

Factors Affecting the Psychological Well-Being of Health Care Workers During the COVID-19 Crisis

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Background: Health care workers (HCWs) are a group that especially suffered during the COVID-19 pandemic. In addition to facing the stress of dealing with patients and social isolation, they had to worry about being infected themselves and transmitting the infection to their families. This study evaluated the fear, anxiety, and depression experienced by HCWs during the COVID-19 crisis.

Subjects and Methods: The sample size was 541 HCWs. Data collection was done using an online validated questionnaire through Google Docs, sent to HCWs by email and WhatsApp groups. We assessed depression and anxiety with the 4-item Patient Health Questionnaire-4 (PHQ-4), while evaluating fear with the Fear of COVID-19 Scale (FCV-19S).

Results: A statistically significant difference was found in the perception of fear between married and unmarried people, and between those with colleagues who had died from COVID-19 infection and those without. There was a significant relation between HCWs' anxiety and a history of death from COVID-19 infection, either of friends or of close relatives. The prevalence of depression was 18.48% in the tested sample of HCWs. Participants who had close relatives or friends infected with COVID-19 showed a significantly higher degree of depression. The age group <30 and those working 20 to 30 hours weekly showed higher degrees of anxiety and depression.

Conclusion: Sociodemographic variables such as age, marital status, and working area had a significant impact on the mental and psychological health of HCWs during the COVID-19 crisis. HCWs who lost patients due to COVID-19 had a significantly higher prevalence of fear, depression, and anxiety.

Keywords: anxiety, COVID-19, depression, fear, health care workers

Introduction

Most countries in the world adopted social distancing strategies, in some cases including complete lockdowns and even curfews, to avoid the rapid spread of COVID-19 infection.¹⁻⁴ The general population worldwide has experienced severe stress as an inevitable result of the sudden, unexpected changes in their lives.^{5,6} Past studies on disease outbreaks and epidemics offered useful perspectives on the negative effects of similar infection crises on the general population's mental health. According to some studies, about one-third of health care workers (HCWs) showed emotional distress, and most were at risk of developing depression and post-traumatic stress disorder (PTSD). During the 2003 SARS epidemic, the number of suicide attempts among people over 65 increased by 30%.⁷ A study conducted in Italy found that Google internet searches regarding "suicide" were significantly reported among people intending to commit such a life-threatening action, with a three-month lag between the Google search and the actual suicide attempt.⁸ Baldessarini et al showed that affective-temperament ratings (TEMPS-A) results for anxious, depressive, irritable, and cyclothymic temperaments and their sum were significantly associated with suicidal risk.⁹ PTSD, lack of sleep, emotional distress, and depression with lack of interest were direct results of the strategies implemented to decrease the viral spread, such as

curfew and quarantine. The population's mental health also suffered greatly due to financial problems and job loss, similar to what has been seen in the current pandemic of COVID-19.^{7,10,11}

The prevalence of psychological disorders among the general population increased dramatically during the COVID-19 pandemic, with PTSD ranging from 4% to 41%; the prevalence of major depression increased by 7% after the outbreak. Some factors may favor the occurrence of these psychological disorders, such as lower resilience and social support, female gender, lower socioeconomic status, and interpersonal conflict with frequent use of social media. Health care workers may also develop psychiatric disorders after dealing with stressful events in the community.¹² A study conducted in Switzerland concluded that both during lockdown and post-lockdown, reported fears were particularly related to containment measures, such as isolation and loneliness. The fear of losing work was generally predominant during lockdown periods. "Hopelessness", though, was more prevalent in the post-lockdown period. Youths experienced a fear of dying or getting sick more often than older people.¹³ Worthy of note is the fact that the economic crisis was the most significant factor in the development of suicide risk during the COVID-19 pandemic.¹⁴

A study conducted on HCWs from major health care institutions in five countries in the Asia-Pacific region concluded that, regardless of the volume of cases or deaths, HCWs from all countries were vulnerable to psychological distress and burnout due to the COVID-19 outbreak.^{15,16} Frontline COVID-19 doctors in India showed 63.5% and 45% prevalence of manifestations of depression and stress, respectively.¹⁷ Kirk et al found a relatively high prevalence of depression, anxiety, and stress among pediatric HCWs during the COVID-19 pandemic.¹⁸ Depression, anxiety, stress, and PTSD were the major psychological disorders reported among surgical providers during COVID-19, with percentages of 32.8%, 30.8%, 25.9%, and 24.0%, respectively.¹⁹ A significant association was reported between the prevalence of physical symptoms and psychological distress among HCWs during the COVID-19 crisis.²⁰ Earlier, similar findings were reported for HCWs who were in direct contact with Ebola-infected patients during the Ebola outbreaks in Sierra Leone in 2014 and the Democratic Republic of Congo in 2018; they experienced high levels of fear and the effects of stigma.²¹ Health care workers who performed tasks related to MERS showed PTSD symptoms after the outbreak of that disease in Korea in 2015.²²

