

The impact of the covid-19 pandemic on the stress, mental state, coping responses and resilience of health care workers in Dammam, Kingdom of Saudi Arabia

Wadha D. Al Otaibi ¹, Sahar A. Al Yami¹

¹ IVF Department, Maternity and Children Hospital, Dammam, Eastern Province, Kingdom of Saudi Arabia

Abstract

Introduction

The authors attempted to elucidate the occurrence of stressful conditions among health care workers in the city of Dammam, Saudi Arabia, caused by the COVID-19 pandemic.

Subjects and Methods

A cross-sectional survey was performed by distributing the questionnaire to all categories of the healthcare community directly or indirectly involved with patients affected by COVID-19. Institutional ethics approval was obtained from the Institutional Ethics Committee of the Maternity and Children Hospital (MCH), Dammam. Data were analyzed statistically.

Results

The majority of respondents were between the ages of 30-40 (62.1%); 92.5% were females, 68% were nurses, which was significantly higher than physicians (2.8%) as well as other health care workers, and 77.5% were married. About 70% of the respondents reportedly suffer from depression related to COVID-19 ($p < 0.0001$). A significant proportion (81.8%, $n=207$; $p < 0.0001$) of the respondents are afraid to go home due to their fear of infecting members of their family. A vast majority of the respondents suffer from anxiety (69.6%, $p < 0.0001$) induced by the pandemic or when handling febrile patients (77.5%). Almost half the respondents (48%) resorted to reading or listened to recitation of the Holy Quran, 22% listened to music, 19% practiced unspecified meditation and 11% listed a range of numerous means of recreation in an effort to cope with the stress related to the COVID-19 pandemic. All these findings were statistically significant ($p < 0.0001$).

Discussion and Conclusion

The COVID-19 pandemic exerts significant psychological stress on health care workers. Although most health care workers on the surface appear to cope and be resilient in the face of the enormous stresses that they had to endure as a consequence of the conditions related to the COVID-19 pandemic, their predicament highlights the need for appropriate psychological support, especially for those on the frontline.

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Correspondence: Wadha D. Al Otaibi; email: moon51171@hotmail.com

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Introduction

The World Health Organization (WHO) assessed the COVID-19 outbreak as a pandemic on the 11th of March 2020 after a surge in the number of infections and deaths reported worldwide (WHO, 2020). The disease surfaced in December 2019 in Wuhan, China as a cluster of pneumonia cases of unknown etiology, which grew to 201 cases by January 2020 (Tan et al., 2020). Of considerable interest to the healthcare community was the possible emergence of COVID-19 as a mutation of a bat-

borne coronavirus, which was predicted as a causative agent for the next potential outbreak of disease by Chinese medical scientists working in the city of Wuhan, the epicenter of the outbreak 10 months earlier (Fan et al., 2019). It appears plausible that their warning was not taken seriously, and as a consequence the world lost the unique opportunity to contain the disease before it progressed into the current pandemic.

COVID-19 belongs to the coronavirus family, which can cause respiratory infections in humans that resemble the common cold, as well as lethal illness similar to that associated with Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS) (Carver and Phillips, 2020). The aforementioned two novel fatal coronaviruses emerged periodically in different areas; Severe Acute Respiratory Syndrome coronavirus (SARS-CoV) in 2002 in East Asia and Middle East Respiratory Syndrome coronavirus (MERS-CoV) in 2012 in the Middle East. Given the high prevalence and wide distribution of coronaviruses, the genetic diversity and frequent recombination of genomes, as well as increasing human and animal activities, novel coronaviruses are likely to emerge periodically in humans owing to frequent cross-species infections and occasional spillover events (Cui et al., 2019; Wong et al., 2018). Coronaviruses are enveloped, positive-sense, single stranded RNA viruses that are distributed broadly among humans, other mammals, and birds, which cause respiratory, enteric, hepatic, and neurologic diseases (Weiss and Leibowitz, 2011). Six coronavirus species are known to cause human disease. Four viruses including hCoV-229E, OC43, NL63, and HKU1 are prevalent and typically cause mild respiratory diseases (Su et al., 2016). The symptoms of the new respiratory syndrome coronavirus 2 (SARS-CoV-2, or COVID-19), can be fever, cough, tiredness, body pain, nasal congestion, headache, and conjunctivitis, but can also include pneumonia, acute respiratory syndrome, kidney failure, and death. Epidemiologic data suggests that transmission is caused by droplets expelled during face-to-face exposure, with the most common mode of transmission being sneezing. The present severe acute respiratory syndrome from coronavirus 2 (SARS-CoV-2) has been reported to have more severe transmissibility than SARS-COV (Liu et al., 2020), and thus frontline medical staff are at a remarkably high health risk. Data has shown that prolonged contact within 6 feet to an infected individual for at least 15 minutes is associated with a high risk of transmission, as well as briefer exposures to symptomatic (e.g., actively coughing) persons (Carver and Phillips, 2020; Lechien et al., 2020; WHO, 2020; Wiersinga et al., 2020).

In a pandemic scenario, the healthcare industry faces the most challenges, as health care workers are confronted by a hazardous work environment when unexpectedly confronted with a previously unknown and highly virulent contagion such as the COVID-19 virus, which research has found to linger in contact surfaces in hospital rooms of infected patients (Chia et al., 2020). Under normal conditions, the health care worker is constantly exposed to health and safety hazards, from biological exposures to disease-causing organisms and hazardous chemicals, in the course of performing their routine duties.

The first case of COVID-19 was reported in Saudi Arabia on the 3rd of March 2020 (Hasounah et al., 2020). Several studies have looked at the psychological impact the pandemic has had on the general public (AlKhamees et al., 2020; AlHumaid et al., 2020). The authors attempted to elucidate the occurrence and level of anxiety among health care workers in the city of Dammam, Saudi Arabia between July and August 2020 as a measure of the negative impact of COVID-19. The taxonomy of COVID-19 virus has been described (Cui et al.2019).

Subjects and Methods

Ethics approval

Institutional ethics approval was obtained from the Intuition Ethics Committee of the Maternity and Children Hospital (MCH), Dammam.

Participants

This study was carried out between July 26th to August 25th, 2020, until the target sample size of 253 was attained. While every effort was made to approach every health care worker, the methodology involved a voluntary survey. Participants were requested to fill an anonymous online questionnaire that was distributed to them via social networks. Data collection commenced five months after the first cases of COVID-19 were confirmed in Saudi Arabia.

