

Access this article online
Quick Response Code:

Website: www.jehp.net
DOI: 10.4103/jehp.jehp_1734_23

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Received: 26-10-2023
Accepted: 10-01-2024
Published: 28-09-2024

The psychological impact of COVID-19 on front-line healthcare providers in the United Arab Emirates: A cross-sectional study

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Abstract:

BACKGROUND: The COVID-19 pandemic has significantly impacted the psychological well-being of healthcare providers (HCPs) worldwide. Understanding the prevalence and associated factors of depression, generalized anxiety disorder (GAD), and posttraumatic stress disorder (PTSD) among these providers is crucial. Assess the prevalence of major depression, GAD, and PTSD symptoms among HCPs in the United Arab Emirates (UAE) during the COVID-19 pandemic. Additionally, this study sought to identify demographic, work-related, and health-related factors associated with these psychological symptoms.

MATERIALS AND METHODS: A cross-sectional survey involving 992 HCPs across various healthcare institutions in the UAE was conducted. Participants were administered standardized assessment tools, including the Patient Health Questionnaire-9 (PHQ-9) for depression, the GAD-7 for GAD, and the Impact of Event Scale-Revised (IES-R) for PTSD. Independent *t*-tests and one-way analysis of variance (ANOVA) were employed to assess the prevalence and associated factors.

RESULTS: The findings revealed that approximately 19% of the participants exhibited significant symptoms of major depression (PHQ-9 ≥ 10), while 57.1% reported no significant anxiety symptoms, and 54.4% displayed minimal or no significant PTSD symptoms. Participants with COVID-19, family infections, and work overload showed higher depression, GAD, and PTSD symptoms. Married in-hospital workers significantly differed from single prehospital workers in psychological symptoms. Occupation, level of education, working department, and age significantly influenced the perceived severity of depression, GAD, and PTSD symptoms. Specifically, the ANOVA test revealed significant differences in depression ($F = 3.01$, $P < 0.05$), GAD ($F = 11.4$, $P < 0.001$), and PTSD symptoms ($F = 3.6$, $P < 0.05$) based on occupation. Nurses had higher depression (5.8 ± 7.4) and GAD (7.4 ± 6.6) scores, while physicians had elevated PTSD symptoms (22.4 ± 21.0). Participants with a bachelor's degree had significantly higher depression (7.0 ± 8.4), GAD (7.2 ± 7.4), and PTSD symptoms (22.9 ± 24.6) than those with diplomas or postgraduate degrees. In the intensive care unit (ICU), higher levels of depression (9.3 ± 9.1), GAD (7.6 ± 7.5), and PTSD symptoms (24.7 ± 25.4) were reported. Participants at the screening center had higher depression (5.4 ± 4.7) and PTSD symptoms (15.2 ± 16.8) than those in other prehospital departments. However, participants in PHCs reported higher levels of GAD symptoms (5.8 ± 7.1) compared to those at screening centers, and EMTs. Concerning age groups, participants between 50 and 60 years old experienced more depressive symptoms (8.3 ± 6.7), while those aged 40-49 reported higher GAD (8.5 ± 7.3) and PTSD symptoms (27.0 ± 19.0).

CONCLUSION: This study underscores the importance of proactive mental health support and tailored interventions for HCPs. It highlights the need for workload management and work-life balance, as well as personalized support for those directly affected by COVID-19. Moreover, it emphasizes

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How to cite this article: AlJaberi M, Elshatarat RA, Sawalha MA, Al Hmaimat N, AlBlooshi H, Alshehhi M, *et al.* The psychological impact of COVID-19 on front-line healthcare providers in the United Arab Emirates: A cross-sectional study. J Edu Health Promot 2024;13:335.

the significance of pandemic preparedness and comprehensive training for HCPs. The study findings contribute to a deeper understanding of the diverse factors influencing the psychological well-being of HCPs during public health crises.

Keywords:

COVID-19 pandemic, depression, generalized anxiety disorder (GAD), healthcare providers, posttraumatic stress disorder (PTSD), psychological well-being

Introduction

The COVID-19 pandemic has ushered in a new era of public health crises, significantly impacting healthcare systems and healthcare providers (HCPs) worldwide.^[1] As the world grapples with the devastating consequences of the virus, HCPs have emerged as steadfast front-line warriors, shouldering the immense responsibility of diagnosing, treating, and caring for COVID-19 patients.^[2,3] In the United Arab Emirates (UAE), this challenge has been particularly formidable, as the nation faced the need to swiftly adapt to evolving circumstances while ensuring the safety and well-being of its citizens.^[4,5] This study is a testament to the courage and resilience of UAE HCPs who confronted the pandemic's challenges head-on.^[5]

The mental health of HCPs during the COVID-19 pandemic has become an increasingly critical area of concern. These professionals have endured prolonged stress, grueling work hours, and an elevated risk of virus exposure, leading to a potential toll on their psychological well-being.^[2,3,6] The significance of addressing the mental health of HCPs cannot be overstated, as it directly influences their ability to deliver quality of care and respond effectively to public health crises.^[1,6,7] As the world continues to grapple with the pandemic's repercussions, it is imperative to explore the experiences of HCPs in the UAE,^[4] investigating the prevalence of mental health challenges, associated factors, and implications for practice.

This study represents a comprehensive exploration of the psychological impact of the COVID-19 pandemic on HCPs in the UAE, contributing to the emerging body of literature in this domain. HCPs encompass a diverse range of professionals, including physicians, nurses, emergency medical technicians (EMTs), and supporting healthcare staff. Their experiences, resilience, and challenges are at the forefront of this research.^[7,8] Moreover, the study recognizes the multifaceted aspects of HCPs' lives by scrutinizing various demographic, work-related, and health-related factors that influence their mental health during the pandemic. The examination extends to the prevalence of major depression, Generalized Anxiety Disorder (GAD), and Posttraumatic Stress Disorder (PTSD) symptoms among these professionals.^[9] By investigating these

dimensions, the study offers a nuanced perspective on the psychological health of UAE HCPs during an unprecedented global crisis.

The investigation is particularly timely in the context of the ongoing pandemic and its dynamic nature. Previous research has illuminated the psychological strains faced by HCPs during health crises, emphasizing high rates of major depression, GAD, and PTSD.^[2,8,9] However, the unique characteristics of the UAE setting, including its preparedness, public awareness campaigns, and support infrastructure, may have created a distinct landscape for HCPs.^[4,8] As a result, this study endeavors to provide tailored insights into the psychological well-being of HCPs in the UAE, offering a deeper understanding of the factors influencing their mental health during the pandemic. These insights are anticipated to inform and guide targeted interventions and support systems for HCPs in the UAE and contribute to the broader international discourse on the psychological well-being of HCPs during public health crises.