After home quarantine during COVID-19 pandemic, the rate of symptoms increased remarkably. The mental health team played an important role in the beginning and throughout, performing psychiatric interventions to help patients cope with the outbreak.²³ Health care workers in Wuhan faced many challenges while dealing with difficult conditions such as the increased risk of COVID-19 infection and lack of adequate protection from infection, very long working hours, frustration, discrimination, family isolation, patients with negative emotions, and exhaustion. In summary, these resulting psychological problems affect health workers' attention, understanding, and decision-making ability, which could prevent them from effectively combating COVID-19. In addition, these factors could also permanently affect their general well-being.²⁴ A study of over 1000 health care workers who dealt with COVID-19 patients in China showed that a significant proportion of participants reported symptoms of depression, anxiety, insomnia, and distress, with percentages of 50%, 45%, 34%, and 72%, respectively. People in close contact and at high risk—such as workers in key areas, those with preexisting physical and mental health problems, COVID-19 patients and their caregivers—are likely to experience poor mental health.¹¹

In the light of this situation, we expected to find that frontline HCWs were psychologically impacted by having to directly confront COVID-19. We thus considered it important to evaluate the fear, anxiety, and depression experienced by HCWs while performing their jobs during the pandemic, in relation to their sociodemographic characteristics, specialties, and workloads. Understanding these problems will enable the health care authorities to adopt plans to overcome their negative effects on both HCWs and in turn the community's general health.

Subjects and Methods

Data Collection

A cross-sectional study was carried out to evaluate health care workers' stress during the COVID-19 crisis in Saudi Arabia. Assessments were conducted with an online survey distributed to a convenience sample of health care workers throughout the kingdom by email and WhatsApp groups. A plain-language information statement was given to all participants at the beginning of the survey describing who the investigators are, the purpose of the study, the number of items, the required duration to complete the survey, and full details about data confidentiality and storage. The questionnaire was anonymous and voluntary, and

the respondents were asked to read the supplied consent and then were let to choose either to agree or disagree on filling the survey before proceeding. Also, they were able to review and change their answers through a back button before the final submission. The data were collected through Google Forms from January 2021 to October 2021. The questions of the survey were designed in the English language by three psychiatric professors relying on the published validated scales. The questionnaire was then translated into Arabic by two independent professional translators. To confirm that the content validity was maintained, the translated Arabic version was retranslated into English by two other professional translators. Then qualitative comparison between the original survey and the retranslated form was carried out by the three psychiatric professors who designed the questionnaire. Their notes were gathered, sent, and considered by the professional translators. The cycle was repeated twice to affirm the validity and consistency of the Arabic version before the pilot study. Finally, the survey was converted into a Google Form and the technical functionality of the electronic questionnaire was tested by an information technology expert. Duplicate entries were avoided by requesting that participants log in before starting the survey.

The survey began with questions to elicit sociodemographic data, after which participants were asked about their personal, family, and colleagues' history of COVID-19 infection and mortality. At the end of this section, the survey touched on the perceptions of the participants regarding the reality of the COVID-19 pandemic and the degree of its effects on their psychological status. Depression and anxiety were assessed using the four-item Patient Health Questionnaire-4 (PHQ-4), a valid and reliable ultra-short self-report questionnaire consisting of a two-item depression scale (PHQ-2) and a two-item anxiety scale (GAD-2). The scale includes scores of zero (not at all), one (some days), two (more than half of the days), and three (almost every day), and the cutoff point chosen was three or more.^{25,26} The sociodemographic groups were then compared by *t*-test and ANOVA to assess their relations to depression and anxiety. The fear experienced by HCWs was assessed using the Fear of COVID-19 Scale (FCV-19S), a reliable and valid scale for evaluating fear of COVID-19. We used the Arabic version because the respondents were native Arabic speakers.^{27–29}

Sample Size

545 participations were recorded, but four of these cases were excluded because some data were missing; the final number was thus 541 participations. Working in any health care facility in the Kingdom of Saudi Arabia offering health care to COVID-19 patients was mandatory for participation in the study. The study was preceded by a pilot run to confirm the consistency of the questionnaire. The pilot included 50 HCWs that were randomly selected from all over the kingdom.

Statistical Analysis

IBM SPSS Statistics for Windows, version 20 (Armonk, NY: IBM Corp) was used for the statistical analysis. Cases with missing values in the survey were excluded from the analysis. The sociodemographic distribution of the participants was analyzed and described in percentages. Cronbach's alpha for internal consistency of the whole survey and the fear scale were calculated. In addition, Bartlett's test of sphericity, the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO), Pearson's inter-item correlation, and factorial analysis were calculated. The scores received from different sociodemographic groups were compared using an independent *t*-test or ANOVA according to the number of groups. Pearson's correlation coefficients among different sociodemographic parameters and the means of the scores were considered.