Survey sample population

The survey included both males and female health care providers who could read, write, and comprehend Arabic, and working in the various government-funded hospitals and health centers based in Dammam, Saudi Arabia, at the time of the study. The authors targeted all health care

workers, which included doctors, nurses, emergency medical service staff, assistants, technicians, and laboratory workers. The required sample size was estimated by the MCH Biostatistician. The recommended sample power was determined to be 253.

Method

An online questionnaire was distributed in both English and Arabic to participants via social networks (see Questionnaire 1).

Data collection

The data was collected online or via social media.

Statistical analysis

Based on the data accrued from the survey, descriptive statistics were performed using SPSS and MedCalc™ statistical software to examine participants' experience of anxiety and strenuous psychological sequelae as a direct consequence of their professional exposure to COVID-19. The authors performed a hierarchical regression analysis to examine the effect of COVID-19 on the participants' demographic characteristics (e.g., age, sex, and marital status) and psychological characteristics (e.g., depression, anxiety, and stress).

Measures

The survey comprised of measures pertaining to age, current level of anxiety and depression experienced with all its various traits and characteristics.

Results

Demography of the respondents

Majority of respondent are between the ages of 30-40 (62.1%) which is significantly higher comparable to other age groups ($p<0.0001$). This was followed by participants between 20 to 30 years of age (19.8%) and 40 to 50 years of age (15.8%). The response from those above 50 was poor (Chart 1a). Most respondents are significantly ($p<0.0001$) females, 92.5%, and only 7.5% are males (Chart 1b). Of the health care providers, 68% of the sample set were nurses, which was significantly higher ($p<0.0001$) than the physicians (2.8%) as well as other Health care workers (Chart 1c). About 77.5% are married participants which was significantly higher than unmarried health care workers (22.5%; $p<0.0001$; Chart 1d).

Almost half the respondents (45.5%) had 10 to 20 years of experience in the healthcare industry while a third (35.8%) have 5 to 10 years. There was no significant difference between these two groups. However, these two groups were significantly higher ($p<0.0001$) compared to those with over 20 years (7.5%) of work experience (Chart 2). More than half the respondents (55.7%) work on a rotational basis while those working morning or day shifts were (40.7%) which was significantly higher ($p<0.0001$) than those who work only night shifts (3.6%; Chart 3). There was also a significant difference ($p<0.0007$) between the latter two groups. Almost all the respondents are interested in their vocation whereas 6.7%, which was significant ($p<0.0001$), are not (Chart 4).

COVID-19-related worries

81.8% ($n=207$) of health care workers reported being worried about carrying the virus and infecting family members with COVID-19. The survey demonstrated a pattern of the majority of health care workers worldwide feeling more concern about others in their social sphere than their own well-being. Older health care workers reported worrying more about themselves than their younger family members. This can be attributed to the high morbidity and high mortality rate of the virus for older individuals. As shown in the table below, the unprecedented events that arose due to the COVID-19 pandemic caused 25.3% ($n= 64$) of the participants to experience anxiety, depression, insomnia, and a constant fear of infecting family members with COVID-19.

Anxiety Vs Experience

The authors attempted to divulge whether greater experience of working in the healthcare industry would have an impact on the anxiety level experienced in response to the COVID-19 pandemic. The data showed that the majority of respondents (78 of 253 participants) who suffered from anxiety had 10 to 20 years of experience working in healthcare.

Responses pertaining to work stress as a consequence of COVID-19

37.5% of the respondents had been quarantined as a consequence of exposure to patients infected by COVID-19 whereas 62.5% ($p<0.0001$) were never quarantined (Chart 5a).

The respondents were questioned whether they were pessimistic following the advent of COVID-19. 45.5% answered in the affirmative whereas the remaining 54.5% were not affected by pessimism (Chart 5b). This difference was significant ($p < 0.05$). However, 76.3% of the respondents answered that they are currently pessimistic, while the remaining 23.7% answered they were not ($p < 0.0001$; Chart 5c). This implies that the majority of health care workers from the sample set are experiencing mental and emotional fatigue due to the stressors of the pandemic. This is further affirmed as a vast majority of the respondents indicated they felt exhausted due to the COVID-19 outbreak ($p < 0.0001$; Chart 5e). 54.5% of respondents admitted to experiencing an emotional response to the COVID-19 outbreak, while the remaining 45.5% reportedly do not feel an emotional response to the outbreak, which was statistically significant ($p < 0.05$; Chart 5d). 69.6% of health care workers have anxiety and 30.4% do not ($p < 0.0001$; Chart 5f).

About 90.9% of health care workers reported to being serious about protective equipment (PPE) at all times while only 9.1% did not place much importance to it ($p < 0.0001$, Chart 5g). About half the respondents reported to suffer from insomnia due to concerns over the COVID-19 outbreak (Chart 5h). The difference is not significant ($p > 0.05$), but the incidence of insomnia compared to the normal population is high. About 70% of the respondents reportedly suffer from depression related to COVID-19 ($p < 0.0001$; Chart 5i). A significant proportion (81.8%; $p < 0.0001$) of the respondents are afraid to go home due to their fear of infecting members of their family (Chart 5j). A vast majority of the respondents suffer from anxiety when handling febrile patients ($p < 0.0001$, Chart 5l).

The majority of respondents (71.5%) did not experience stigmatization or social rejection by their neighbors due to their profession and exposure to infected patients, with only about 28.5% reporting such an occurrence (Chart 5k). This difference was significant ($p < 0.0001$).

Responses Pertaining to Measures taken by respondents to combat COVID-19 related stress
The respondents reported several different ways in which they tried to alleviate their stress

caused by their exposure to potential risks of infection when managing COVID-19 infected patients, and the need to adhere to movement restrictions imposed by the authorities to prevent the spread of the disease. Almost half the respondents (48%, $p < 0.0001$) responded that they turned to spirituality by either reading or listening to recitation of the Holy Quran, 22% listened to music, 19% practiced unspecified meditation and 11% listed a numerous range of recreation (Chart 6). Meditation in Saudi Arabia could refer to prayer and/ or supplication. This could indicate that a significant (67%) of all means used to overcome stress by health care workers in the sample set is related to their spirituality. 95% conveyed their fears in the increased mortality rate while the remaining 5% were concerned about the decrease in recovery rate ($p < 0.0001$; Chart 7).