Study Objectives

This study investigates the psychological impact of the COVID-19 pandemic on UAE front-line HCPs, emphasizing major depression, GAD, and PTSD prevalence. Rigorous data analysis aims to reveal factors influencing these psychological challenges, providing nuanced insights into the unique circumstances and stressors faced by front-line HCPs during the pandemic.

This study's objectives are (1) provide a comprehensive report on the demographics and work-related data of front-line HCPs during the UAE's COVID-19 pandemic, (2) assess major depression, GAD, and PTSD prevalence among these HCPs, (3) identify associated factors using *t*-tests, focusing on gender, marital status, COVID-19 influence, work conditions, and psychological support, and (4) investigate factors associated with major depression, GAD, and PTSD through one-way ANOVA, considering demographics.

Materials and Methods

Study design and setting

This study adopted a cross-sectional survey design to investigate the psychological impact of COVID-19 on front-line HCPs in the UAE.

Study participants and sampling

The research spanned various healthcare institutions situated in prominent Emirates of the UAE, including Abu Dhabi, Dubai, and the Northern Emirates, such as Umm Al Quwain, Sharjah, and Al Fujiera. Participants were drawn from a diverse range of healthcare settings and COVID-19 screening centers, which included the medical services administration and the emergency and public safety directorate in Abu Dhabi Emirate, two governmental hospitals and the Dubai Corporation for Ambulance Services in Dubai Emirate, and six governmental hospitals under the Ministry of Health and Preventions in the Northern Emirates, alongside the National Ambulance.

Employing a convenience sampling method, the study successfully recruited a total of 992 front-line HCPs. This sample represented a comprehensive spectrum of HCPs, encompassing physicians, nurses, EMTs, and staff involved in COVID-19 screening and ambulance services. Inclusion criteria for participation in the study encompassed individuals who were full-time employees working as front-line HCPs actively engaged in the care of COVID-19 patients. Additionally, participants were required to be proficient in either English or Arabic language. Their prior COVID-19 diagnosis status (whether previously diagnosed with COVID-19 or not) was not a decisive factor for inclusion. However, HCPs who were currently infected with COVID-19 at the time of data collection or had unstable medical conditions related to other medical or mental health issues as well as those with a documented history of depression, anxiety, stress, or PTSD, were excluded from participation in the study.

The sample size calculation was conducted using the G*Power software program, taking into account predetermined parameters. The sample size was determined based on medium effect sizes (effect size = 0.30), ensuring a statistical power of 0.80 at a 5% significance level, and employing *t*-test analysis and ANOVA to estimate the required number of participants. The minimum required sample size was estimated at 962. However, the authors distributed a total of 1085 surveys, with 992 individuals successfully completing the online survey.

Instruments

To comprehensively address the research objectives, which primarily aimed at evaluating the psychological impact on the study participants, the research team employed various structured questionnaires. These instruments encompassed an examination of diverse demographic and work-related factors coupled with health-related variables. The assessment tools utilized for this purpose included the Patient Health

Questionnaire-9 for evaluating major depressive symptoms, the Generalized Anxiety Disorder-7 Scale for assessing anxiety disorder symptoms, and the Impact of Event Scale-Revised for investigating the consequences of traumatic events associated with the COVID-19 pandemic. These standardized, well-established, and highly reliable tools were instrumental in providing a thorough understanding of the psychological well-being of the participants. The following are the descriptions of the instruments utilized in the study:

Demographic, work-related factors, and health-related tool: This tool covered several variables, including gender, marital status, age, educational level, occupation, working area (in-hospital or prehospital), Emirates distribution, medical history, extra working hours, exposure to COVID-19, availability of sufficient personal protective equipment (PPE), place of residence after duty, and whether participants received psychological services and support. This comprehensive tool aimed to capture a nuanced picture of the participants' circumstances and experiences, contributing to a robust analysis of the psychological impact of the pandemic on healthcare professionals in different settings and regions.

Patient Health Questionnaire-9 (PHQ-9): The PHQ-9 was utilized to evaluate depressive symptoms in the study participants. Comprising nine questions, this scale allows participants to rate the frequency of their depressive symptoms, ranging from 0 (indicating no presence of depressive symptoms) to 3 (indicating the presence of depressive symptoms nearly every day). The total score falls within a range of 0 to 27, with participants categorized as follows: 0-4 (minimal or no depression), 5-9 (mild depression), 10-14 (moderate depression), 15-19 (moderately severe depression), and 20-27 (severe depression).^[10,11] The PHQ-9 has consistently demonstrated good sensitivity and specificity, particularly when using a cutoff score of ten or higher.^[10,11]

Generalized Anxiety Disorder-7 (GAD-7) Scale: This assessment tool was employed to measure symptoms related to GAD among the study participants. Comprising seven items, each of which is rated on a frequency scale ranging from 0 (indicating no anxiety symptoms) to 3 (indicating the presence of anxiety symptoms nearly every day), the total score spans from 0 to 21. Individuals' anxiety levels were classified as follows: 0-4 (indicating no GAD), 5-9 (indicating mild anxiety), 10-14 (indicating moderate anxiety), and >15 (indicating severe anxiety). The GAD-7 has consistently demonstrated strong reliability and construct validity, with high sensitivity and specificity values, particularly when using a cutoff score of ten or higher.^[12]

Impact of Event Scale-Revised (IES-R): This tool was employed to assess the self-reported distress experienced by participants as a consequence of the traumatic events associated with the COVID-19 pandemic. The IES-R scale is comprised of 22 items, each of which is rated on a Likert scale, enabling participants to express the extent of their distress, ranging from 0 (indicating no distress) to 4 (indicating extreme distress). The total score spans from 0 to 88 and is categorized into four levels: 0-8 (subclinical), 9-25 (mild distress), 26-43 (moderate distress), and 44-88 (severe distress). This scale has consistently demonstrated strong internal consistency, with Cronbach alpha reliability values ranging from 0.82 to 0.86.^[13-15]

The research employed standardized assessment tools, distributed online via Google Form, to gain a comprehensive understanding of the psychological well-being of participants amid the COVID-19 pandemic. Language preferences were meticulously considered; English versions of PHQ-9, GAD-7, and IES-R were utilized for English-fluent healthcare professionals (HCPs) like nurses, physicians, and EMTs. In contrast, Arabic versions of these tools were employed for Emirati supportive workers with limited proficiency in English. The choice of these tools was grounded in their well-established psychometric properties, as evidenced by demonstrated validity and reliability in previous researches.^[16-18]

Pilot study

A pilot study was undertaken, involving 28 eligible participants from diverse healthcare settings and roles in the UAE, to evaluate the clarity, ease of completion, and reliability of both Arabic and English versions of the questionnaires. Additionally, the validity of the adopted questionnaires underwent scrutiny by three experts holding PhDs in nursing and clinical research. An extra expert, proficient in both Arabic and English with a PhD degree in English language, evaluated the Arabic versions for translation accuracy and structural fidelity compared to the original English versions. The experts unanimously affirmed the clarity, translation accuracy, and robust validity of the chosen questionnaires. Pilot study participants reported questionnaire clarity and reliability analysis demonstrated strong internal consistency, with Cronbach's alpha coefficients surpassing 0.84 for all questionnaires. Notably, participants in the pilot study ($n = 28$) were subsequently excluded from the final analysis of this research.

