Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.47750/jptcp.2023.30.05.023

Impact of COVID-19 on Health Care Service Provider Practices in Saudi Arabia

Othman AlOmeir[1], Khold Yahya Alahdal[2], Mohammed Alrouji[3], Fahad Algabbani[4], Aljoharah Algabbani[5], Sharif Alhajlah[6], Ghallab AlOtaibi[7], Afnan A Ben Gassem[8], Atallah Alenezi[9], Rakan Bijad Alosaimi[10], Mohamed S. Imam[1,11]

[1]Department of Pharmacy Practice, College of Pharmacy, Aldawadmi, Shaqra University, Shaqra 11961, Saudi Arabia
[2]College of Dentistry, King Saud University, Riyadh, Saudi Arabia
[3]College of Applied Medical Sciences Shaqra, Shaqra University, Shaqra 11961, Saudi Arabia
[4]Department of Family Medicine, Prince Sultan Military Medical City, Riyadh, Saudi Arabia
[5]College of Public Health and Health Informatics, King Saud bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia
[6]Department of Medical Laboratories, College of Applied Medical Sciences, Shaqra University, Shaqra 11961, Saudi Arabia
[7]Department of Pharmaceutical Sciences, College of Pharmacy Aldawadmi, Shaqra University, Shaqra, Saudi Arabia
[8]Department of Pediatric Dentistry and Orthodontics, College of Dentistry, Taibah University, AlMadinah Al-Munawarah, Saudi Arabia
[9]College of Applied Medical Sciences, Shaqra University, Shaqra 11961, Saudi Arabia
[10] King Saud Medical City, Saudi Arabia, Riyadh, 19976
[11]Clinical Pharmacy Department, National Cancer Institute, Cairo University, Egypt
***Corresponding author:** Othman AlOmeir, Department of Pharmacy Practice, College of Pharmacy, Aldawadmi, Shaqra University, Shaqra 11961, Saudi Arabia, Email: O.k.alomeir@gmail.com

Submitted: 14 January 2023; Accepted: 18 February 2023; Published: 11 March 2023

ABSTRACT

Background: Both healthcare personnel and patients have been impacted negatively by the COVID-19 epidemic, which has had a substantial effect on the healthcare sector. The healthcare workforce consists of physicians, nurses, and other healthcare professionals. Objectives: To assess the psychological impact of COVID19 pandemic among different healthcare providers by assessing the depression, stress level, and anxiety related to COVID19 pandemic and the effect it had on their practice and psychological well-being.

Methodology: To learn more about the experiences of healthcare professionals and to ascertain the effects of COVID-19 on their practice, a cross-sectional observational study including 311 practicing physicians, pharmacists, nurses, dentists, lab technicians, and other hospital staff members was carried out across Saudi Arabia. A pretested semi-structured QuestionPro questionnaire that was sent electronically via social media, email, and phones was used to collect responses from study participants. It was cleaned up before being examined with SPSS program 28. Frequency and percentage displays were used to illustrate quantitative data. Spearman's correlation was used to calculate the association between stress score, anxiety score, and depression score. Appropriate statistical tests of significance were used to determine the association between stress scores and various background characteristics. Statistical significance was set at the 0.05 level for P-value.

J Popul Ther Clin Pharmacol Vol 30(5):e238–e248; 11 March 2023.

Results: Over half of the medical staff had expertise in caring for COVID-19 patients, and approximately two out of every five trial participants had a history of COVID-19 infection previous to immunisation. The vaccine could minimise the infection, according to 3/4 of them. Among those surveyed, just 33% had a history of chronic diseases. The majority of participants believed they had dealt with difficult events at some time in the preceding week for all of the categories. Similar to this, depression was sometimes experienced for 4 items but never for 3 when there were the most participants. It could be deduced that the majority of participants had normal Anxiety (33.8%), Stress (36%), and Depression (38.6%) scores. The median psychological assessments were considerably higher among those who were between the ages of 35 and 56, divorced, were already infected with the COVID-19 virus previous to immunisation, and had a history of chronic disease.

Conclusion: The study's findings led to the conclusion that stress and anxiety are significant COVID-19 effects on both healthcare professionals and patients. The epidemic has also highlighted the significance of the need for appropriate safety equipment, practices, and support for the physical and mental well-being of medical personnel.