Discussion

The causative agent of COVID-19 is a virus from the Coronavirus family. Most COVID-19 cases appeared in the Chinese city of Wuhan at the end of December 2019, which initially came to be recognized as a form of acute pneumonia or 2019-nCoV-infected pneumonia (She et al., 2020). COVID-19 was found to be highly contagious and spread to assume widespread proportions at a rapid rate. However, the gravity of the disease was not taken seriously at that time. However, the disease began to take its toll on the population of Wuhan, placing enormous pressure on the ability of health facilities to cope with the rapidly increasing numbers of patients. The rapidity with which the disease developed into an epidemic in China led the health authorities to search for the causative factor of the disease.

Soon after COVID-19 surfaced in December 2019 in China, documented infections continued to increase dramatically within a short span of time on an exponential rate throughout the world from March 2020, affecting some countries more seriously than others. By May 22, 2020, the number of global confirmed infections and deaths had reached ~4,893,000 and ~323,000, respectively (WHO, 2020). These figures have continued to increase to date, reaching an astounding 80 million infected, 56.3 million recovered and 1.75 million dead as of 24 December 2020 (Worldmeters.info, 2020). The

Charts 1a-d: Characteristics of survey respondents by age, gender, healthcare profession and marital status.

Chart 1a: Age of respondents

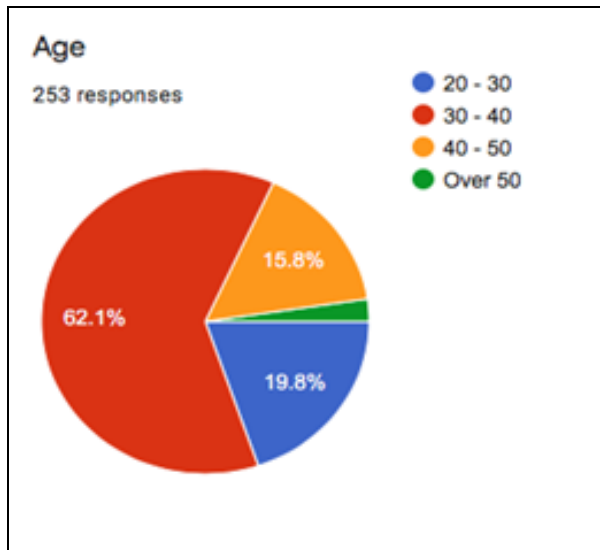


Chart 1b: Gender of respondents

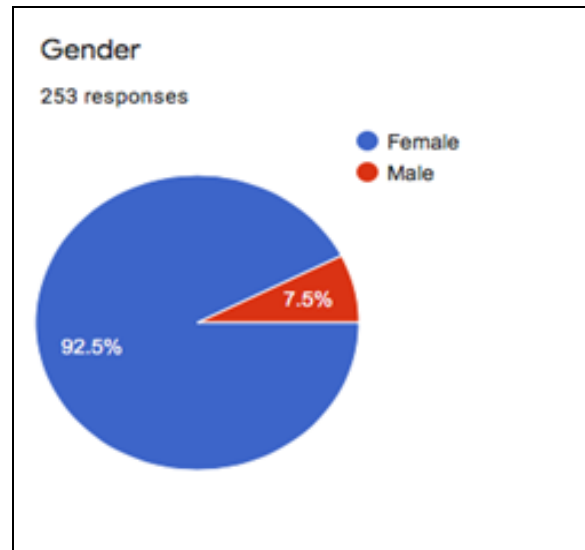


Chart 1c: Category of healthcare worker

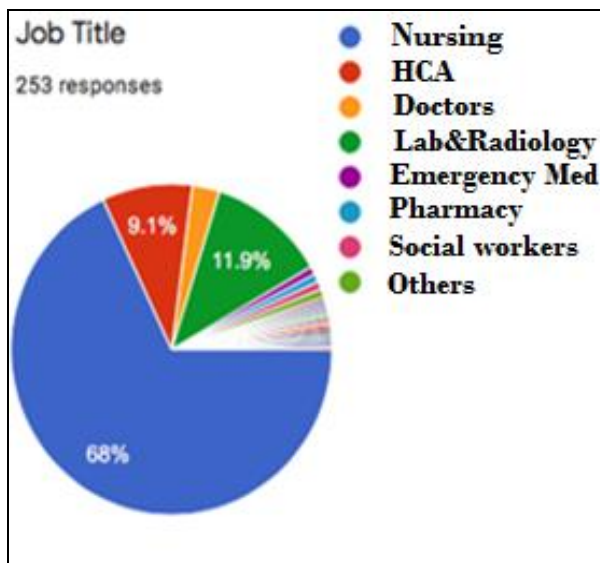


Chart 1d: Marital status of the respondents

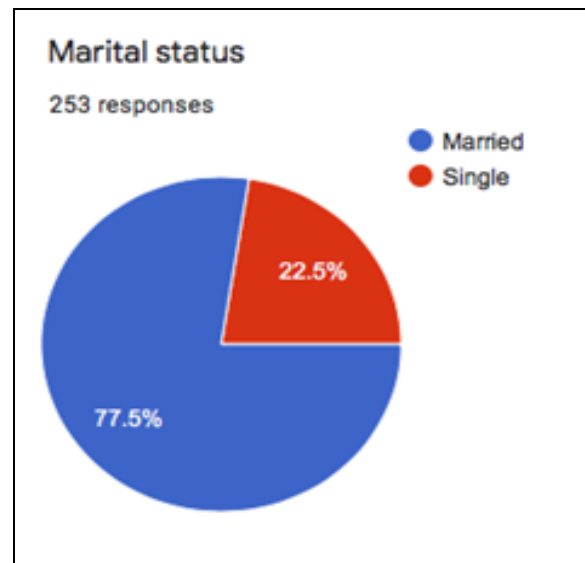


Chart 2: Work experience of respondents

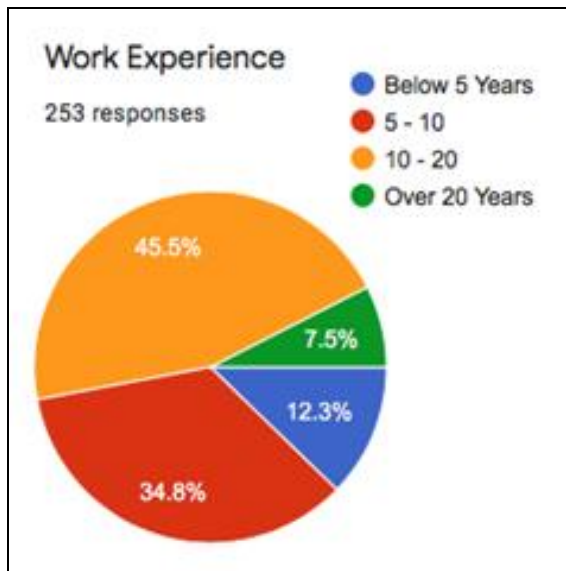


Chart 3: Survey Respondents by shift duty

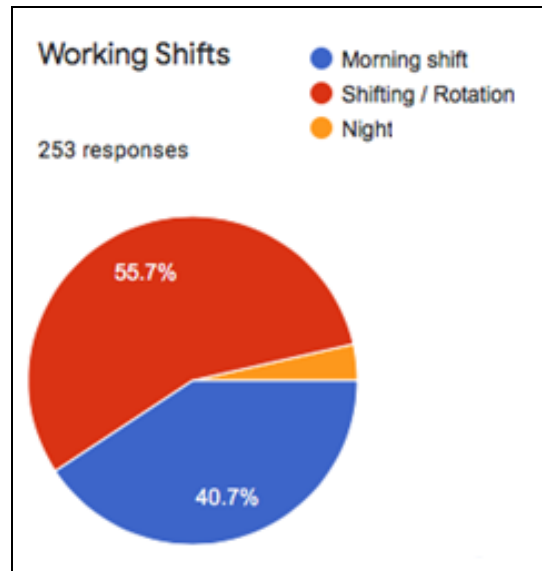
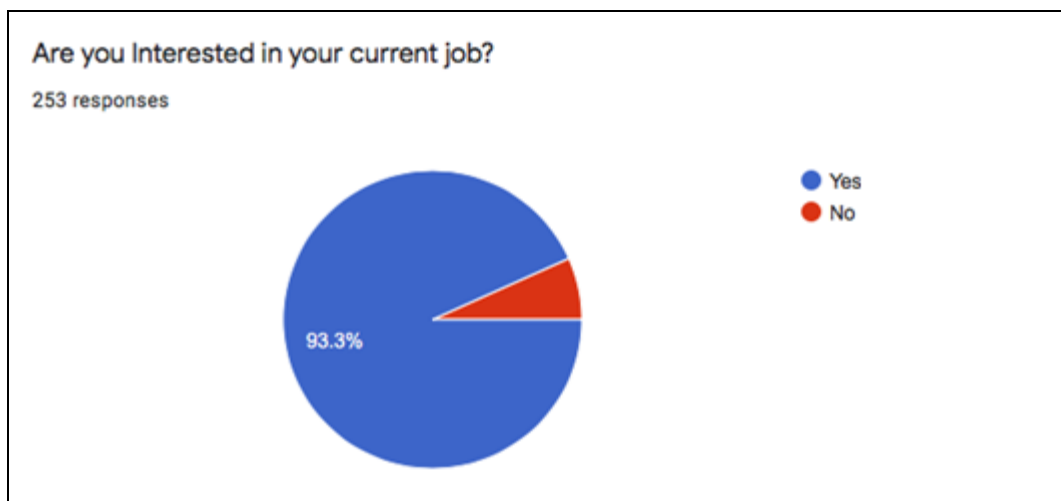


Chart 4: Survey Respondents' Interest in their Job



Charts 5a-f: Gauging survey respondents' stress levels while performing health care duties during the COVID-19 pandemic in Dammam, Eastern Province, Kingdom of Saudi Arabia