Ethical considerations

This study adhered to rigorous ethical standards, receiving approvals from institutions including the Institutional Review Board of Fatima College of Health Sciences in Dubai (Approval Number: INTSTD008BSN20)

and the Ministry of Health Research and Ethics Committee (Ethical letter No: 156/2020). Ethical clearance was also obtained from the Medical Accreditation and Research Division at Dubai Corporation for Ambulance Services.

Participant consent was diligently acquired, with an electronic signature on a consent form, emphasizing informed and voluntary participation. The online survey, designed to have no adverse impact on the ongoing COVID-19 situation, ensured participant privacy, and data confidentiality was maintained through encoding and secure storage. Participants were assured that only the researcher would have access to the collected information.

Data collection procedure

The data collection period, spanning from December 2020 to February 2021, began with the research team contacting managing directors of relevant institutions to obtain contact information, including email addresses and "WhatsApp" numbers, aiming to facilitate participant recruitment. Three co-authors were assigned to manage the online survey distribution using "Google Forms," closely monitoring response rates. The survey was then shared via email and "WhatsApp" with eligible participants actively engaged in managing COVID-19 cases, and precautions were taken to avoid response duplication through contact via "WhatsApp" or email. The survey cover page outlined the study's purpose, aims, specific objectives, risks, benefits, and the voluntary and confidential nature of participation. Participants who agreed signed an electoral consent form. The survey assured participants that they could withdraw at any time and provided contact information for questions. Regular monitoring and proactive follow-up via phone calls, "WhatsApp," and emails encouraged participation. Once the minimum effective sample size of 962 was reached, the survey link was promptly closed, with 992 returned and completed surveys marking the successful conclusion of the data collection phase.

Data analysis

The study extensively analyzed data using the Statistical Package for Social Science (SPSS) version 24, focusing on understanding the psychological impact on front-line HCPs during the COVID-19 pandemic. The analysis delved into various demographic, work-related, and health-related factors to illuminate the prevalence of psychological health problems, including major depression, GAD, and PTSD. Descriptive statistics such as frequencies, percentages, means, and standard deviations were employed to provide a comprehensive understanding of participant profiles, work conditions, and COVID-19 exposure.

The analysis aimed to identify factors associated with major depression, GAD, and PTSD through the use of independent *t*-tests, revealing contributors to higher levels of psychological distress among participants. Additionally, the study utilized one-way ANOVA tests to uncover the significant influence of factors like occupation, level of education, department (in-hospital or prehospital), and age on the psychological well-being of front-line HCPs. This thorough statistical examination not only shed light on the psychological consequences of the pandemic but also offered valuable insights into the specific factors shaping the mental health of this essential group of healthcare workers.

Results

Demographics, work-related data, and exposure to COVID-19

The cross-sectional survey comprised 992 front-line HCPs, with nurses forming the majority at 64.4% ($n = 639$), followed by EMTs at 16.4% ($n = 163$), physicians at 11.6% ($n = 115$), and supporting professions, including laboratory technicians, pharmacists, and radiology technicians, at 7.6% ($n = 75$). The participant demographics revealed a predominance of females (62.7%) who were married (77.2%), predominantly falling within the age range of 30 to 39 years (55.9%), and holding bachelor's degrees (62.7%). These participants were employed across various healthcare institutions in the UAE. Roughly half of them (50.8%) worked in hospital settings, while the remaining half (49.2%) worked in prehospital institutions. Among in-hospital HCPs, roles were distributed across different units, with 21.6% ($n = 109$) in the emergency department, 13.7% ($n = 69$) in the intensive care unit (ICU), 21.6% ($n = 109$) in the medical-surgical department, 21.8% ($n = 110$) in the isolation unit, and 21.2% ($n = 107$) in supporting health departments. In contrast, the other half of the participants were employed in prehospital institutions, with 45.1% ($n = 220$) as EMTs, 45.1% ($n = 220$) in primary healthcare centers (PHCs), and 9.8% ($n = 48$) in COVID-19 screening centers.

Approximately 20% of the participants had a medical history of chronic health conditions such as diabetes or hypertension. Around two-thirds (62.5%) of the participants reported working extra hours, and the majority (65.8%) were involved in managing COVID-19 patients. However, only 13.4% ($n = 133$) of the participants had received a positive COVID-19 diagnosis, and 13.3% ($n = 132$) reported that their family members had been infected with COVID-19. Regrettably, 61.9% ($n = 614$) of their friends had tested positive for COVID-19. Families of the participants (65.6%, $n = 561$) expressed anxiety about the potential transmission of the virus to them.

A significant proportion of the participants (80%, $n = 794$) confirmed that they received an adequate supply of PPE during their duty hours, while 18.2% ($n = 181$) indicated an insufficient amount of PPE, and 1.7% ($n = 17$) reported the availability of PPE to some extent. The provision of staff accommodations to minimize infection transmission was available; however, a majority of the participants (79.9%, $n = 793$) chose to return to their homes after their duty hours, while only 20.1% ($n = 199$) utilized employer-provided accommodations. Throughout the COVID-19 pandemic, a significant majority of participants, 58.7% ($n = 582$), received psychological support in the form of materials, psychotherapy, or psychological counseling [Table 1].

Psychological health problems

The participants responded to nine questions aimed at screening for depression symptoms. The results from the PHQ-9 revealed that approximately 81% of the participants exhibited no significant depression symptoms, as their PHQ-9 scores were less than 10 out of a possible 27. Conversely, 19% of participants displayed major depression symptoms, scoring 10 or higher out of 27. The reported symptoms were further categorized into five groups: no symptoms (64.1%), mild symptoms (16.8%), moderate symptoms (7.8%), moderately severe symptoms (5.3%), and severe depression symptoms (5.9%). The mean score for the severity of depression on the PHQ-9 was 5.3 (± 7.1) out of 27.

Regarding the responses to the seven questions from the GAD-7 scale, they were classified into four groups. Approximately half of the participants (57.1%) reported no anxiety symptoms, while 18.4% reported mild symptoms, 11.9% experienced moderate symptoms, and 12.6% displayed severe anxiety symptoms. The GAD-7 mean score was 5.8 (± 7.0) out of a possible 21. Based on the GAD-7 scale, approximately three-quarters of the participants were classified as having GAD, with the remaining quarter showing no signs of GAD.

As for posttraumatic stress symptoms, they were categorized into four levels: participants with minimal or no significant PTSD symptoms (54.4%), those with mild PTSD symptoms (20.7%), participants with PTSD symptoms (17.1%), and those with severe PTSD symptoms (7.8%). The mean score for posttraumatic stress symptoms on the IES-R was 16.7 (± 20.9) out of 88 [Table 2].