Ethical Approval

The study received approval from the ethical research committee, College of Medicine, the University of Bisha, with the reference number (UBCOM/ H-06-BH-088) (06/ 04). The study complies with the Declaration of Helsinki.

Results

The results showed that the ages of participants ranged from 30 or less to 61 or more years, with the largest group falling between 31 and 40 years, representing 44.5% of the whole sample. More than half of the participants (52.3%) were working in hospital settings. Males constituted about 75% of the sample, and the majority of participants were from the southern region of Saudi Arabia (67.5%), while the least were from the northern region (4.4%). The majority of respondents were Saudi nationals, representing 71% of the total sample. Physicians and nurses constituted 32.2% and 25.1% of the participants, respectively. It was also noticed that 21.3% were being treated for chronic diseases, and 29.4%

had been previously infected with the coronavirus during the pandemic. Participants with close relatives or friends who had been infected with the coronavirus formed about 64%, while those with close relatives or friends who had died from the infection were 26.8%. In addition, 34.6% of the participants had colleagues who had died from the coronavirus, and only 15.5% of the tested population had a history of patients' death from infection with the coronavirus (Table 1). Cronbach's alpha for the pilot trial was 0.925 and that for the whole study was 0.815.

HCWs' fear was rated by using a five-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree). Cronbach's alpha for internal consistency of the scale was 0.733, Bartlett's test for sphericity was < 0.001 , and the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) was 0.703. Spearman correlation was conducted and showed inter-item correlation (0.062–0.687) and item-total correlation (0.549–0.669). Comparison between the mean scores of different sociodemographic groups was performed through *t*-test or ANOVA according to the number of groups. Correlation between different sociodemographic distributions and the mean score of the fear of COVID-19 Scale was estimated through Spearman correlation test. Analysis with a *t*-test revealed a strong significant difference in the perception of fear related to marital status with mean \pm SD of 3.044 ± 0.784 and 2.69 ± 0.959 for those married and unmarried, respectively, and $p < 0.0001$. In addition, a mild significant difference ($p = 0.023$) in fear perception was determined between those with colleagues who had died of COVID-19 infection and those without such a history (mean \pm SD = 2.83 ± 0.931 and 3.01 ± 0.795 , respectively). Fear was the highest in the population of the age group between 51 and 60 years (mean \pm SD = 3.046 ± 0.611), while the lowest mean score of fear went to those less than 30 years old (mean \pm SD = 2.74 ± 1.015). The population from the middle geographic region had the highest mean score of fear, while that from the eastern region had the lowest mean score (mean \pm SD = 3.03 ± 0.899 and 2.43 ± 1.012 , respectively). For the differences in the mean score among different jobs, the highest mean score was for jobs other than those mentioned in the questionnaire, and the lowest mean score was for pharmacists (mean \pm SD = 3.3504 ± 0.793 and 2.69 ± 0.884 , respectively). Presentation of ANOVA and Tukey multiple comparisons post-hoc test results are shown in Figure 1. There were significant correlations between age, job, current workplace, work hours per week, workplace region, history of close relatives' or

Table 1 Sociodemographic Distribution (No. = 541)

Parameter	No.	Percent	Parameter	No.	Percent
Age			Workplace region		
1. 30 or younger	128	23.7%	1. Northern	24	4.4%
2. 31–40 years	241	44.5%	2. Southern	365	67.5%
3. 41–50 years	120	22.2%	3. Eastern	28	5.2%
4. 51–60 years	44	8.1%	4. Western	48	8.9%
5. 61 or older	8	1.5%	5. Middle	76	14.0%
Gender			Nationality		
1. Male	348	64.3%	1. Saudi	384	71.0%
2. Female	193	35.7%	2. Non-Saudi	157	29.0%
Marital status			Job		
1. Married	406	75.0%	1. Physician	175	32.3%
2. Unmarried	135	25.0%	2. Nurse	136	25.1%
Current workplace			3. Dentist	56	10.4%
1. PHC	171	31.6%	4. Pharmacist	45	8.3%
2. Hospital	283	52.3%	5. Admin	23	4.3%
3. Other	87	16.1%	6. Psychologist	6	1.1%
Work hours per week			7. Social worker	8	1.5%
1. < 20 hours	31	5.7%	8. Therapist	2	0.4%
2. 20–29 hours	68	12.6%	9. Paramedic	12	2.2%
3. 30–39 hours	217	40.1%	10. Other	78	14.4%
4. > 40 hours	225	41.6%			