Keywords: *COVID-19, Health care providers, Practices, Stress, Anxiety*

INTRODUCTION

The healthcare sector has been profoundly affected by the COVID-19 outbreak, affecting both healthcare providers and patients alike. Doctors, nurses, pharmacists, dentists, lab technicians, and other healthcare workers make up the healthcare workforce. These health providers have been working hard to control COVID-19. In the current COVID scenario, healthcare providers are operating in emergency mode all the time. They have a significant risk of getting sick and could later spread the sickness to their family.(1) The already precarious concerns for the mental health of healthcare professionals had gotten worse during the several pandemic waves due to increasing infection rates, poor personal protective equipment, and a scarcity of hospital beds. Burnout was occurring among healthcare providers at frightening rates of 35%-54% even before the COVID-19 outbreak.(2) When the pandemic swept the world, healthcare providers were faced with unprecedented challenges in caring for patients, challenges such as; limited resources and high demand for services are the norm, but dealing with them while still lacking a proper understanding of the virus or seeing an end to the pandemic were especially difficult challenges.

Healthcare providers may experience psychological strain as a result of the factors listed above.(3)(4) According to the reviewed research, HCWs (health care workers) who work in ERs, screening clinics, isolation wards, and ICUs are at a higher risk of contracting and spreading infections and are more likely than those in other departments to experience negative psychiatric outcomes. This finding may be related to the fact that these HCWs are either directly or indirectly exposed to patients who may be infected and that their jobs are very demanding.(5)(6) These issues have been shown to range from delirium, psychosis, and even suicidal ideation to anxiety, sadness, somatic complaints, post-traumatic stress disorder (PTSD) symptoms, and panic attacks.(7)(8)

There are few studies reporting on the psychological evaluation of healthcare professionals who are working to manage SARS-CoV2 in the Saudi context. In order to evaluate the workers in the healthcare industry and their psyches participating in the SARS-CoV2 pandemic and to search for relevant characteristics, we have designed this study.

With a focus on the difficulties and changes they encountered during this time; this research project attempts to analyse how the COVID-19 pandemic affected healthcare providers' practice focusing specifically on mental issues.

OBJECTIVES

Examining the mental health effects of the widespread COVID19 epidemic among medical personnel including physicians, pharmacists,

dentists, nurses, and lab technicians among others. By assessing the anxiety stress level, and depression related to COVID19 pandemic and finding out any association of these with the sociodemographic characteristics of the participants.

METHODOLOGY

An observational cross-sectional study was conducted among 311 practicing physicians, pharmacists, dentists, nurses, lab technicians, and others in healthcare settings in Saudi Arabia from August 2021 - January 2022. The purpose of which is to investigate the perspectives of healthcare professionals and to find out the impact of COVID-19 on their practice. All healthcare providers practicing in Saudi Arabia during the pandemic of COVID-19 were included as the study population. The responses from study participants were taken via a pretested semi-structured questionnaire in the form of a QuestionPro link that was circulated electronically via social media, emails, and texts. The first part of the questionnaire was the consent to participate in the study. Those who gave consent were taken to the next page of the questionnaire which had the following sections- background characteristics of the health professionals which apart from demographic profile included questions about any exposure to handling COVID-19 patients and history of attending any mental health education session. The next section of the questionnaire was about the impact of COVID-19 on healthcare professionals' practice which was a 21-item impact-based assessment questionnaire based on DASS21.

DASS scale is a self-report questionnaire consisting of 21 questions that is used to assess depression, anxiety, and stress in adults. For each emotional state, 7 items are assigned (items 3, 5, 10, 13, 16, 17, 21 are used to assess depression, Items 2, 4, 7, 9, 15, 19, 20 for anxiety, Items 1, 6, 8, 11, 12, 14, 18 for stress assessment.). Every item on a range from 0 (did not apply at all) to 3 is scored by the patients (applied to me very much). The scores on the elements per (sub)scale are added together to create the sum scores, which are then multiplied by a factor of 2. Sum scores for the DASS-total scale can therefore vary from 0 to 120, and those for each of the subscales can range from 0 to 42. The depression subscale and the total DASS score have cut-off values of 60 and 21, respectively. Ratings of 60 or less on the DASS-total and 21 or less on the depression subscale are categorised as "high" or "severe". Thus, rating is categorized into Normal, Mild, Moderate, Severe, Extremely severe.(9)

The data generated by the online survey was extracted in the form of a Microsoft spreadsheet. It was cleaned and then analysed using SPSS software version 28. Quantitative statistics and percentages were used to illustrate the frequency and significance of variables between stress score, anxiety score, and depression score were calculated using spearman's correlation while the association between stress score and various background characteristics were derived using the appropriate statistical test of significance. Statistical significance was assumed to exist at the 0.05 level.