Associated factors of major depression, GAD, and PTSD

The independent *t*-test results revealed statistically significant differences in the mean scores of major depression, GAD, and PTSD symptoms among the

Table 1: Participants' demographic and work-related data, participants' and relatives' exposure to COVID-19, and receiving psychological support

Variables	n (%)
Gender (Female)	622 (62.7%)
Marital status	
Single	214 (21.6%)
Married	778 (77.2%)
Widowed and divorced	12 (1.2%)
Age (year)	
20-29	137 (14.7%)
30-39	523 (55.9%)
40-49	217 (23.2%)
50-60	58 (6.2%)
Educational level	
Diploma degree	249 (25.1%)
Bachelor degree	622 (62.7%)
Postgraduate degree	121 (12.2%)
Occupation	
Physician	115 (11.6%)
Nurse	639 (64.4%)
EMT	163 (16.4%)
Supporting profession	75 (7.6%)
Working area (in-hospital)	504 (50.8%)
In-hospital workplace (n=504)	
Emergency Department (ED)	109 (21.6%)
Intensive care unit (ICU)	69 (13.7%)
Medical-Surgical department	109 (21.6%)
Isolation Unit	110 (21.8%)
Supporting department	107 (21.2%)
Prehospital workplace (n=488)	
Emergency medical technician (EMT)	220 (45.1%)
Primary healthcare center (PHC)	220 (45.1%)
Screening center	48 (9.8%)
Emirates distribution	
Abu Dhabi	500 (50.4%)
Dubai	136 (13.7%)
Northern Emirates	356 (35.9%)
Medical history (yes)	202 (20.4%)
Worked extra hours (yes)	620 (62.5%)
Exposure to COVID-19	
Participants who managed COVID-19 patients	653 (65.8%)
Participants have been diagnosed with positive COVID-19	133 (13.4%)
Participants who have a family member (s) infected with COVID-19	132 (13.3%)
Participant's families felt worried about transmitting the infection to participants or them	561 (56.6%)
Participants have a friend infected with COVID-19	614 (61.9%)
Sufficient PPE amount (yes)	794 (80.0%)
Place of residence after duty	
Home	793 (79.9%)
A particular apartment provided by the employer	199 (20.1%)
Received psychological services and support	
Psychological materials	374 (37.7%)
Psychotherapy or counseling	96 (9.7%)
Psychological materials and Psychotherapy or counseling	112 (11.3%)
None	410 (41.3%)

Table 2: Psychological health problems

Variables	n (%) or (Mean±SD)
Depressive symptoms (PHQ-9)	
No symptoms	636 (64.1%)
Mild symptoms	167 (16.8%)
Moderate symptoms	77 (7.8%)
Moderately severe symptoms	53 (5.3%)
Severe symptoms	59 (5.9%)
Depressive symptoms (scores of PHQ-9 range: 0–27)	
No major depression symptoms (PHQ-9 is <10)	803 (80.9%)
Have major depression symptoms (PHQ-9 is ≥ 10)	189 (19.1%)
Overall mean of summative Score of PHQ-9	5.3 (±7.1)
Generalized Anxiety Disorder (GAD)	
No symptoms	566 (57.1%)
Mild symptoms	183 (18.4%)
Moderate symptoms	118 (11.9%)
Severe symptoms	125 (12.6%)
Generalized Anxiety Disorder (scores of GAD-7 range: 0–21)	
No generalized anxiety disorder (GAD-7 is <10)	749 (75.5%)
Have generalized anxiety disorder (GAD-7 is ≥ 10)	243 (24.5%)
Overall mean of Summative Score of (GAD-7)	5.8 (±7.0)
Posttraumatic stress disorder (PTSD)	
Symptoms severity of PTSD (measured by using IES-r)	
No symptoms	535 (54.4%)
Few symptoms	203 (20.7%)
Moderate symptoms	168 (17.1%)
Severe symptoms	77 (7.8%)
Mean of Summative score of (IES-r)	16.7 (±20.9)

participants based on various factors. Specifically, participants who had contracted COVID-19 themselves, had family members infected with COVID-19, had family members concerned about transmitting the infection, worked extra hours (indicating work overload), had access to a sufficient and efficient supply of protective isolation equipment in their workplace for dealing with COVID-19 patients, and were receiving psychological support exhibited higher mean scores for major depression, GAD, and PTSD symptoms. In contrast, those who had not contracted COVID-19, did not have family members infected with COVID-19, did not work extra hours, had no family concerns about transmitting the virus, had insufficient protective equipment in their workplace, and were not receiving psychological support had lower mean scores for these psychological symptoms. Additionally, participants who were married and worked in in-hospital settings displayed statistically significant differences in the perception of major depression, GAD, and PTSD symptoms compared to single participants working in prehospital areas.

Furthermore, a history of chronic medical conditions was significantly associated with major depressive symptoms ($t = 2.3, P < 0.05$) and PTSD symptoms ($t = 2.5, P < 0.05$). Significant associations were also found

between the presence of GAD and participants who managed COVID-19 patients ($t = 5.4$, $P < 0.001$), had friends diagnosed with COVID-19 ($t = 5.4$, $P < 0.001$), were male ($t = 3.6$, $P < 0.001$), and resided at home after their duty hours ($t = 2.2$, $P < 0.05$) [Table 3].

The one-way ANOVA identified statistically significant differences in self-reported depression, anxiety, and PTSD symptoms among the participants based on their occupation, level of education, working department (in-hospital or prehospital), and age. Specifically, the ANOVA test indicated significant differences in perceived depression ($F = 3.01$, $P < 0.05$),

GAD ($F = 11.4$, $P < 0.001$), and PTSD symptoms ($F = 3.6$, $P < 0.05$) among participants based on their occupation. Nurses displayed higher mean scores for depression symptoms (5.8 ± 7.4) and GAD (7.4 ± 6.6), while physicians had a higher average of perceived PTSD symptoms (22.4 ± 21.0). Participants with a bachelor's degree exhibited higher mean scores for depression symptoms (7.0 ± 8.4), GAD (7.2 ± 7.4), and PTSD symptoms (22.9 ± 24.6) than those with diplomas or postgraduate degrees. Furthermore, participants working in the ICU reported higher levels of depression symptoms (9.3 ± 9.1), GAD (7.6 ± 7.5), and PTSD symptoms (24.7 ± 25.4) compared to those working in

Table 3: Independent t-test to investigate the associated factors of major depression, GAD, and PTSD