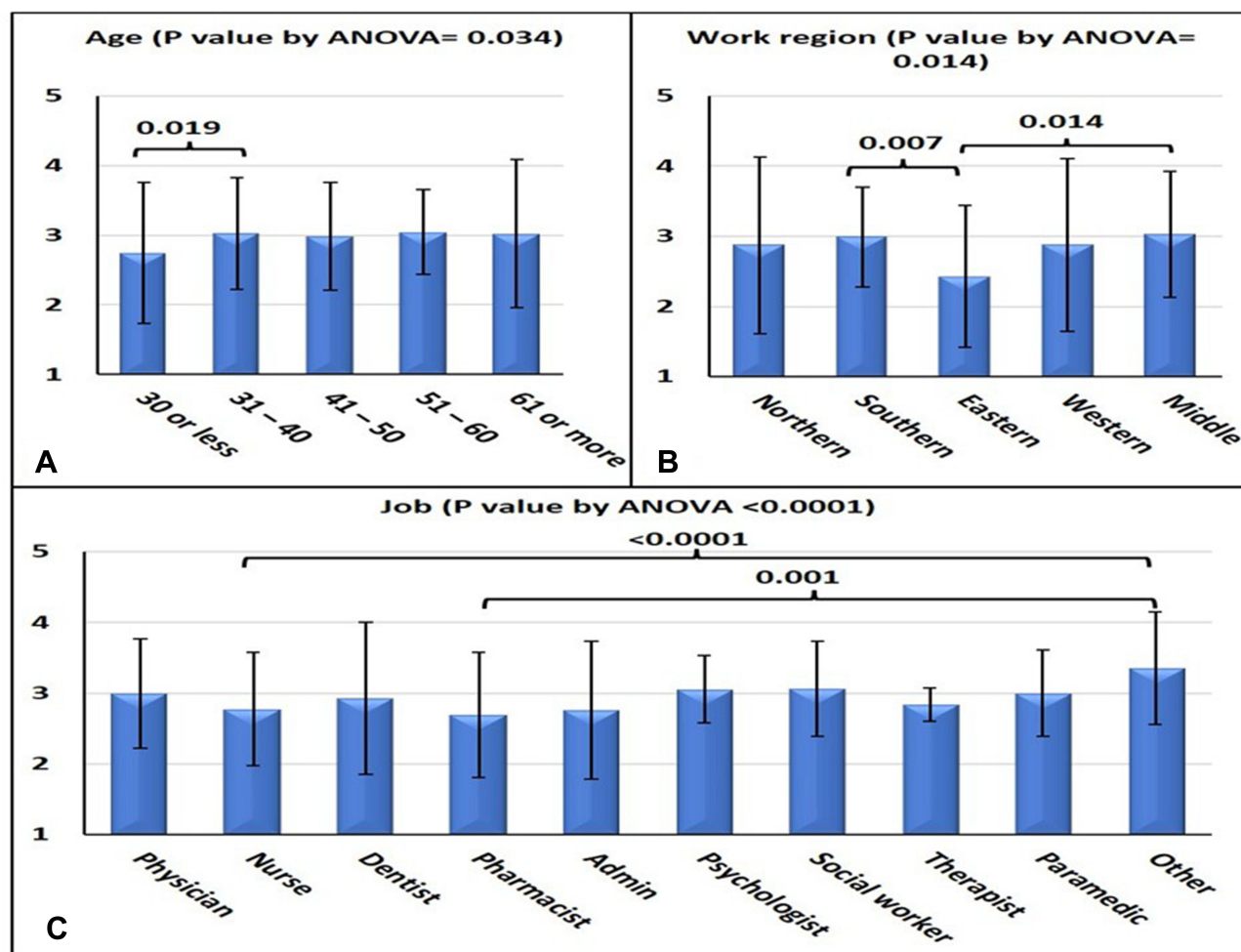


Figure 1 Graphical presentation of ANOVA and post-hoc test results for fear scores (only significant differences are marked). Data are presented as mean \pm SD. (A) Age (P-value by ANOVA = 0.034). (B) Work region (P-value by ANOVA = 0.014). (C) Job (P-value by ANOVA <0.0001).

friends' infection with the coronavirus, history of patients' death from COVID-19 infection, and the mean score of fear. Results of the correlation coefficient and *P*-value are summarized in Table 2.

Anxiety showed a prevalence of 18.30% among the tested sample, with a total score cutoff point of three. Those participants who had patients who died from COVID-19 infection differed significantly from the others ($p = 0.001$) by *t*-test (mean \pm SD is 1.98 ± 2.195 and 1.1488 ± 1.58936 , respectively). Using the ANOVA test, different age groups, jobs, workplaces, work intervals per week, and work regions showed significant differences in their scores with *P*-values of 0.02, <0.0001, 0.003, <0.0001, and <0.0001, respectively. In terms of age, participants less than 30 years old had the highest level of anxiety (1.59 ± 1.821), while geographically the northern region population had the highest degree of

Table 2 Spearman Correlation Between Different Sociodemographic Factors and the Mean Scores of Fear, the Total Scores of Anxiety and Depression in the Whole Tested Population (No: 541)

Parameter	Fear		Anxiety Cut Off Point (3)		Depression Cut Off Point (3)	
	Coeff	P-value	Coeff	P-value	Coeff	P-value
Age	-0.170	<0.0001***	-0.048	0.636	-0.087	0.388
Gender	-0.057	0.189	-0.091	0.370	0.208	0.038
Nationality	0.003	0.942	-0.142	0.162	0.101	0.316

(Continued)

Table 2 (Continued).