RESULTS& OBSERVATIONS

TABLE 1: Personality traits of health care practitioners [N=311]

Background characteristics	Count (n)	Proportion (%)
Age categories (in years)		
24-34	198	63.7 %
35-45	67	21.5 %
46-56	36	11.6 %
Above 57	10	3.2 %
Gender		
Female	170	54.7 %
Male	141	45.3 %
Marital Status		

J Popul Ther Clin Pharmacol Vol 30(5):e238–e248; 11 March 2023.

Divorced	25	8.0 %
Married	130	41.8 %
Single	156	50.2 %
Children		
No	180	57.9 %
Yes	131	42.1 %
Profession		
Dentist	22	7.1 %
Lab Technician	22	7.1 %
Nurse	169	54.3 %
Other	53	17.0 %
Pharmacist	22	7.1 %
Physician	23	7.4 %
Experience in handling any COVID-19 patients		
No	139	44.7 %
Yes	172	55.3 %
Received any mental health education since the start of the pandemic		
No	107	34.4 %
Yes	204	65.6 %
History of infection with COVID-19 before getting the vaccination		
No	172	55.3 %
Yes	139	44.7 %
Faith in the vaccine's ability to reduce mortality, when the vaccines were first introduced		
No	85	27.3 %
Yes	226	72.7 %
History of chronic health condition		
No	208	66.9 %
Yes	103	33.1 %

The study comprised of 311 participants. About three-fifths of the participants were 24-34 years age group. The participation from male and female was almost equal; with a little higher participation of females (170, 54.7%). Almost half of the participants were single and nurses by profession. More than half of the healthcare professionals had an experience handling COVID-19 patients and almost every 2 participants out of 5 had a history of infection with COVID-19 before getting vaccinated. Three-fourths of them had faith in the vaccine's ability to reduce the infection. Most of the participants had received mental health education since the start of the pandemic. Only 33% had a history of chronic health conditions. [Table 1]

TABLE 2: Effects of the COVID-19 pandemic on the distribution of healthcare workers

Impact-based assessment questionnaire	**Count (n)**	**Proportion (%)**
It was difficult for me to unwind		
0	68	21.9 %
1	135	43.4 %
2	83	26.7 %
3	25	8.0 %
I noticed that my mouth was dry		
0	68	21.9 %
1	85	27.3 %
2	96	30.9 %
3	62	19.9 %

There didn't appear anything particularly good about me at all		
0	95	30.5 %
1	89	28.6 %
2	90	28.9 %
3	37	11.9 %
I was having trouble breathing (e.g., excessively rapid breathing, breathlessness in the absence of physical exertion)		
0	82	26.4 %
1	97	31.2 %
2	90	28.9 %
3	42	13.5 %
It was challenging for me to get the motivation to take action		
0	77	24.8 %
1	109	35.0 %
2	78	25.1 %
3	47	15.1 %
I have a tendency to overreact to things		
0	74	23.8 %
1	103	33.1 %
2	97	31.2 %
3	37	11.9 %
I started to tremble		
0	103	33.1 %
1	85	27.3 %
2	80	25.7 %
3	43	13.8 %
I felt that my anxious energy was being expended heavily		
0	65	20.9 %
1	99	31.8 %
2	97	31.2 %
3	50	16.1 %
I was concerned that I would get flustered and act foolishly in certain circumstances		
0	92	29.6 %
1	100	32.2 %
2	71	22.8 %
3	48	15.4 %
I thought I didn't have anything to look forward to		
0	94	30.2 %
1	101	32.5 %
2	73	23.5 %
3	43	13.8 %
I saw I was becoming irritated		
0	95	30.5 %
1	99	31.8 %
2	80	25.7 %
3	37	11.9 %
Relaxation was challenging for me		
0	72	23.2 %
1	104	33.4 %
2	87	28.0 %
3	48	15.4 %
I was depressed and blue		