Variables	n	PHQ-9		GAD-7		IES-r	
		Mean±SD	t	Mean±SD	t	Mean±SD	t
Managing COVID-19 patients							
Yes	653	5.8 (±9.1)	1.4	7.5 (±8.2)	5.4**	16.6 (±23.9)	0.01
No	339	5.1 (±5.7)		4.9 (±6.1)		16.3 (±19.1)	
Self-infected by COVID-19							
Yes	133	6.5 (±7.0)	1.9*	7.1 (±6.7)	2.4*	21.2 (±22.6)	2.7*
No	859	5.1 (±7.1)		5.8 (±7.0)		15.9 (±20.5)	
Family infected by COVID-19							
Yes	132	6.7 (±7.2)	2.3*	6.7 (±7.2)	1.9*	20.5 (±21.6)	2.3*
No	860	5.1 (±6.9)		5.3 (±6.6)		16.0 (±20.7)	
Friend has been diagnosed with COVID-19							
Yes	614	5.1 (±5.7)	1.4	4.9 (±6.1)	5.4**	16.7 (±19.1)	0.01
No	378	5.7 (±9.1)		7.5 (±8.2)		16.6 (±23.9)	
Participant's families felt worried about transmitting COVID-19 infection							
Yes	561	6.1 (±7.1)	4.4**	6.4 (±7.0)	3.3**	19.8 (±21.8)	5.5**
No	431	4.2 (±6.9)		5.0 (±6.9)		12.6 (±18.8)	
History of medical diseases							
Yes	202	6.3 (±6.7)	2.3*	6.3 (±6.9)	1.1	19.9 (±21.4)	2.5*
No	790	5.1 (±7.2)		5.7 (±7.0)		15.8 (±20.6)	
Working extra hours (work overload)							
Yes	620	6.5 (±6.6)	1.9*	6.9 (±6.8)	2.5**	21.2 (±20.1)	3.0**
No	371	4.8 (±7.8)		4.7 (±7.4)		14.0 (±21.7)	
Workplace provide a sufficient and efficient amount of protective isolation equipment to deal with COVID-19 patients							
Yes	794	4.6 (±6.7)	1.7*	4.8 (±7.1)	4.3**	15.2 (±21.3)	3.7**
No	192	6.9 (±6.6)		8.4 (±6.6)		24.2 (±21.1)	
Gender							
Male	370	5.1 (±8.1)	0.5	5.7 (±7.1)	3.6**	14.6 (±22.0)	1.3
Female	622	5.3 (±6.8)		8.1 (±7.1)		16.9 (±20.5)	
Marital status							
Single	214	4.9 (±6.8)	2.1*	4.5 (±6.4)	3.1**	14.8 (±20.3)	2.2*
Has been married	778	6.6 (±6.9)		7.8 (±6.1)		19.8 (±20.5)	
Workplace							
In-hospital	504	6.8 (±7.1)	3.1*	7.7 (±6.2)	4.4**	25.2 (±17.2)	3.7**
Prehospital	488	4.3 (±6.5)		5.1 (±6.4)		20.2 (±21.6)	
Place of residency after duty							
Home	793	5.4 (±7.3)	0.8	6.1 (±7.7)	2.2*	21.3 (±21.6)	0.9
Special apartment provided by employers	199	5.2 (±7.2)		4.3 (±7.3)		19.7 (±22.5)	
Receiving psychological support							
Yes	582	4.1 (±6.0)	4.9**	4.4 (±6.4)	5.5**	13.3 (±20.1)	6.3**
No	410	8.7 (±7.6)		9.5 (±6.8)		29.5 (±18.1)	

other in-hospital departments, including the emergency department, medical-surgical department, isolation unit, and supporting department. Additionally, findings revealed that participants working at the screening center perceived higher levels of depression symptoms (5.4 ± 4.7) and PTSD symptoms (15.2 ± 16.8) than those working in other prehospital departments, including EMTs and patient transport, as well as PHCs. However, participants working in PHCs reported higher levels of GAD symptoms (5.8 ± 7.1) compared to those working at screening centers, EMT, and patient transport. Furthermore, participants between 50 and 60 years old perceived more depressive symptoms (8.3 ± 6.7) than other age groups. Participants aged between 40 and 49 reported higher levels of GAD symptoms (8.5 ± 7.3) and PTSD symptoms (27.0 ± 19.0) than other age groups [Table 4].

Discussion

To the best of the authors' knowledge, this study represents the inaugural comprehensive investigation conducted within the UAE to assess the repercussions of the COVID-19 pandemic on the psychological well-being of HCPs. Extensive review of the existing literature

highlighted a dearth of studies examining the interplay between the demographic attributes of HCPs, their work-related conditions, their exposure to and infection with COVID-19, and the receipt of psychological support in relation to the manifestation of symptoms of major depression, anxiety, and posttraumatic stress levels in the UAE and other Arab nations.^[4,5,19,20] Although a limited number of studies have explored certain facets of these factors and their influence on the psychosocial welfare of HCPs in the UAE, Saudi Arabia, Jordan, and globally,^[5,19-21] this study distinguishes itself through its diverse and extensive participant pool. Comprising HCPs of various ethnicities and backgrounds, including physicians, nurses, EMTs, and support staff, this research encompassed healthcare settings both within hospitals and prehospital areas, spanning all geographic regions of the UAE.

The study also reveals a pertinent aspect of the participants' health, which was a significant portion had preexisting chronic health conditions, such as diabetes and hypertension, which could increase their vulnerability to COVID-19. The fact that most participants reported working extra hours underscores the immense dedication and commitment of HCPs

Table 4: ANOVA test to investigate the associated factors of major depression, GAD, and PTSD

Variables	n	PHQ-9		GAD-7		IES-r	
		Mean±SD	f	Mean±SD	f	Mean±SD	f
Occupation							
Physician	115	4.5 (±7.5)	3.01*	7.1 (±6.5)	11.4**	22.4 (±21.0)	3.6*
Nurse	639	5.8 (±7.4)		7.4 (±6.6)		21.2 (±16.6)	
EMT	163	4.2 (±6.1)		5.5 (±3.3)		19.6 (±13.0)	
Supporting profession	75	5.3 (±5.5)		4.8 (±4.2)		17.3 (±18.7)	
Educational level							
Diploma	249	4.1 (±6.3)	7.7**	5.0 (±6.6)	3.9*	11.6 (±17.4)	13.4**
Bachelor	622	7.0 (±8.4)		7.2 (±7.4)		22.9 (±24.6)	
Postgraduate	121	5.5 (±7.1)		5.9 (±7.1)		17.5 (±21.2)	
In-hospital workplace (n=504)							
Emergency department	109	4.5 (±7.9)	11.3**	6.2 (±6.7)	3.9*	22.9 (±26.3)	11.3**
ICU	69	9.3 (±9.1)		7.6 (±7.5)		24.7 (±25.4)	
Medical-Surgical department	109	6.3 (±7.9)		7.4 (±7.7)		16.4 (±18.6)	
Isolation unit	110	6.3 (±6.7)		4.5 (±5.5)		24.0 (±22.8)	
Supporting department	107	7.6 (±8.7)		6.8 (±7.5)		13.8 (±18.0)	
Prehospital workplace (n=488)							
EMT and transporting patients	220	4.2 (±6.3)	11.2**	4.7 (±6.8)	3.4*	14.2 (±19.2)	6.3**
Primary healthcare center	220	3.7 (±4.9)		5.8 (±7.1)		13.1 (±17.4)	
Screening center	48	5.4 (±4.7)		5.2 (±6.8)		15.2 (±16.8)	
Emirates distribution							
Abu Dhabi	500	4.8 (±6.1)	2.4	5.1 (±7.2)	2.0	17.2 (±18.2)	1.7
Dubai	136	4.5 (±5.6)		5.4 (±6.1)		16.7 (±18.3)	
Northern Emirates	356	4.7 (±5.9)		5.7 (±6.4)		17.5 (±17.2)	
Age (year)							
20-29	137	5.3 (±6.3)	12.8**	5.2 (±6.9)	13.1*	21.3 (±21.5)	11.3**
30-39	523	5.1 (±8.4)		7.4 (±5.5)		24.2 (±22.8)	
40-49	217	6.8 (±6.9)		8.5 (±7.3)		27.0 (±19.0)	
50-60	58	8.3 (±6.7)		7.3 (±6.6)		26.2 (±22.2)	