Chart 5a: % Respondents quarantined

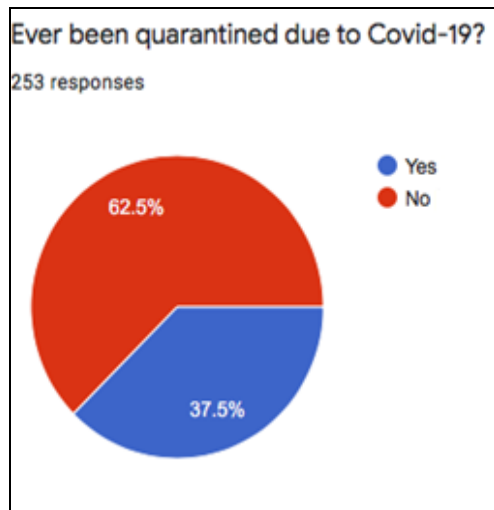


Chart 5b: % Pessimism experienced by respondents

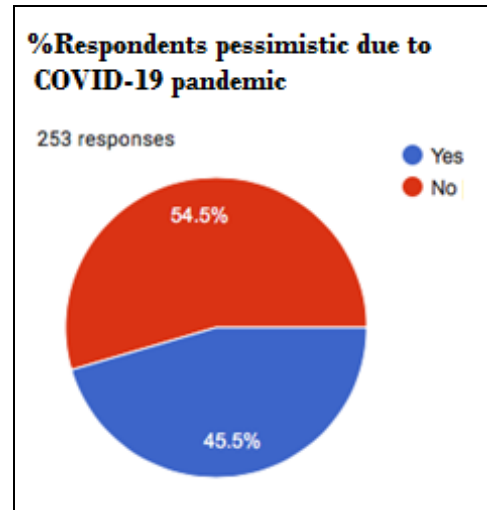


Chart 5c: Intensity of pessimism

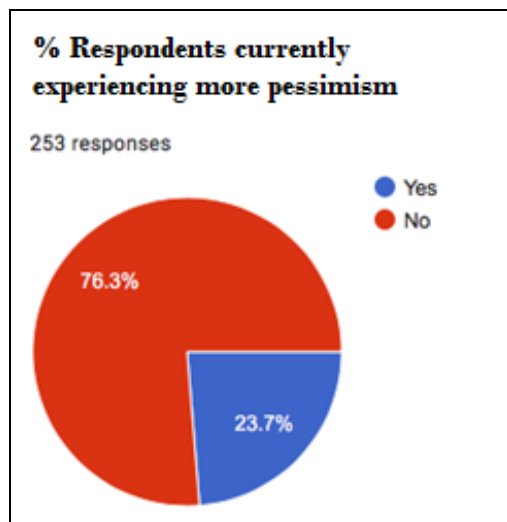


Chart 5d: Lack of emotional response

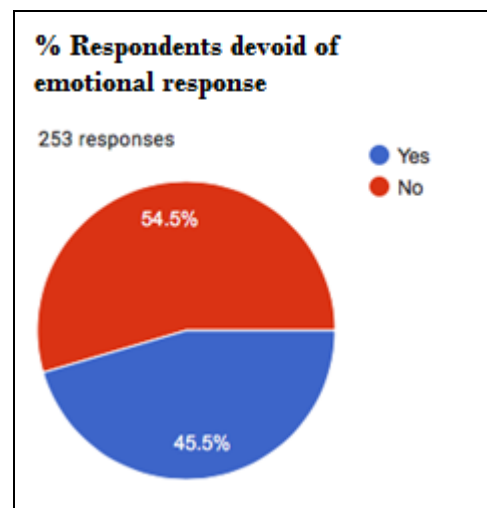


Chart 5e: Level of exhaustion

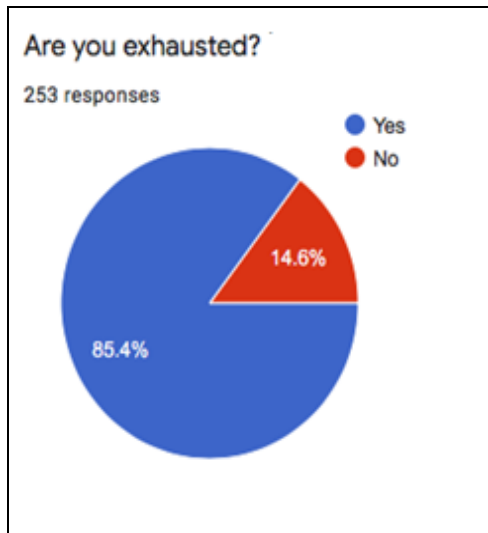


Chart 5f: Level of anxiety

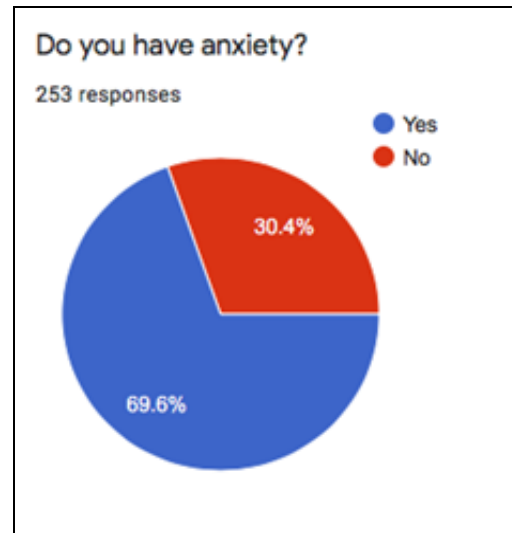


Chart 5g: Diligence in using PPE