0	102	32.8 %
1	92	29.6 %
2	80	25.7 %
3	37	11.9 %
Everything that prevented me from moving on with what I was doing, I found intolerable		
0	85	27.3 %
1	118	37.9 %
2	73	23.5 %
3	35	11.3 %
I thought I was about to panic		
0	87	28.0 %
1	106	34.1 %
2	69	22.2 %
3	49	15.8 %
I couldn't find anything to be excited about		
0	86	27.7 %
1	110	35.4 %
2	75	24.1 %
3	40	12.9 %
I believed my value as a person was really low		
0	115	37.0 %
1	88	28.3 %
2	71	22.8 %
3	37	11.9 %
I perceived myself to be rather sensitive		
0	93	29.9 %
1	94	30.2 %
2	79	25.4 %
3	45	14.5 %
Even when I wasn't physically active, I could still feel my heartbeat (e.g., sense of heart rate increase, heart missing a beat)		
0	89	28.6 %
1	94	30.2 %
2	84	27.0 %
3	44	14.1 %
I experienced fear for no apparent cause		
0	92	29.6 %
1	99	31.8 %
2	66	21.2 %
3	54	17.4 %
I believed that life had no purpose		
0	93	29.9 %
1	96	30.9 %
2	83	26.7 %
3	39	12.5 %

0 Never, 1 Sometimes 2 Often 3 Almost always

TABLE 3: Healthcare workers suffering from depression, anxiety, and stress. [N= 311]

	Stress Score		**Anxiety Score**		**Depression Score**	
	n	%	n	%	n	%
Median score (IQR)	18 (12)		18 (12)		18 (14)	
Normal	112	36.0 %	105	33.8 %	120	38.6 %
Mild	50	16.1 %	54	17.4 %	44	14.1 %
Moderate	82	26.4 %	76	24.4 %	85	27.3 %
Severe	52	16.7 %	60	19.3 %	52	16.7 %
Extremely Severe	15	4.8 %	16	5.1 %	10	3.2 %

The stress was assessed using 7 items. For all of the items, the majority of participants felt they had experienced stressful situations at some point in the previous week. Similarly, out of 7 anxiety-related situations, 5 were experienced occasionally by most participants and one item was experienced never or frequently by most participants.

Similarly, for the maximum number of participants, depression was occasionally felt for 4 items and never for 3 items. [Table 2]

Based on table 3 it could be deduced that most of the participants had normal Anxiety (33.8%), Stress (36%), and Depression scores (38.6%).

TABLE 4: Correlation matrix between Anxiety Score, Stress Score, and Depression Score

		Stress Score	**Anxiety Score**
Anxiety Score	Spearman's rho	0.655	—
	p-value	< .001	—
Depression Score	Spearman's rho	0.715	0.742
	p-value	< .001	< .001

The correlation coefficient reflects that the correlation between every two psychological scores is significantly strong and positively correlated with each other. [Table 4]

TABLE 5: Correlations between healthcare workers' psychological test scores and background variables [N=311]

Background characteristics		**Stress score**			**Anxiety Score**			**Depression Score**		
	N	**Median**	**IQR**	**P-value**	**Median**	**IQR**	**P-value**	**Median**	**IQR**	**P-value**
Age categories (in years)										
24-34	198	16	12	0.046	18	14	0.005	16	14	< .001
35-45	67	20	12		22	12		20	11	
46-56	36	20	8		22	10		22	10	
Above 57	10	18	9		23	6.5		22	5.5	
Gender										
Female	170	18	12	0.256	18	12	0.782	18	14	0.569
Male	141	20	12		20	14		18	12	
Marital Status										
Divorced	25	22	6	0.044	26	10	0.004	24	8	0.004