during the pandemic. A substantial majority of these HCPs were involved in the care of COVID-19 patients, placing them at an increased risk of exposure to the virus. Also, the findings showed that only a small percentage of participants had received a positive COVID-19 diagnosis contrasts with the high number of their friends who had contracted the virus. This discrepancy suggests that participants were implementing effective preventive measures both at work and in their personal lives. Moreover, the study demonstrates that many participants received psychological support during the pandemic, with the majority benefiting from materials, psychotherapy, or psychological counseling. This highlights the importance of providing HCPs with mental health resources to address the psychological challenges associated with their roles during the COVID-19 pandemic.^[4,22-25] Overall, the study's results not only contribute to the understanding of the demographic and occupational characteristics of HCPs in the UAE but also shed light on the importance of psychological support and protective measures during a public health crisis. These findings are consistent with some of the international literature on healthcare provider experiences during the pandemic,^[2,3,6] underlining the global nature of the challenges they faced.

The findings from this study provide valuable insights into the psychological impact of the COVID-19 pandemic on HCPs, particularly in the UAE. It is noteworthy that a significant portion of the participants reported minimal to no symptoms of major depression, accounting for approximately 64.1% of the sample. Surprisingly, the study revealed that the prevalence of major depression symptoms was lower than expected when compared to earlier research conducted in different global contexts.^[20,24,26,27] This divergence, particularly in the UAE, might be attributed to the country's proactive approach in terms of preparedness and public awareness. The UAE's effective implementation of pandemic strategies and a robust mass media campaign to disseminate protective measures played a crucial role in minimizing major depression symptoms among HCPs. Additionally, the introduction of tele-assessment services for mental health in the UAE further contributed to addressing psychological ramifications. This suggests that timely and comprehensive interventions, along with robust public education, can mitigate the psychological impact of such crises. The categorization of participants into varying levels of depression severity, from none to severe, highlights the complexity of the psychological impact on HCPs during the pandemic. It resonates with similar categorizations used in previous studies, further emphasizing the need for a nuanced understanding of their experiences. The classification is consistent with previous researches,^[19,20,28,29] who also identified varying levels of depression symptoms among HCPs, reflecting

the multifaceted nature of their psychological responses. The mean score for depression severity (5.3 ± 7.1) aligns with scores from earlier studies, emphasizing the significant psychological challenges faced by HCPs.^[2,6,27,30] In light of these findings, it is crucial to consider the broader context of healthcare system preparedness, the availability of support systems, and public health campaigns when assessing and addressing the mental health of HCPs.

The findings related to anxiety and posttraumatic stress symptoms among HCPs during the COVID-19 pandemic reveal the multifaceted nature of their psychological responses. The results from the GAD-7 scale indicated that while a substantial portion of participants reported no anxiety symptoms (57.1%), a noteworthy percentage displayed varying levels of anxiety. This aligns with previous research, such as a study by AlAteeq *et al.*^[20] (2020) as well as reported in previous review articles,^[6,27] which also reported a range of anxiety symptoms among HCPs during the pandemic. Interestingly, the GAD-7 mean score (5.8 ± 7.0) in this study is in concordance with scores from prior research, highlighting the persistence of anxiety symptoms among HCPs in various global contexts. The classification of participants into those with and without GAD emphasizes the complexity of psychological responses, resonating with similar categorizations in earlier studies.^[9,20,29]

Similarly, the results pertaining to posttraumatic stress symptoms, as categorized into four levels, shed light on the spectrum of psychological experiences among HCPs. A significant proportion of participants (54.4%) reported minimal or no significant PTSD symptoms, while others exhibited varying degrees of posttraumatic stress. This classification reflects the multifaceted nature of the psychological impact of the pandemic, which is in line with the findings in previous literature,^[2,9,20,28,29,31] who reported varying levels of posttraumatic stress symptoms among HCPs. The mean score for posttraumatic stress symptoms (16.7 ± 20.9) in this study aligns with scores in previous research and underlines the significant psychological challenges faced by HCPs. These results underscore the need for a comprehensive understanding of the psychological responses to such crises and the importance of tailored support measures for HCPs.^[2,9,32]

The results of the independent *t*-tests in this study reveal a host of associated factors that significantly impact the mental health of HCPs during the COVID-19 pandemic. Several findings in this study align with existing literature. Notably, individuals who had contracted COVID-19 themselves, had family members infected with the virus, and had family members concerned about transmitting the infection exhibited higher mean

scores for major depression, GAD, and PTSD symptoms. This aligns with previous researches,^[19,20,24,29] which also found that personal and familial exposure to COVID-19 was associated with elevated psychological distress among HCPs. The presence of these stressors reflects the complexity of HCPs' experiences during the pandemic and underscores the importance of tailored mental health support. Moreover, the association between work-related factors and psychological symptoms is consistent with prior literature.^[20,24,28,29] The findings indicate that participants who worked extra hours, a possible indicator of work overload, reported higher mean scores for major depression, GAD, and PTSD symptoms. This reflects the strain placed on HCPs during the pandemic, which has been documented in previous research, such as the study by AlAteeq *et al.*^[20] (2020). Additionally, the presence of psychological support was linked to elevated symptom scores, which may indicate that HCPs with more severe psychological symptoms were more likely to seek and receive support. Notably, factors such as marriage status, workplace setting, and history of chronic medical conditions also exhibited significant associations with major depression, GAD, and PTSD symptoms. These results resonate with research by Elamin *et al.*^[28] (2020) and Abolfotouh *et al.*^[19] (2020), which identified the importance of personal and work-related factors in understanding the psychological well-being of HCPs during pandemics.^[19,28] These findings collectively emphasize the need for comprehensive support systems, including early intervention and tailored mental health resources, to address the diverse challenges faced by HCPs during public health crises.