Parameter	Fear		Anxiety Cut Off Point (3)		Depression Cut Off Point (3)	
	Coeff	P-value	Coeff	P-value	Coeff	P-value
Marital status	0.034	0.436	0.103	0.312	0.114	0.259
Job	0.155	<0.0001***	-0.087	0.392	-0.254	0.011
Current workplace	0.200	<0.0001***	-0.095	0.352	-0.068	0.499
Work hours per week	0.011	0.014	0.086	0.396	-0.109	0.281
Workplace region	0.155	<0.0001***	-0.132	0.192	-0.099	0.328
History of chronic disease	-0.075	0.080	-0.098	0.335	-0.058	0.569
History of coronavirus infection	0.026	0.540	-0.173	0.088	0.078	0.441
History of close relatives' or friends' infection with coronavirus	-0.105	0.015	0.092	0.367	-0.102	0.312
History of close relatives' or friends' death from coronavirus	-0.059	0.147	0.217	0.031	0.091	0.366
History of colleagues' death from coronavirus	-0.070	0.102	0.120	0.238	-0.023	0.820
History of patients' death from coronavirus	-0.148	0.001**	-0.291	0.003**	-0.257	0.010*

Notes: High significance (***) when P -value < 0.001, moderate significance (**) at $0.01 > P$ -value ≥ 0.001 and low significance (*) when $0.05 > P$ -value ≥ 0.01 .

anxiety (2.17 ± 1.904). Participants working in health care facilities other than hospitals and primary health care centers expressed the highest mean score of anxiety, as did paramedics, and those working 20 to 30 hours per week (1.89 ± 1.888 , 2.58 ± 2.275 , and 1.69 ± 1.863 , respectively). Tukey's post-hoc test results are presented in Figure 2. The results

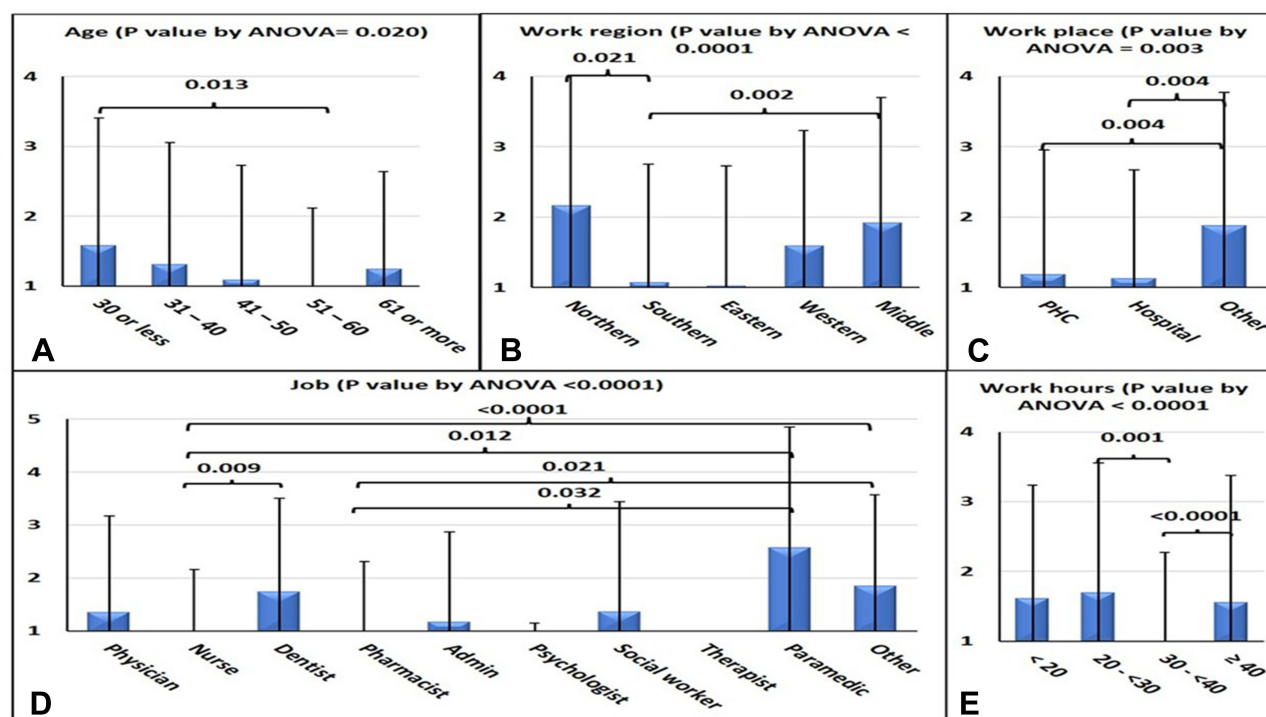


Figure 2 Graphical presentation of ANOVA and post-hoc test results for anxiety scores (only significant differences are marked). Data are presented as mean \pm SD. (A) Age (P-value by ANOVA = 0.020). (B) Work region (P-value by ANOVA < 0.0001). (C) Workplace (P-value by ANOVA = 0.003). (D) Job (P-value by ANOVA < 0.0001). (E) Work hours (P-value by ANOVA < 0.0001).