Married	130	18	12		18	14		18	16	
Single	156	18	12		18	12		16	14	
Children										
No	180	18	12	0.223	18	12	0.145	16	14	0.438
Yes	131	20	11		20	12		20	12	
Profession										
Dentist	22	22	8.5	0.141	23	9.5	0.824	20	11.5	0.153
Lab Technician	22	19	13.5		21	15		20	13	
Nurse	169	18	12		18	12		16	12	
Other	53	20	10		20	10		20	12	
Pharmacist	22	20	9		18	11		20	7.5	
Physician	23	18	10		18	15		18	18	
Experience of handling any COVID-19 patients										
No	139	18	12	0.132	18	14	0.482	16	16	0.279
Yes	172	20	12		18	10.5		18	12	
Received any mental health education since the start of the pandemic										
No	107	18	12	0.511	16	15	0.012	16	14	0.016
Yes	204	18	10		20	12		20	12	
History of infection with COVID-19 before getting the vaccination										
No	172	16	12	< .001	16	16.5	< .001	14	16	< .001
Yes	139	22	10		20	10		20	9	
Faith in the vaccine's ability to reduce mortality, when the vaccines were first introduced.										
No	85	20	10	0.057	20	12	0.091	20	12	0.069
Yes	226	18	12		18	14		17	16	
History of chronic health condition										
No	208	18	12.5	0.007	18	14	0.001	16	16	< .001
Yes	103	20	8		22	10		20	9	

Significantly higher median psychological scores were associated with those aged between 35 to 56 years, divorced participants, those who had a history of COVID-19 infection before getting vaccinated, and those who had a history of chronic disease. It is to be emphasized that although insignificant, those who had faith in the vaccine's ability to reduce mortality when the vaccines were first introduced had lower stress, anxiety, and depression scores. It was also observed that those had attended mental health programs had lower anxiety and depression median scores. However, the stress score was comparable irrespective of the mental health program.

DISCUSSION

Examining how COVID-19 is influencing medical procedures, an observational cross-sectional study including 311 practicing physicians was conducted. Male and female involvement in the study was practically equal, with female participation being slightly greater (170, 54.7%). The majority of participants—nearly half—were single nurses. Nearly two out of every five participants had a history of COVID-19 infection prior to vaccination, and more than half of medical personnel had experience caring for COVID-19 patients. Three-fourths of them believed that the vaccine could lessen the infection. Since the pandemic's beginning, the majority of the participants had received mental health education. Only 33% of people had a history of chronic illnesses. The tension was assessed using 7 items. For all of the items, the majority of participants felt they had experienced stressful situations at some point in the previous week. Similar to this, 5 of the 7 anxiety-related scenarios were encountered infrequently by most individuals, while 1 item was never or regularly experienced by most participants. Similar to this, when there were the most participants, depression was occasionally experienced for 4 items but never for 3. The majority of subjects had normal Anxiety (33.8%), Stress (36%), and Depression (38.6%)

scores. Participants who were between the ages of 35 and 56, were divorced, had a transmission of COVID-19 prior to vaccination, and had a history of chronic disease all had significantly higher median psychological ratings. It should be highlighted that although not statistically significant, individuals who believed in the vaccine's capacity to reduce mortality at the time of its introduction scored lower on measures of stress, anxiety, and depression. Additionally, those who had participated in mental health programs had median anxiety and sadness scores that were lower. The stress score, however, was comparable regardless of the mental health program.

Ali Azeez Al-study Jumaili's states that the authors got 430 surveys from HCPs covering 14 provinces. 60 percent of the participants were involved in the diagnosis or care of COVID-19 cases. More than 80% felt that the stress and infectious disease risk was significant during the COVID-19 pandemic. In addition, during the COVID-19 incident, 85.9% of the HCPs expressed anxiety about putting the lives of their loved ones at peril for their profession. Compared to other HCPs, HCPs working in a context dealing with the diagnosis and treatment of COVID-19 cases reported significantly more concerns for their own and their families' safety. HCPs who work during the COVID-19 pandemic suffer from poor mental and physical health, as well as a stressful work environment. In order to help HCPs cope, social and emotional support are necessary.(10)It was also high (64% of the HCPs experienced stress while 66.2% experienced anxiety) in the present study which reflects a constantly high-stress anxiety and depression among the HCPs dealing with COVID19.

