Stress among Healthcare Providers who Treat COVID-19 Patients

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Abstract

The outbreak in Wuhan, China causes the coronavirus disease 2019 (COVID-19) which was named by World Health Organization (WHO). The infection is acquired through infected droplets by inhalation and/or contact. The incubation period varies from 2 to 14 days. The most common symptoms may include fever, sore throat, dry cough, shortness of breath, fatigue and malaise. During the outbreak, healthcare workers (HCWs) have the highest risk of getting infected as they are exposed to patients more often. This study is conducted to assess the impact of stress among HCWs, and to make a comparison of the different levels of stress experienced by HCWs during and before the outbreak. This study was conducted among HCWs in UAE who played a role during the outbreak and took a stance in treating COVID-19 patients.

Keywords: COVID-19, Common symptoms, Healthcare providers.

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1. Introduction

The severe acute respiratory syndrome coronavirus 2 (SARS-COV-2, also known as the coronavirus) is the recent outbreak which was first reported on December 31st 2019 in Wuhan China.1 This virus causes coronavirus disease 2019 (COVID-19) which was named by World Health Organization (WHO). Till date (25th-January-2021), about 100 million cases and 2 million deaths has been reported [2]. This virus is transmitted through infected droplets by inhalation and/or contact. The Incubation period varies from 2 to 14 days. The most common symptoms may include fever, sore throat, dry cough, shortness of breath, fatigue and malaise, which are mild in most people. In severe cases, it may progress to acute respiratory distress syndrome (ARDS) and multi organ dysfunction, which is more prevalent in elderly and those with chronic medical conditions. The diagnosis is done by analyzing the virus from respiratory secretions by molecular test, such as Polymerase Chain Reaction (PCR). Prevention comprises of the basic hygienic measures, like wearing mask, frequent hand washing, social distancing and vaccination [3].

Generally, health care workers (HCWs) have the highest risk of getting infected as they are exposed to patients more often. As they are more vulnerable, HCWs may experience more emotional stress. Isolation of HCWs from their families could be a reason for the emotional stress [4]. Furthermore, HCWs are one of the few occupations that continued working at the workplace even during the outbreak situation. Increasing infected cases, mass of workload, lack of personal protective equipment (PPE) and feelings of inadequate support could also contribute to stress among HCWs. As a result of increase in cases, it is expected from HCWs to work longer hours at the risk of being infected [4].

During the outbreak HCWs have reported instances about the mental health and they elaborated their experiences of anxiety and stigma. Thus, in a given critical clinical setting, the poor mental health status of HCWs should be viewed as a primary public health concern [5].

This study is conducted to assess the impact of stress among HCWs, and to make a comparison of the different levels of stress experienced by HCWs during and before the outbreak. The study will be conducted among HCWs who played a role during the outbreak and took a stance in treating COVID-19 patients. Several questions will be designed to analyze the collected data and conclude the study. Accordingly, considering the risk factors, many interventions have been put forth to improve the mental health of the target group.

1.1 Rationale

During the ongoing pandemic, lack of understanding the relevance of the mental health of HCWs could put them and their patients' lives at risk. Therefore, the study could educate the HCWs about the dangers of stress in their profession and to better predict the primary sources of stress among HCWs in treating COVID-19 patients. Additionally, it will prevent HCWs from developing stress complications. If those complications are left untreated, it may cause long-term adverse effects on health

and require therapy adding to the cost burden of managing the illness. HCWs with a healthy mindset will be able to perform more efficiently in their jobs, which will have a positive effect on treating COVID-19 patients. This study will assess and make the HCWs aware about major stress causes which will help them to manage and minimize stress in future pandemics to come.

1.2   Objectives
- To determine the prevalence of depressive and anxiety levels among HCW during the COVID-19 pandemic.
- To compare the stress level among different health care professionals treating COVID-19 patients.
- To determine the association between different factors like: social support, sleep quality and self-efficacy among HCW.

2. Literature Review
2.1   Introduction about COVID-19 and Stress
The latest epidemic of the severe acute respiratory syndrome coronavirus 2 (SARS COV-2, generally known as coronavirus) was initially detected on December 31st, 2019 in the city of Wuhan, China. The World Health Organization (WHO) named the disease caused by this virus as coronavirus 2019 disease (COVID-19) [1].

As much as 263 million cases and 5 million deaths have been reported as of December 1, 2021 [2].