The results of the one-way ANOVA in this study provide intriguing insights into how various factors influence the psychological well-being of HCPs during the COVID-19 pandemic in the UAE. Occupation played a significant role, with nurses displaying higher mean scores for depression symptoms and GAD symptoms, while physicians exhibited higher levels of perceived PTSD symptoms. These findings align with prior research that has often shown varying degrees of psychological distress among different healthcare professions.^[6,19,24,28] For example, nurses, being at the forefront of patient care, might experience heightened anxiety and depression due to prolonged exposure to critical cases and patient care duties. However, physicians, while not immune to these challenges, may have a different set of stressors related to diagnosis and treatment decisions. The level of education emerged as another influential factor, with participants holding bachelor's degrees reporting higher mean scores for depression, GAD, and PTSD symptoms compared to those with diplomas or postgraduate degrees. This finding may indicate that individuals with higher educational qualifications are more attuned to recognizing and reporting symptoms

of psychological distress. It is also possible that those with advanced degrees have increased responsibilities or roles in the healthcare system, leading to added stress and emotional burden. The department in which HCPs worked, whether in-hospital or prehospital, significantly impacted their psychological well-being. Participants in the ICU experienced higher levels of depression, GAD, and PTSD symptoms compared to their counterparts in various in-hospital departments. This result is consistent with the heightened demands and stress levels typically associated with ICU work.^[2,9,19,24] Additionally, those working in prehospital settings, such as screening centers, reported different symptom profiles. This underscores the distinctive challenges and pressures faced by HCPs in these roles. Age was also identified as a factor influencing the perception of psychological symptoms, with participants between 40 and 49 years of age reporting higher levels of GAD and PTSD symptoms. This aligns with previous literature that has shown how different age groups may experience and cope with stress differently.^[2,7,9] The findings highlight the necessity of personalized support and interventions that consider the unique demands and stressors associated with specific healthcare roles, educational backgrounds, work environments, and age groups.

The study's findings align with prior research, emphasizing the intricate and varied nature of depression, anxiety, and posttraumatic stress symptoms among HCPs in the context of the COVID-19 pandemic. By categorizing participants based on symptom severity, the study contributes to a nuanced understanding of the diverse psychological experiences of HCPs, recognizing the complexity of their responses. These results reinforce the importance of tailored interventions and support systems that acknowledge and address the distinct psychological challenges faced by HCPs during public health crises. Moreover, the current study, in conjunction with existing literature,^[2,6,7,32] strengthens the understanding of the intricate relationship between various factors and the psychological well-being of HCPs amid the COVID-19 pandemic. The findings extend and support the existing body of knowledge, emphasizing the necessity for targeted interventions that account for the interplay of personal, work-related, and contextual factors. This holistic approach is crucial for effectively supporting the mental health of HCPs facing the challenges posed by the ongoing pandemic.

In conclusion, this research provides valuable insights into HF patients' quality of life in Jordan, stressing the importance of education, symptom management, and mental health support. Implementing these findings can enhance care for HF patients not only in Jordan but also globally.

Implementations and Recommendations

This study underscores crucial healthcare implications in Jordan, emphasizing the need for enhanced health education for HF patients, focusing on disease understanding, medication adherence, and lifestyle modifications to enhance their quality of life. Effective communication between HCPs and patients is deemed vital. Additionally, the study stresses the paramount need for tailored mental health support for HCPs, given the prevalence of major depression, GAD, and PTSD symptoms. Proactive measures, including regular mental health check-ins, counseling services, and peer support programs, are recommended to assist HCPs in coping with the unique challenges they face during crises. Moreover, the study underscores the importance of workload management and maintaining a healthy work-life balance. It advocates for healthcare institutions to implement policies restricting excessive working hours and providing support to prevent burnout. Ensuring adequate staffing levels and resources during public health crises is essential for enabling HCPs to fulfill their roles effectively without becoming overwhelmed, aligning with existing literature.^[7,33,34]

Acknowledging the impact of personal and familial exposure to COVID-19 on the mental health of HCPs, institutions should provide individualized support, encompassing specialized counseling, flexible scheduling, and accommodations for those directly affected. The emotional toll on both HCPs and their families should not be underestimated.^[3,6,7,33] Another significant implication of the study is its emphasis on pandemic preparedness. Healthcare institutions should allocate resources for comprehensive training programs focusing on psychological resilience, stress management, and self-care techniques for HCPs. Preparedness plans should encompass the provision of protective equipment and accommodations for staff. A multidisciplinary approach to support, involving collaboration among mental health professionals, medical practitioners, and organizational leaders, is recommended to address the complex interplay of factors influencing HCPs' mental health.^[6,27,33]

Lastly, the study underscores the necessity for further research to investigate the effectiveness of specific interventions and support mechanisms. Longitudinal studies can offer insights into the evolving psychological well-being of HCPs during and after pandemics, facilitating the refinement and adaptation of support strategies. In conclusion, these implications underscore the importance of proactive mental health support, customized interventions, and preparedness strategies to enhance HCPs' psychological well-being during public health crises, enabling them to maintain the

delivery of high-quality care even in challenging circumstances.^[2,6]

Conclusion

This study provides a comprehensive examination of the psychological impact on front-line HCPs in the UAE during the COVID-19 pandemic. The findings reveal the complex interplay of demographic, work-related, and health-related factors in influencing the prevalence of major depression, GAD, and PTSD among these HCPs. The results emphasize the need for tailored mental health support and interventions, acknowledging the diversity in healthcare roles, educational backgrounds, work environments, and age groups. Additionally, the study underscores the importance of preparedness strategies, proactive mental health initiatives, and personalized support mechanisms to mitigate the psychological distress experienced by HCPs during public health crises. By addressing these implications in practice, healthcare institutions can better equip their staff to manage the challenges of pandemics while continuing to deliver high-quality care. Further research is warranted to assess the effectiveness of specific interventions and the evolution of psychological well-being over time, thereby contributing to the ongoing refinement of support strategies for HCPs.

Acknowledgments

The authors are grateful to all the HCPs for participating in the study. We also thank Applied Science Private University for their support. This study is supported via funding from Prince Sattam Bin Abdulaziz University project number (PSAU/2023/R/1445).

Financial support and sponsorship

This study is supported via funding from Prince Sattam Bin Abdulaziz University project number (PSAU/2023/R/1445).

Conflicts of interest

There are no conflicts of interest.