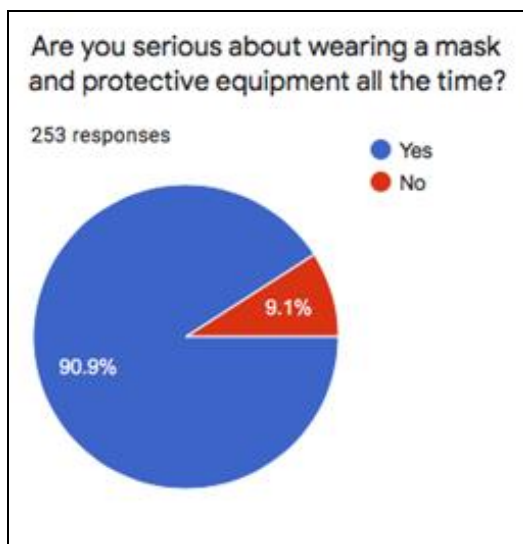


Chart 5h: Level of insomnia

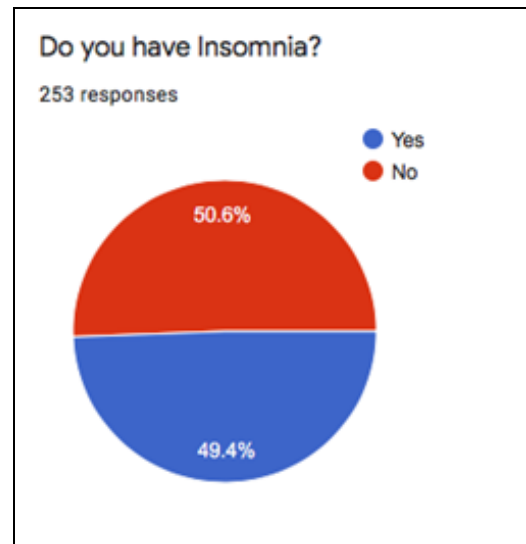


Chart 5i: Incidence of depression

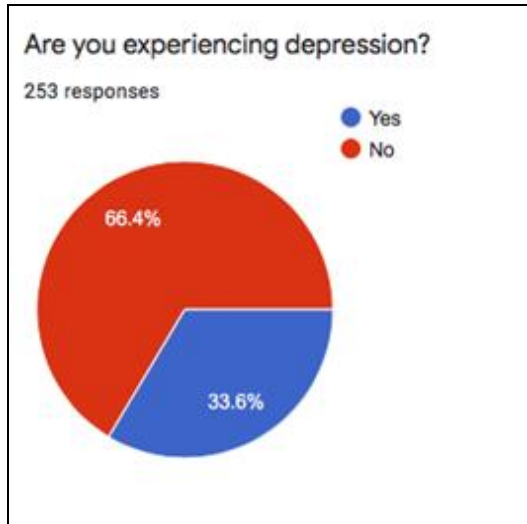


Chart 5j: Fear of infecting the family

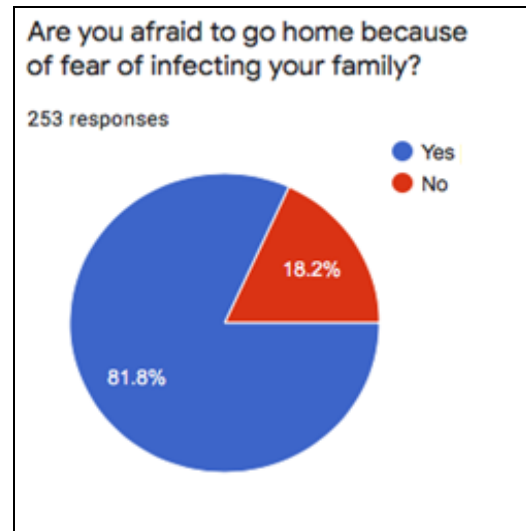


Chart 5k: Social rejection by neighbors

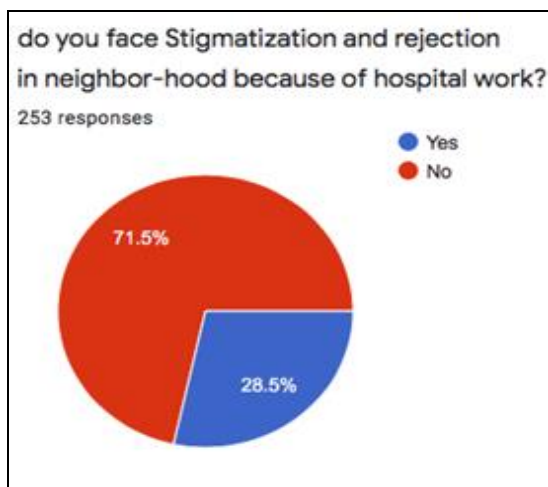


Chart 5L: Anxiety when handling febrile patients

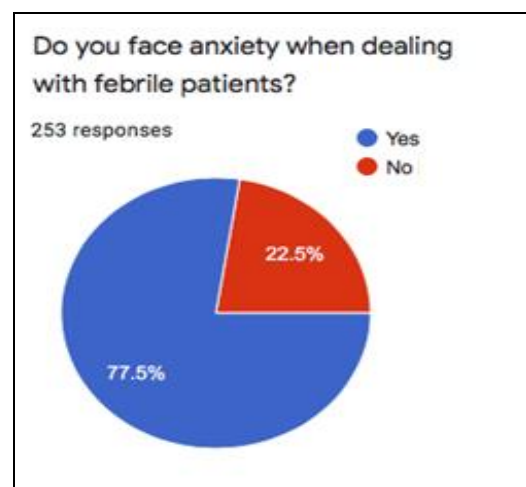


Chart 6: Respondents' means for reducing anxiety levels during the COVID-19 pandemic