This virus is spread via inhalation and/or contact with contaminated droplets. The incubation phase might last anywhere from two to fourteen days. Fever, sore throat, dry cough, dyspnea, weariness, and malaise being the most prevalent symptoms, which are usually minor in most patients. Acute respiratory distress syndrome (ARDS) and multi organ damage and failure can persist in severe cases, which is more common in the elderly and those with chronic medical issues. The virus is detected from respiratory secretions using a molecular test such as the Polymerase Chain Reaction (PCR). Basic sanitary practices including frequent hand washing, wearing masks, social distancing and vaccination are all part of the prevention strategy [3].

Health care workers (HCWs) are at the highest risk of acquiring infection since they are exposed to patients on a regular basis. HCWs may face more emotional stress since they are more vulnerable. HCWs' separation from their families could be contributing to their emotional distress [4].

Furthermore, HCWs are one of the few jobs that have remained to operate in the workplace despite the outbreak. Increased infected cases, a large workload, shortage of personal protective equipment (PPE), and a sense of insufficient support could lead to HCW stress. As the number of cases rises, HCWs are expected to work longer shifts at the risk of becoming infected [4].

During the outbreak, HCWs reported incidents involving mental health and reported their anxiety and stigmatization experiences. As a result, in a critical clinical context,

HCWs' poor psychosocial health should be considered a priority public health concern [5].

Stress is defined as the degree to which a person feels overwhelmed or unable to handle a given situation as a result of uncontrollable pressures [6].

Stress is a physical reaction to any form of pressure or challenge that reduces efficiency [7].

Generally, mainly three types of stress had been elaborated, which are episodic acute stress, chronic stress and acute stress. Acute stress is the body's immediate response to a new and challenging situation. When someone is confronted with a particularly difficult scenario, such as a life-threatening condition, severe acute stress occurs, which can develop post traumatic stress disorder (PTSD). It is observed that acute stress gives rise to episodic acute stress which happens on a regular basis. Chronic stress occurs when a high amount of stress remains for a longer duration of time, and it can culminate in anxiety, CVS disease, depression, high blood pressure, and other health problems [8].

Stress present in the working environment is an aspect to be considered in the healthcare industry in modern society. Workplace stress is a source of concern for people's mental stability. Workplace stress is interpreted as a pattern of perceptual, physiological, emotional, and behavioral responses to negative features of employment, the environment, and the workplace. Job stress has a substantial impact on physical and mental disorders. Job or work-related stress is without a doubt very one of the starting points of experiencing mental health problems around the world. Employees' performance can be harmed by high levels of stress, which can also have a detrimental impact on their attitudes and behaviors [9].

HCWs can be stressed by a variety of factors. During the outbreak HCWs have reported instances about mental health and they elaborated their experiences of anxiety and stigma. According to prior research, developing post-traumatic stress disorder (PTSD) is common among infectious disease survivors. Throughout the pandemic, HCWs experienced occupational burnout. Because of long-term exhaustion and a lack of motivation, job burnout produces a decrease in work performance. The rising number of cases is overwhelming hospitals all across the world. This condition may put HCWs in an unfavorable position, causing them to work under pressure [1].

Thus, in this very critical situation, the mental stability of HCWs ought to be appraised as the chief public health concern.

2.2   Prevalence of Stress among Health Care Workers

COVID-19 outbreak caused an emergence of a broad spectrum of mental difficulties, including anxiety, fear, prejudice, shame, marginalization toward COVID-19, and its impact on everyone from healthy people to at-risk people to caregivers. HCWs have experienced unprecedented psychological stress because of the outbreak, which include anxiety, post-traumatic stress symptoms, fear, psychological distress, panic attacks, stigma, depressive tendencies, avoidance of contact, sleep

disturbances, interpersonal and social isolation, helplessness, and fears of infecting others are all common symptoms. Health care workers in hospitals and isolation ward may experience panic, stress, and anxiety as a result of mass quarantine. Although HCWs experience psychological problems, most of them don't get routine psychological care [10].

Certain attributes of the work, like shifts and working hours, contribute to different degrees of work stress. HCWs with extra work shifts experienced more degree of work stress. Working for longer than 35 hours weekly has showed to cause more stress than working for a smaller number of hours weekly. HCWs who worked for companies reported experiencing more work stress than self-employed HCWs [11].

In a research study conducted in New York among HCWs throughout the outbreak showed that positive tests for psychological symptoms were widespread, with 33 percent for anxiety symptoms, 48 percent for depressive symptoms, and 57 percent for acute stress [12].

