with only one question. In addition, the questions related to COVID-19 are not previously validated as they were designed specifically for our study.

## Conclusion

We believe that those who work in high-risk units, especially operating surgeons and anesthesiology, should be identified early and supported by establishing psychological support groups. Thus, psychological intervention and efficient resource consumption are desirable to relieve the psychological effects of the pandemic. It is critical to increase the observation and detection of early cases of depressive and anxiety symptoms to prevent disastrous events.

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## Conflict of Interest

All authors declare that they have no conflicts of interest.

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