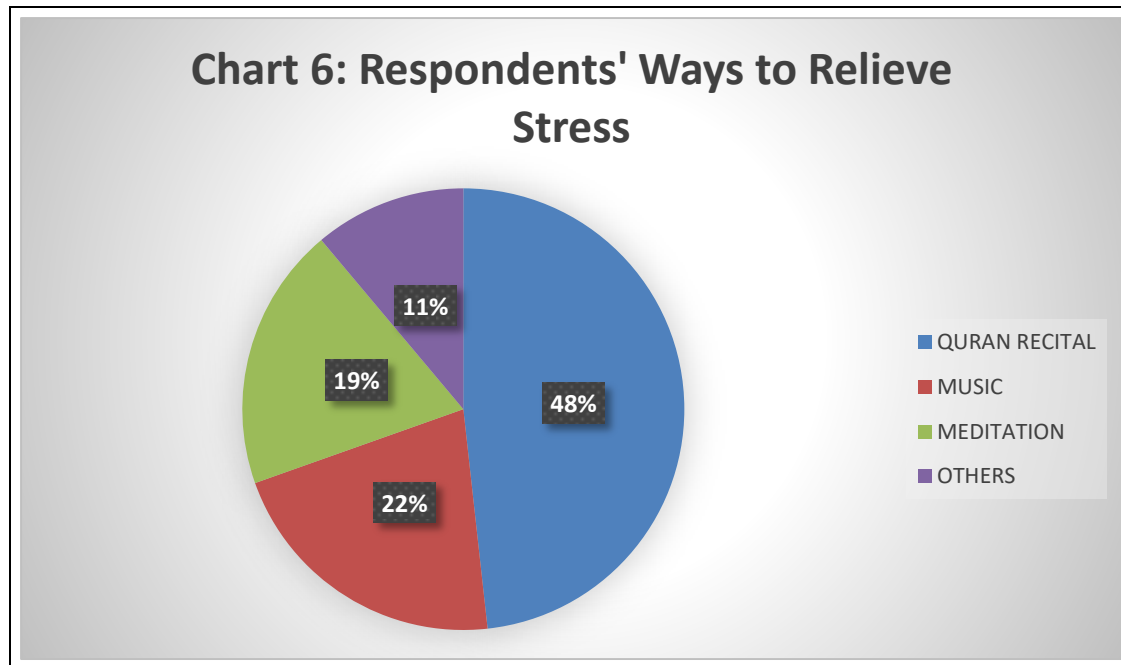


Chart 7: Causative factors of anxiety during the COVID-19 pandemic

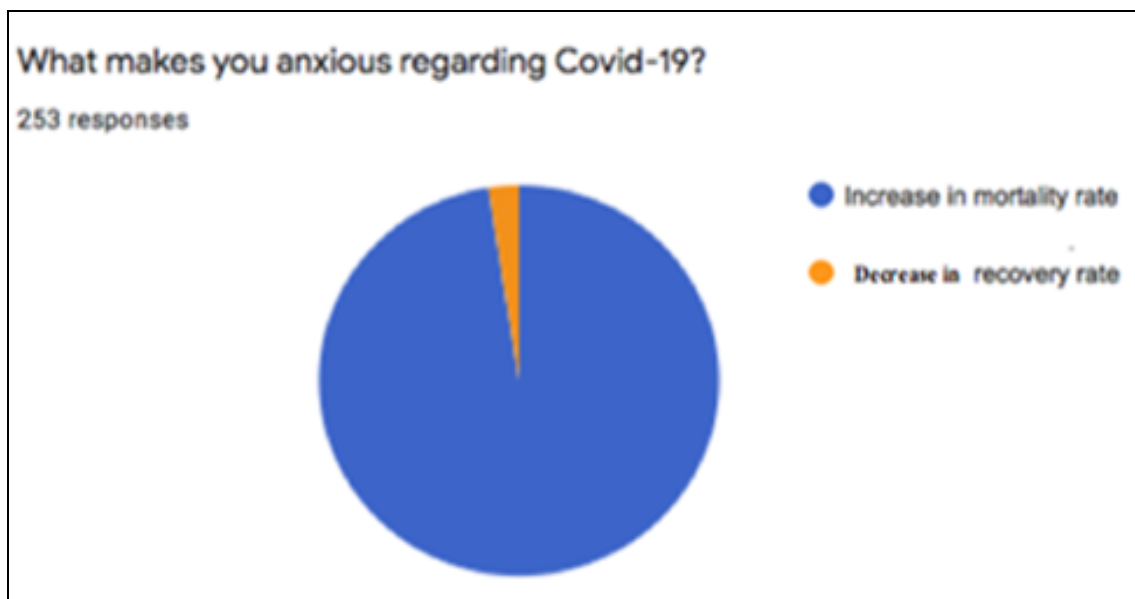


Table 1. Demographics of Participants

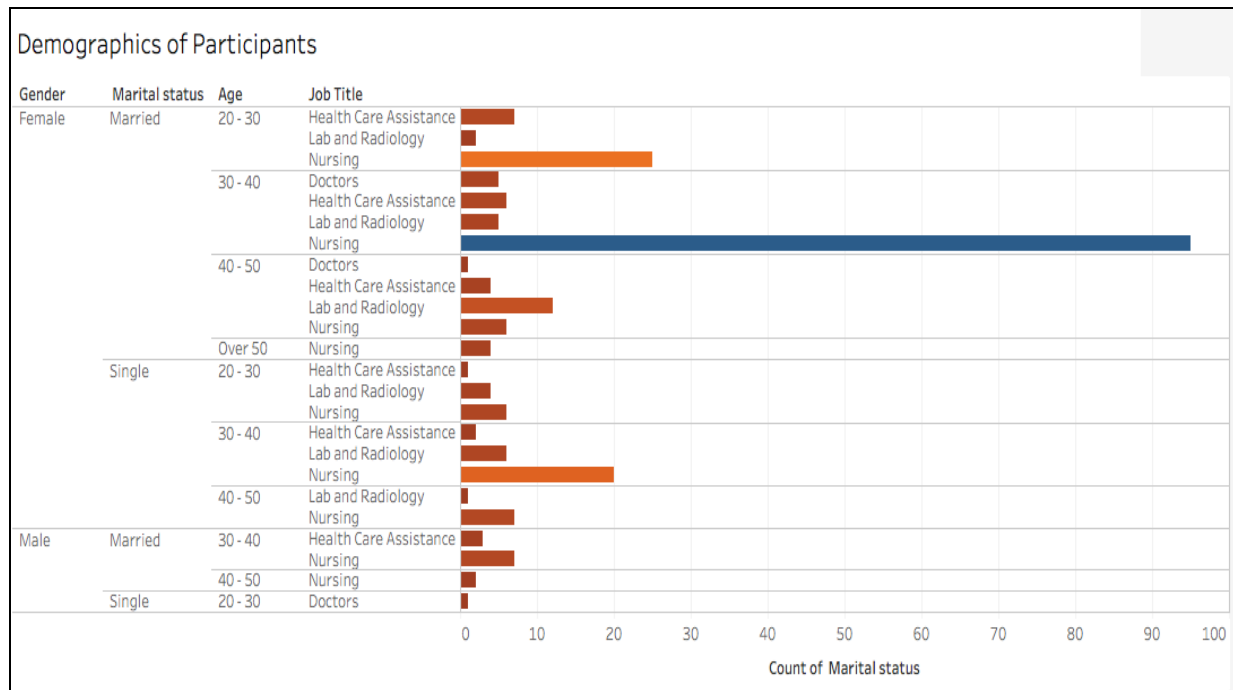


Table 2. Anxiety vs fear of infecting others

		Have Insomnia / Depressed			
		No		Yes	
Have fear of infecting your family	Have anxiety	No	Yes	No	Yes
No	No	18		11	
	Yes	8		7	2
Yes	No	32	2	8	6
	Yes	57	11	27	64

Table 3. Anxiety vs experience

		Gender	
		Female	Male
No	5 - 10	19	2
	10 - 20	28	6
	Below 5 Years	8	4
	Over 20 Years	9	1
Yes	5 - 10	65	2
	10 - 20	78	3
	Below 5 Years	18	1
	Over 20 Years	9	

outbreak foreshadowed a hitherto unprecedented virulence on a global scale of colossal proportions with a high mortality rate. The healthcare community do not have a cure, effective treatments, or vaccines to combat COVID-19. This coupled with the lack of prior knowledge of the pathogenicity of the disease have made it the most challenging and hazardous pandemic that the world has had to deal with in recent history. This disease caught the healthcare community off-guard and woefully unprepared to deal with it in an effective manner.

Health care workers play an essential and critical role in dealing with patients that have contracted COVID-19 (Akintujoye, 2020). There are nearly 59 million health care workers worldwide (Joseph and Joseph, 2016). Their services and care are either delivered directly as doctors and nurses, or indirectly by other health care staff such as assistants, technicians, laboratory staff, or even medical waste handlers. The exceptional magnitude of the trauma caused by the COVID-19 pandemic is classifiable as a traumatic event of exceptional magnitude that transcends the range of normal human experience