References

1. Chauhan S. Comprehensive review of coronavirus disease 2019 (COVID-19). *Biomed J* 2020;43:334-40.
2. De Pablo GS, Vaquerizo-Serrano J, Catalan A, Arango C, Moreno C, Ferre F, *et al.* Impact of coronavirus syndromes on physical and mental health of health care workers: Systematic review and meta-analysis. *J Affect Disord* 2020;275:48-57.
3. Shreffler J, Petrey J, Huecker M. The impact of COVID-19 on healthcare worker wellness: A scoping review. *West J Emerg Med* 2020;21:1059-66.
4. Abbas Zaher W, Ahamed F, Ganesan S, Warren K, Koshy A. COVID-19 crisis management: Lessons from the United Arab Emirates leaders. *Front Public Health* 2021;9:724494. doi: 10.3389/fpubh.2021.724494.

5. AlQutob R, Moonesar IA, Tarawneh MR, Al Nsour M, Khader Y. Public health strategies for the gradual lifting of the public sector lockdown in Jordan and the United Arab Emirates during the COVID-19 crisis. *JMIR Public Health Surveill* 2020;6:e20478.
6. Sun P, Wang M, Song T, Wu Y, Luo J, Chen L, Yan L. The psychological impact of COVID-19 pandemic on health care workers: A systematic review and meta-analysis. *Front Psychol* 2021;12:626547. doi: 10.3389/fpsyg.2021.626547.
7. Shaukat N, Ali DM, Razzak J. Physical and mental health impacts of COVID-19 on healthcare workers: A scoping review. *Int J Emerg Med* 2020;13:1-8. doi: 10.1186/s12245-020-00299-5.
8. Cheikh Ismail L, Mohamad MN, Bataineh MaF, Ajab A, Al-Marzouqi AM, Jarrar AH, et al. Impact of the coronavirus pandemic (COVID-19) lockdown on mental health and well-being in the United Arab Emirates. *Front Psychiatry* 2021;12:633230. doi: 10.3389/fpsyt.2021.633230.
9. Li Y, Scherer N, Felix L, Kuper H. Prevalence of depression, anxiety and post-traumatic stress disorder in health care workers during the COVID-19 pandemic: A systematic review and meta-analysis. *PloS One* 2021;16:e0246454.
10. Kroenke K, Spitzer RL. The PHQ-9: A new depression diagnostic and severity measure. *Psychiatr Ann* 2002;32:509-15.
11. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: Validity of a brief depression severity measure. *J Gen Intern Med* 2001;16:606-13.
12. Plummer F, Manea L, Trepel D, McMillan D. Screening for anxiety disorders with the GAD-7 and GAD-2: A systematic review and diagnostic metaanalysis. *Gen Hosp Psychiatry* 2016;39:24-31.
13. Sundin EC, Horowitz MJ. Impact of event scale: Psychometric properties. *Br J Psychiatry* 2002;180:205-9.
14. Weiss DS. The effects of systematic variations in information on judges' descriptions of personality. *J Pers Soc Psychol* 1979;37:2121-36.
15. Weiss DS. The Impact of Event Scale: Revised Cross-Cultural Assessment of Psychological Trauma and PTSD. Springer; 2007. p. 219-38.
16. Creamer M, Bell R, Failla S. Psychometric properties of the impact of event scale—revised. *Behav Res Ther* 2003;41:1489-96.
17. Kroenke K, Spitzer RL, Williams JB, Löwe B. The patient health questionnaire somatic, anxiety, and depressive symptom scales: A systematic review. *Gen Hosp Psychiatry* 2010;32:345-59.
18. Yousuf M, Harvey H, Al Sharei A, Albakri K, Alabdallat Y. Patient health questionnaire-9 and generalized anxiety disorders-7: Arabic version reliability in Jordan. *Jordan Med J* 2022;56. doi: 10.35516/jmj.v56i3.362.
19. Abolfotouh MA, Almutairi AF, Ala'a AB, Hussein MA. Perception and attitude of healthcare workers in Saudi Arabia with regard to Covid-19 pandemic and potential associated predictors. *BMC Infect Dis* 2020;20:1-10. doi: 10.1186/s12879-020-05443-3.
20. AlAteeq DA, Aljhani S, Althiyabi I, Majzoub S. Mental health among healthcare providers during coronavirus disease (COVID-19) outbreak in Saudi Arabia. *J Infect Public Health* 2020;13:1432-7.
21. Al Garhy M, Al Dhufairi A, Abdulrahman H, Al Maskari B, Ahmed N, Al Khamashi S, et al. Mental health services during the COVID-19 pandemic in Abu Dhabi, UAE. *Prog Neurol Psychiatry* 2021;25:38-41.
22. Duan L, Zhu G. Psychological interventions for people affected by the COVID-19 epidemic. *Lancet Psychiatry* 2020;7:300-2.
23. Iyengar K, Mabrouk A, Jain VK, Venkatesan A, Vaishya R. Learning opportunities from COVID-19 and future effects on health care system. *Diabetes Metab Syndr* 2020;14:943-6.
24. Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, Li R. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Netw Open* 2020;3:e203976.
25. Al Harthi M, Al Thobaity A, Al Ahmari W, Almalki M. Challenges for nurses in disaster management: A scoping review. *Risk management and healthcare policy*. 2020 Nov 16:2627-34.
26. Que J, Le Shi JD, Liu J, Zhang L, Wu S, Gong Y, et al. Psychological impact of the COVID-19 pandemic on healthcare workers: A cross-sectional study in China. *Gen Psychiatry* 2020;33:e100259. doi: 10.1136/gpsych-2020-100259.
27. Spoorthy MS, Pratapa SK, Mahant S. Mental health problems faced by healthcare workers due to the COVID-19 pandemic—A review. *Asian J Psychiatr* 2020;51:102119. doi: 10.1016/j.ajp.2020.102119.
28. Elamin MM, Hamza SB, Abdalla YA, Mustafa AAM, Altayeb MA, Mohammed MA, et al. The psychological impact of the COVID-19 pandemic on health professionals in Sudan 2020. *Sudan J Med Sci* 2020;15:54-70.
29. Kang L, Ma S, Chen M, Yang J, Wang Y, Li R, et al. Impact on mental health and perceptions of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: A cross-sectional study. *Brain Behav Immun* 2020;87:11-7.
30. Liu Q, Luo D, Haase JE, Guo Q, Wang XQ, Liu S, et al. The experiences of health-care providers during the COVID-19 crisis in China: A qualitative study. *Lancet Global Health* 2020;8:e790-8.
31. Mahendran K, Patel S, Sproat C. Psychosocial effects of the COVID-19 pandemic on staff in a dental teaching hospital. *Br Dent J* 2020;229:127-32.
32. Nicola M, Alsafi Z, Sohrabi C, Kerwan A, Al-Jabir A, Iosifidis C, et al. The socio-economic implications of the coronavirus pandemic (COVID-19): A review. *Int J Surg (London, England)* 2020;78:185-93.
33. Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N, et al. The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *Lancet* 2020;395:912-20.
34. Penedo FJ, Dahn JR. Exercise and well-being: A review of mental and physical health benefits associated with physical activity. *Curr Opin Psychiatry* 2005;18:189-93.