Another analysis by Ray Moynihan found 3097 distinct references, 81 studies from 20 different nations, and information on over 11 million services prior to the pandemic and 6.9 million services during the epidemic. There were 143 estimates of changes for the primary outcome, with an overall median service reduction of 37% (IQR: 51% to 20%). This included median reductions for visits of 42% (IQR: 53% to 32%), admissions of 28% (IQR: 40% to 17%), diagnostics of 31% (IQR: 53% to 24%), and therapeutics of 30% (IQR: 57% to 19%). There were 60 estimates from 35 studies reporting secondary outcomes; 27 (45%) reported greater usage reductions among patients with a lesser spectrum of illness, whereas 33 (55%) reported no difference. During the pandemic, healthcare use declined by about a third, with wide variations and bigger declines among those with less severe illnesses. Studies on the health effects of reductions may help health systems avoid wasteful care in the post-pandemic recovery while still addressing unmet needs, which remains a top goal.(11) Meanwhile our study didn’t explore any such reduction in services post-pandemic.

Katherine Bernacki Four conducted a qualitative investigation, and the following fundamental themes emerged: first, the risk of COVID-19 may shift depending on where you live; second, isolation has unintended consequences; third, telehealth exists in a different dimension; and fourth, COVID-19 is undermining the foundation of healthcare. Each theme contained a number of ideas that were affected by various cultural, social, and psychological aspects. Throughout the "universal" care pathway, the effects of COVID-19 were apparent at many times of care, including diagnosis, initial screening, treatment initiation/surgery, expert referral, and care. Care for patients may be improved in the future if we have a better grasp of the short- and long-term consequences of COVID-19 and the accompanying care gaps.(12) Although the present study didn’t investigate these qualitatively yet it was able to infer the majority of the HCPs encountered the long term effects and those who had participated in mental health programs had somewhat lower anxiety and sadness scores.

Seven themes came out of a similar qualitative investigation conducted by Shaharior Rahman Razu. Participants reported experiencing higher workloads, mental agony, inadequate personal protective equipment (PPE), social marginalisation and/or marginalisation, a lack of rewards, a lack of coordination, and bad management throughout their participation. Because of the circumstances and organisational reasons, these healthcare professionals had trouble handling these issues.(13)(14) They claimed that having faith in God and helping one

another out were the keys to overcoming difficulties. For a better overall health outcome during the pandemic, healthcare personnel must have adequate support to manage the challenges they face. The results reflect the typical difficulties faced by medical personnel during the COVID-19 outbreak. This suggests the necessity for proper safety supplies, procedures, and support for the medical professionals' physical and emotional health.(15) These findings in the present study were also akin to the participants in our study too who felt scared, touchy, and emotionally labile.

According to Nishtha Gupta and Meera Dhuria et al's research, the COVID-19 pandemic is a healthcare emergency that has had an unanticipated effect on healthcare systems.(16)(17) In the midst of this extraordinary outbreak, medical personnel caring for COVID-19 patients face a variety of challenges. Recent studies have focused on the mental health and well-being of healthcare professionals due to the prevalence of burnout, psychological stress, and suicide within this profession (HCWs). Negative effects include increased rates of illness and death, severe financial difficulty, stress related to both known and especially unknown information, and anxiety about the future impact of the situation. Some studies concentrated exclusively on the effect of COVID-19 on HCW sleep. Significant increases in stress and anxiety had a negative impact on sleep quality and self-efficacy. Drug use is significantly influenced by stress. Investigating the factors that are linked to psychological distress, which might result in anxiety or depressive symptoms or spark suicidal thoughts, is important. Controlling the modifiable elements is also important. Due to the fact that negative mental health conditions will worsen as the disease progresses, increasing clinicians' understanding of mental health issues and conducting more in-depth studies over the long term is essential.(18)

CONCLUSION

It was concluded from the study that the pandemic COVID-19 has put an impact on the health of every individual around the globe along with an impact on the practices of providing health care. The scenario has changed entirely after the pandemic. Stress and anxiety have an important place among the effects of COVID-19 on medical professionals as well as patients. Also, the importance of the necessity for proper safety supplies, procedures, and support for medical professionals' physical and emotional health has come out of the pandemic.

CONFLICT OF INTEREST

Nil

Ethics Approval

This research project received ethical approval from the University of Shaqra Ethics Research Committee under the ERC no. ERC_SU_20210049.

ACKNOWLEDGEMENTS

The authors extend their appreciation to the Deputyship for Research & Innovation, Ministry of Education in Saudi Arabia for funding this research work through the project number (IFP2021-091).