with exposure to risk of death (Dutheil et al., 2020). With an increasing number of patients, health care workers had to endure long hours of intensive work and lack of sleep, inadequate PPE, and the risk of infection at any time. Consequently, medical workers experienced a high risk of physical and mental exhaustion. It therefore follows that these stressful situations elicit a range of psychological pathologies. These aspects can trigger psychopathologies such as acute stress disorder (ASD) and post-traumatic stress disorders (PTSD). Health care workers have been faced with unprecedented demands, both professionally and personally, in efforts to manage a disease with unclear etiology and pathology. The adverse psychological sequelae among health care workers during the ongoing COVID-19 outbreak has been extensively investigated and described by a number of workers worldwide. The numbers of reports from the world over on the psychological impact of COVID-19 on health care workers is enormous (Abolfotouh et al., 2020; AlAteeqa et al., 2020; Alenazi et al., 2020; Almaghrabi et al., 2020; Bareeqa et al., 2020; Benfante et al., 2020; Dosil Santamaría et al., 2020; Dutheil et al., 2020; El

Haj et al., 2020; Gavin et al., 2020; Ghosh et al., 2020; Kisely et al., 2020; Kuang et al., 2020; Lima et al., 2020; Nevin et al., 2020; Rodríguez and Sánchez, 2020; Röhr et al., 2020; Romanò M., 2020; Temsah et al., 2020; Vindegaard and Benros, 2020; Vinkers et al., 2020; Weiner et al., 2020; Wong et al., 2020; Zerbini et al., 2020 and many more). The large number of publications that have been published within a span of months on the disease appears unprecedented, which demonstrate the colossal effect the disease has on a global scale despite the novelty of the virus.