showed a significant relationship between anxiety and a history of death from COVID-19 infection of friends, close relatives, or patients (Table 2).

The results showed that the prevalence of depression was 18.48% in the tested sample of HCWs. Participants who had close relatives or friends infected with the coronavirus showed a higher degree of depression (mean \pm SD = 1.34 ± 1.824) with a significant difference when compared to those without (mean \pm SD = 1.02 ± 1.535), and $p = 0.029$. Also, those who had patients who died from COVID-19 infections had a score of mean \pm SD (1.95 ± 2.243) higher than others with no history of patient death from COVID-19 (1.09 ± 1.585), with a significant difference between both groups of $p = 0.001$. Notably, participants in the age group less than 30 years old showed the highest level of depression (1.65 ± 1.926), as did those working in places other than those mentioned in the survey, paramedics, and those working 20 to 30 hours per week (1.83 ± 1.913 , 2.28 ± 0.657 , and 1.91 ± 1.983 , respectively). However, unlike the condition of anxiety, participants from the middle geographical region expressed the highest mean score of depression (1.91 ± 1.935). For depression, there were significant differences between the mean scores of the same sociodemographic parameters as there were for anxiety (age groups, jobs, workplaces, number of work hours per week, and work regions). The differences were assessed by ANOVA and Tukey post-hoc test with a p -value of less than 0.05 (details shown in Figure 3).

Moreover, Spearman correlation test showed significant correlations among the sense of depression, gender, job, and a history of patients' death from COVID-19 infection, with p -values of 0.038, 0.011, and 0.010, respectively (Table 2). Based on these results, the relations between fear, anxiety, and depression in the selected population of health care workers during the COVID-19 pandemic were estimated by Spearman correlation test. There was a low correlation between fear and anxiety or depression ($r = 0.374$ and 0.372 , respectively). However, an evaluation of the relation between anxiety and depression showed a very high correlation ($r = 0.842$).