REFERENCES

1. Shekhar S, Ahmad S, Ranjan A, Pandey S, Ayub A, Kumar P. Assessment of depression, anxiety and stress experienced by health care and allied workers involved in SARS-CoV2 pandemic. J Family Med Prim Care. 2022 Feb;11(2):466–71.
2. Verma AK, Ayub A, Singh GP, Kumar A. Resilience related to novel coronavirus among doctors and undergraduate medical students-A study from India. J Educ Health Promot. 2022;11:350.
3. Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, et al. Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. JAMA Netw Open. 2020 Mar 23;3(3):e203976.
4. Maunder R, Hunter J, Vincent L, Bennett J, Peladeau N, Leszcz M, et al. The immediate psychological and occupational impact of the 2003 SARS outbreak in a teaching hospital. CMAJ. 2003 May 13;168(10):1245–51.
5. Bai Y, Lin CC, Lin CY, Chen JY, Chue CM, Chou P. Survey of stress reactions among health care workers involved with the SARS outbreak. Psychiatr Serv. 2004 Sep;55(9):1055–7.

6. Chua SE, Cheung V, Cheung C, McAlonan GM, Wong JWS, Cheung EPT, et al. Psychological effects of the SARS outbreak in Hong Kong on high-risk health care workers. Can J Psychiatry. 2004 Jun;49(6):391–3.
7. Hall RCW, Hall RCW, Chapman MJ. The 1995 Kikwit Ebola outbreak: lessons hospitals and physicians can apply to future viral epidemics. Gen Hosp Psychiatry. 2008;30(5):446–52.
8. Tucci V, Moukaddam N, Meadows J, Shah S, Galwankar SC, Kapur GB. The Forgotten Plague: Psychiatric Manifestations of Ebola, Zika, and Emerging Infectious Diseases. J Glob Infect Dis. 2017;9(4):151–6.
9. Depression Anxiety Stress Scales (DASS) [Internet]. [cited 2023 Mar 2]. Available from: https://www.psytoolkit.org/survey-library/depression-anxiety-stress-dass.html
10. Al-Jumaili AA, Al-Fatlawi BG, Al-Jalehawi AK, Al-Hamadani FY, Alsawad OS. Impact of COVID-19 pandemic on healthcare providers: save the frontline fighters. International Journal of Pharmacy Practice. 2021 Aug 11;29(4):369–75.
11. Moynihan R, Sanders S, Michaleff ZA, Scott AM, Clark J, To EJ, et al. Impact of COVID-19 pandemic on utilisation of healthcare services: a systematic review. BMJ Open. 2021 Mar;11(3):e045343.
12. Bernacki K, Keister A, Sapiro N, Joo JS, Mattle L. Impact of COVID-19 on patient and healthcare professional attitudes, beliefs, and behaviors toward the healthcare system and on the dynamics of the healthcare pathway. BMC Health Serv Res. 2021 Dec;21(1):1309.
13. Razu SR, Yasmin T, Arif TB, Islam MdS, Islam SMS, Gesesew HA, et al. Challenges Faced by Healthcare Professionals During the COVID-19 Pandemic: A Qualitative Inquiry From Bangladesh. Front Public Health. 2021 Aug 10;9:647315.
14. Problems associated with usage of PPE Kits during COVID19 pandemic : Experience of Healthcare workers of a tertiary care center from Eastern India. European Journal of Molecular & Clinical Medicine. 2022 May 31;9(3):6133–44.
15. Razu SR, Yasmin T, Arif TB, Islam MdS, Islam SMS, Gesesew HA, et al. Challenges Faced by Healthcare Professionals During the COVID-19 Pandemic: A Qualitative Inquiry From Bangladesh. Front Public Health. 2021 Aug 10;9:647315.
16. Gupta N, Dhamija S, Patil J, Chaudhari B. Impact of COVID-19 pandemic on healthcare workers. Industrial Psychiatry Journal. 2021 Oct 1;30(3):282.
17. Dhuria1 M, Ayub2 A, Kumar3 A, Ahmad4 S, Kumar5 P. Is India Ready to Address COVID-19 Like Pandemics: A Perspective From Existing Public Health Acts. Indian Journal of Public Health Research & Development. 2020 Oct 21;11(11):119–25.
18. Gupta N, Dhamija S, Patil J, Chaudhari B. Impact of COVID-19 pandemic on healthcare workers.