Apart from physical hazards such as from exposure to radiation and noise, health care workers experience ergonomic stresses such as standing for long periods and heavy lifting, long working hours, and shift rotations (Joseph and Joseph, 2016). On occasion, health care workers are subjected to violence or abusive patients, or relatives of patients, as added stressors to their work environment. The sudden unanticipated emergence of a challenging public health threat of high mortality posed by COVID-19 has left the health care worker overwhelmed. They are inadvertently exposed to, and had to deal with, an extraordinary event that demands extraordinary decisions, affecting their patients and themselves. They are obliged to make difficult ethical decisions and function professionally under conditions of fear for themselves and their loved ones (Abolfotouh et al., 2020; Almaghrabi et al., 2020; AlAteeqa et al., 2020; Benfante et al., 2020; Alenazi et al., 2020; Dutheil et al., 2020; Gavin et al., 2020; Kisely et al., 2020; Nevin et al., 2020; Wong et al., 2020). According to previous studies of epidemics and quarantine, such events will have long-term effects on the mental health of health care workers (Maunder et al., 2006; Brooks et al., 2020; Kisely et al., 2020). A recent example would be the outbreak of Severe Acute Respiratory Syndrome in 2003. Health care workers in Singapore were found to be emotionally traumatized by the SARS epidemic, provoked by maintaining a state of high alert over extended periods of time due to the rapidity of transmission and high morbidity and mortality of the virus. Chan and Huak (2003) found that 20% of doctors and nurses suffered from PTSD two months after the outbreak of SARS. The media was also found to negatively impact health care workers as there was a focus on the

number of cases and affected health care workers. Chan and Huak (2003) suggested that this constant focus by the media may have led to further emotional trauma for health care workers.

Shaukat et al. (2020) conducted a scoping review on articles to summarize the research conducted and the evidence collected of the many physical and mental health issues that have impacted health care workers during the COVID-19 pandemic. The review noted that globally health care workers have experienced high levels of depression, anxiety, distress, and insomnia. The research has found that female health care workers and nurses were disproportionately affected by the pandemic. This finding may explain the large number of female respondents (92.5%) in the present study. The fact that more female health care workers took part in the online survey in the present investigation could indicate that they identified with the research subject more closely than their male counterparts. This reasoning could also be imparted with the significantly higher number of nursing staff (68%) who responded to the online survey. The literature has shown that nurses have felt the brunt of the stressors of the pandemic as they have closer and more prolonged contact with infected patients (AlAteeq et al., 2020, Alreshidi et al., 2020; Shaukat et al., 2020).

Insomnia is one the most commonly reported mental health symptoms in the literature (Pappa et al. 2020, AlAteeq et al. 2020; among many others), and is significantly reported by the respondents of this study. The negative emotion of pessimism is another aspect of mental health that is looked at closely in this study. The majority of the participants of this study were not initially pessimistic as the pandemic emerged but have since changed their view as the pandemic wore on, likely due to the increasing infection rates in the Kingdom, coupled with the fear of attending to infectious patients, as a significant portion of the respondents reported, as well as the fear of bringing the virus home to their family (81.8%).

The respondents reported several different ways in which they alleviate the stress of working in the healthcare industry through a pandemic, with the majority turning towards their faith, divinity

and spirituality to seek solace in an effort to cope with the stress brought upon by the dual compelling emotion of fear of COVID-19 and the severity of the preventive and precautionary measures established by the authorities to contain the disease from spreading. This is keeping with the findings of Sameer et al. reported in their review (Sameer et al., 2020). In addition to turning to prayers and divinity, health care workers also resorted to listening to music, meditation, exercise, engaging in games, reading non-medical literature and a variety of other outlets to overcome stress, similar to that reviewed by other workers (see reviews by Chew et al., 2020; Sameer et al., 2020; Agha 2021 and many more). This shows the resilience of the health care workers to the stresses of the pandemic.

The importance of early intervention in regard to the mental health of health care workers was demonstrated by Zhou et al. (2020), who focused on the mental health of frontline workers in China during the late stage of the COVID-19 outbreak. Frontline workers in China experienced a large prevalence in psychological stress and insomnia, which began to improve as the pandemic progressed, in contrast to the increase in pessimism demonstrated by the respondents in the current study. Zhou et al., (2020) have credited the psycho-social measures which were effectively adopted by the healthcare community in China to address frontline workers' mental health. COVID-19-specific psychological interventions for medical staff in China included: psychological intervention support teams and counselling, a dedicated helpline, shift rotation systems for hospital staff, online platforms for medical assistance, providing adequate breaks and leave, providing a place to rest and sleep, yoga, meditation, exercise, and motivational sessions to keep the morale high (Shaukat et al., 2020). The present survey has also touched upon the social stigma that health care workers have faced during the pandemic from non-frontline workers who see health care workers as spreaders of the virus. While only 28.5% of the 253 respondents reported to have experienced this phenomenon, it has been quite widespread around the world and has been acknowledged by the WHO, with health care providers as well as COVID-19 survivors harassed in public, caused by a lack of understanding and

education on the transmission of the coronavirus (Baggchi, 2020).

The findings of this study on health care workers in the city of Dammam, Saudi Arabia, confirms aforementioned studies of the susceptibility of these workers to various mental health issues due to the pandemic, with the majority of respondents struggling with the fear of the consequence of their profession due to their close contact with infected patients, and the effect this may have on their well-being, as well as their family. When asked what specifically made the respondents in this study anxious about the COVID-19 pandemic, 95% conveyed their fears in the increased mortality rate while the remaining 5% were concerned about the decrease in recovery rate documented in the Kingdom of Saudi Arabia. Both concerns suggest that health care workers are confronted with the fear of possible death while providing care to COVID-19 infected patients.

Conclusion

The COVID-19 disease outbreak is a public health crisis that has impacted the physical and mental health for both frontline and non-frontline workers. Combating COVID-19 on the frontline makes health care workers vulnerable to psychological pressures. While most of the healthcare workers may appear to cope and be resilient on the surface in the face of the enormous stresses that they had to endure as a direct consequence of the COVID-19 pandemic; their predicament highlights the need for appropriate psychological support, especially for those on the frontline. Timely mental health care is crucial, as while the current pandemic will eventually subside, health care workers will continue to live with the psychological trauma of their experiences and may compromise their ability to perform their duties when faced with the "normal" stressors of their profession.

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