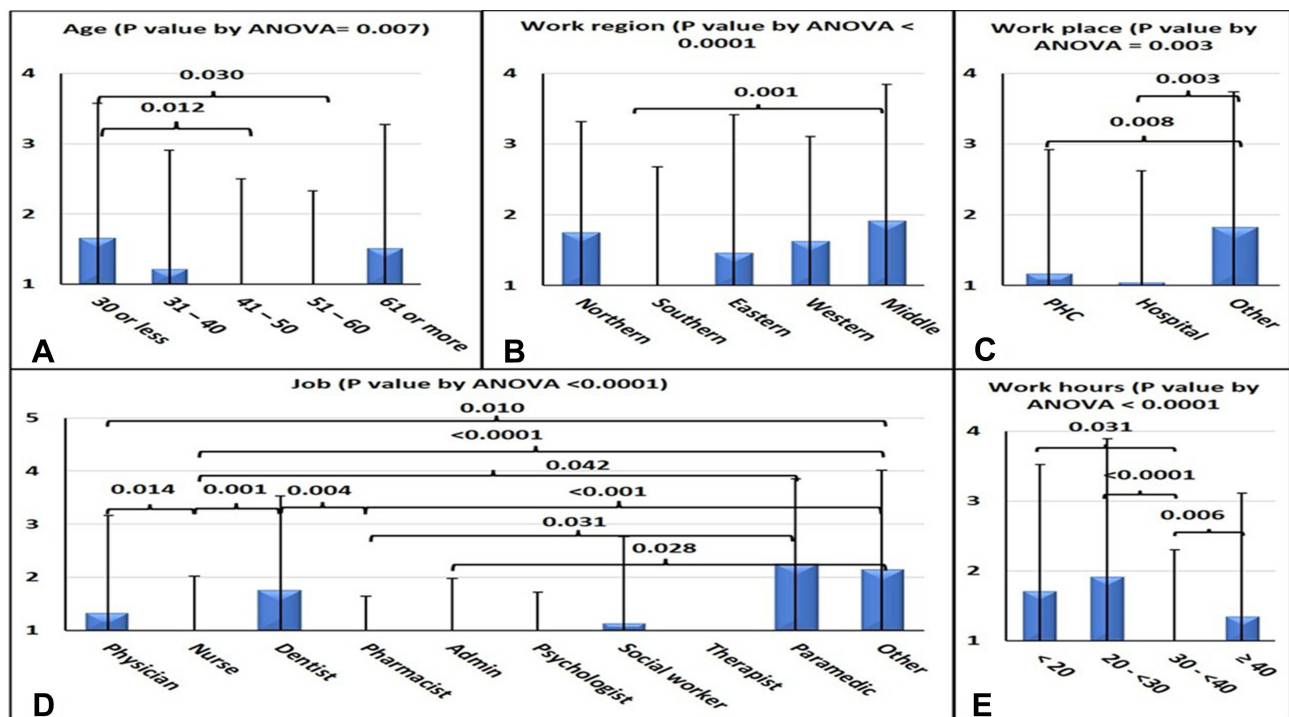


Figure 3 Graphical presentation of ANOVA and post-hoc test results for depression scores (only significant differences are marked). Data are presented as mean \pm SD. (A) Age (P-value by ANOVA = 0.007). (B) Work region (P-value by ANOVA < 0.0001). (C) Workplace (P-value by ANOVA = 0.003). (D) Job (P-value by ANOVA < 0.0001). (E) Work hours (P-value by ANOVA < 0.0001).

Discussion

One of the most common psychological disorders is depression triggered by stressors and unsettling events. Symptoms of mental illnesses such as depression, anxiety, obsessive-compulsive, suicidal, neurological, cognitive, and other disorders have increased overall during the COVID-19 pandemic, as clinical, financial, and psychological stress continues.^{30–32} Our study described the depression, anxiety, and fears observed in HCWs during the waves of COVID-19.

This study indicated that the prevalence of depression among HCWs was 18.48%. This concurs with international studies, in which the prevalence of depression ranges from 14% to 32.7% in countries such as Denmark, the United States, China, Nepal, Spain, Italy, and Iran.³³ The prevalence of depression among HCWs in this study was comparable with the prevalence of depression reported among HCWs in three metropolitan cities in Pakistan,³⁴ in Singapore,³⁵ and in India,²⁰ with percentages of 10.1%, 8.9%, and 12.6%, respectively.

This study showed that the prevalence of anxiety among HCWs during the COVID-19 period was 18.30%, which was in the mid between the prevalences found by Liu et al, who revealed it to be around 12.5%,³⁶ and by Salazar de Pablo et al, who performed their study during the SARS/MERS epidemic and reported the prevalence of anxiety as 29.0%.³⁷ The present study revealed that there was a high level of fear among HCWs in response to COVID-19, and that was in agreement with a study conducted in Egypt which reported that the prevalence of fear related to the COVID-19 pandemic among the participants was 16.5% for a severe degree of fear, and 78.1% for a moderate degree of fear.³⁸

The high prevalence of fear, anxiety, and depression observed in our study might be due to a similar situation to that revealed by a study that linked stress among HCWs to several causes and risk factors, such as the rapid spread of COVID-19, the lack of knowledge of the disease, deaths among health professionals, feelings of being inadequately supported, concerns about one's health, fear of bringing the infection home to the family, being isolated, feelings of stigmatization, and an overwhelming workload.³⁹

This study showed that married participants had higher anxiety levels than unmarried participants. This was in contrast to the results of the study by Alamri et al, who found that unmarried participants had significantly higher levels of depression and anxiety than married ones (41.5% and 25%, respectively),⁴⁰ which could be explained by the fact that married HCWs were afraid of spreading the severe infection to their families.

In the present study, the prevalence of depression and anxiety was highest in the age group less than 30 years, while fear was highest in the population of the age group between 51 and 60 years. Previous research notably showed some debate regarding the association between age and psychological disorders such as fear, anxiety, and depression. Many studies showed young age to be associated with increased depression, anxiety, or stress.^{33,40,41} At the same time, other studies in the catastrophic field revealed that older people were more susceptible to unfavorable psychological sequelae of serious situations, eg, PTSD.⁴² However, in congruence with our results for depression and anxiety, a great deal of research revealed that the older people get, the more invulnerability they build up. This might be due to a greater understanding of life gained from prior exposure to disasters.⁴³ Another possible explanation is that the younger generation is more exposed to social media, which is a common risk factor leading to mental distress during the COVID-19 pandemic.³³

The data displayed the highest rate of depression among those participants living in the middle region of the kingdom, which includes the capital city, Riyadh. This region is also the most populated region in Saudi Arabia. Moreover, the highest proportion of hospitals are located in this region, and most of the infected cases were treated at hospitals there. All of these reasons might lead to an increase in stress among health care workers living in the middle region over the others, which in turn increases the prevalence of depression in this region.⁴⁴

In this study, female HCWs showed a higher prevalence of depression. This is in agreement with a local study performed on the general population,⁴⁰ and similar to evidence in the international literature demonstrating female HCWs as being more likely to experience greater levels of depression, anxiety, insomnia, and PTSD.^{33,41,45}

Our results showed that HCWs dealing with patients infected with COVID-19 were significantly affected by depression, anxiety, and fear. This was similar to another study that concluded that frontline workers who work in high-risk environments are more likely to be afraid of becoming infected and infecting others, and thus experience higher levels of occupational stress, fatigue, and burnout.⁴⁶ These may serve as precursors to more serious conditions that

include anxiety, depression, substance use, and symptoms of PTSD.⁴⁷ This agrees with Nyashanu, who reported feelings of anxiety and fear of COVID-19 among professionals as untreatable, and that some health and social care frontline workers (HSCFWs) had lost their lives due to having COVID-19.⁴⁸

The present study reported more significant depression, fear, and anxiety levels among HCWs who had patients who died due to COVID-19 infection. This concurs with Parvar et al, who observed increased levels of depression and anxiety due to losing a family member from COVID-19 infection.⁴⁹

This study revealed an increased level of fear and anxiety in HCWs following the death of a friend or patient from the coronavirus. This concurs with Rossi et al, who concluded that the passing of a friend was related to PTSD, depression, and sleep deprivation indications. The hospitalization of a friend was associated with PTSD and an undeniable degree of stress. Having a colleague being quarantined has been connected to PTSD, symptoms of depression, and high perceived stress.⁴¹

It is very important to consider the role of online or smartphone-based psychoeducation such as cognitive behavioral therapy (CBT) and mindfulness-based cognitive therapy (MBCT) in improving mental wellness, and psychological interventions for HCWs in the outbreaks of infectious diseases.⁵⁰ CBT may challenge the cognitive biases in patients who exaggerate the risk of getting infected and dying from COVID-19 complications. Behavioral therapy can then aid them in fighting anxiety with the use of relaxation techniques and preventing depression onset by changing the schedule of their routine activities. CBT can alleviate maladaptive coping behaviors like avoidance, antagonistic confrontation, and self-blame, and increase the patient's capability to deal with stress.^{51,52}

It is noteworthy that some studies have tried to estimate the effect of the COVID-19 vaccine on the mental health of HCWs. HCWs across Asian countries recorded a high overall desire to receive the vaccine, while only 3.8% of study participants expressed no desire.⁵³ However, HCWs in Europe and the United States showed a high reluctance rate regarding receiving the vaccine: 15–26% in Italy,⁵⁴ 26% in France,⁵⁵ 29% in Poland,⁵⁶ and 20% in the U.S.⁵⁷ The COVID-19 vaccine was reported to improve the HCWs' comfort level in caring for patients with COVID-19 and other illnesses, and to significantly decrease anxiety in HCWs caring for patients with COVID-19 and other diseases, greatly improving their mood and level of comfort at social gatherings.⁵⁸

Limitations

The research design could be a limitation; a cross-sectional study design cannot establish a causal relationship between the variables studied. No longitudinal examination of the participants was done to assess progression or improvement in their symptoms. A snowball sampling method was adopted to recruit participants and the survey was conducted through email and WhatsApp groups, rather than a random sample selection from a nationally representative sample frame. Most of the study participants were from the southern region of Saudi Arabia (67.5%), suggesting sampling bias, since this could not fairly represent the distribution of Saudi HCWs. Suicidal behavior was not assessed in this study, which focused mainly on the assessment of fear, anxiety, and depression among HCWs. Besides, no consensus has been reached regarding the theoretical dimensions underlying the Scale for Suicide Ideation (SSI) and Beck's Scale for Suicide Ideation (BSI), which are widely used in research and clinical practice,⁵⁹ so this requires a careful study design focused on that serious psychological disorder. Also, assessment of that behavior would add to the length of the survey, possibly affecting the compliance of the participants. Movement restrictions and precautions in places where medical services are provided due to the COVID-19 pandemic led the researchers to rely only on the questionnaire sent by email and WhatsApp groups. We were unable to conduct face-to-face interviews with HCWs or set up focus groups to enrich the discussion and achieve a high level of credibility in the responses.

Conclusion and Clinical Implications

Married status, losing a colleague who died from COVID-19 infection, being aged 51–60 years, and being a HCW in the middle region of Saudi Arabia were the main factors leading to a perception of fear. Participants who work in the northern region experienced the highest mean scores for anxiety. Participants who work in the middle region of Saudi Arabia showed a higher degree of depression. Participants who had patients who died from COVID-19 infection, those

less than 30 years old, paramedics, those working in health care facilities other than hospitals and primary health care centers, and those working 20–30 hours per week showed a higher degree of anxiety and depression.

Take home message: There should be carefully administered psychological support for HCWs during medical disasters like the COVID-19 pandemic, especially for those who are married, had patients who died from the disease, and are less than 30 years old. Otherwise, they will experience high levels of anxiety, fear, and depression, which may affect their physical, mental, and social well-being, negatively impacting the quality of health services provided to the community.

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