In another research study, female HCWs were nearly twice as likely as their male counterparts to experience psychological distress. When compared to HCWs who interacted with COVID-19 patients, those who did not have interaction with COVID-19 patients had an 87 percent lower incidence of mental stress. When compared to those with high knowledge of COVID-19, HCWs with insufficient knowledge had a 44% lower incidence of psychological discomfort. From 313 participants those who were between the ages of 31 to 40 showed the highest rate of stress dealing with COVID-19 patients with a 34.2% compared to participants who were 50 years of age or older who showed the least amount of stress with a 5.8% only. Participants who were married reported a remarkably elevated rate of stress in contrast to non-married participants with a ratio of 233/80. According to work-related variables, the most remarkable rate of mental stress was found in doctors with a 53 percent and 2.2 percent in radiographs. Also, the rate was the highest in HCWs with less than 5 year of service and least among HCWs with more than 20 years of service. This indicates that experience plays a major role in coping and adapting to stressful situations [13].

In a study that showed the status of mental health in HCWs throughout the outbreak found that female, younger medical staff, nurses, front-line HCWs, and workers in sites with greater infection rates all demonstrated higher levels of mental distress signs than other.

HCWs. Furthermore, Non-front-line nurses and the general public had more mental trauma than front-line nurses [14].

A research conducted in the U.S.A. with around 21 thousand HCWs participating in the study, medical assistants, nursing assistants, and social workers had the highest stress degrees. Moreover, the rates of stress were more prominent in females, and Black and Latinx workers in contrast to males, and Whites workers [15].

A recent research study done in Saudi Arabia with less than 5 thousand HCWs reported anxiety level were high in 32.3 percent, medium in 36.1 percent, and low in 31.5 percent of participants. High anxiety level was found more in unmarried HCWs compared to married, as well as in nurses, radiology workers, and respiratory

therapists. Working in a setting exclusive for COVID-19 positive patients, as well as working with such patients, were both linked to a high level of anxiety [16].

2.3   Factors Associated with Stress and COVID-19

A broad spectrum of sociodemographic factors were identified and co-related to the COVID-19 incidence and mortality. Findings of a certain article [17], were related with community level sociodemographic factors. Firstly, the ethnic inequalities visible in descriptive statistics show underlying differences in a plethora of social determinants at the macro and micro levels known to be related with disparities in health outcomes, like structural racism. Communities with socio environmental circumstances such as congested hospital facilities and dependency on public transit are more vulnerable to disease transmission due to the difficulties in maintaining social distance. Citizens of impoverished and ethnic minority populations are also more likely to work in rural healthcare centers, putting them at more risk of COVID-19 exposure and transmission from person to person.

Furthermore, individuals with diabetes, lung disease and hypertension as well as lived in ethnic minority groups showed to be at higher risks for COVID-19 morbidity and mortality. Factors observed in front line workers such as increased working hours, increased number of patients, reduced peer support and logistic support were all seen. Diving deep into the regression analysis, it showed that being a young female, having a history of psychiatric conditions and working as a frontline worker were sole predictors of worsening mental health outcome [18].

In another Chinese study investigating the psychological impact of SARS outbreak in China, younger participants and those who were working in high-risk geographical locations were more likely to develop anxiety and PTSD symptoms [19].

During the pandemic, HCWs with more than 10 years of experience, concomitant chronic diseases, a history of mental problems, and confirmed or suspected family members or relatives are more sensitive to stress, depression, and anxiety. Furthermore, because HCWs are frequently more stigmatized than the general public when it comes to mental illness, it is important to address the needs of HCWs during this epidemic and provide adequate psychological assistance for individuals at high risk of mental illness. A number of factors have been linked to the development of depression, anxiety, and stress. For example, the stress outcome, which has the following linked variables: Women, with a history of exposure to COVID-19, concomitant chronic diseases, history of mental disorders, and confirmed or suspected family members or relatives; having thought of resigning; unsure thought of resigning; worry about life-threatening; feel of family members and friends' avoidance. Sociodemographic factors which are associated with the highest psychological stress include, women, 30 to 49 years of age, and married. Clinical factors include mostly junior nurses, with 2 to 5 years of service were more vulnerable to stress [20].

A study conducted in Vietnam to investigate the related factors that contribute to

development on stress among HCWs revealed that 44.6 percent of HCWs developed stress during the pandemic. Some of the risk factors that led to stress development include increased working hours, lack of PPE availability, having inadequate information about preventing and treating COVID-19, working in a setting exclusive for COVID-19 treatment, and working as a physician, nurse, or laboratory. The frequency of stress in the group is related directly to treating and caring for patients, accounting as 50.3 percent in physicians and 46.3 percent in nurses. Overwork, interaction with COVID-19 positive patients who are critically ill, and fearing of getting infected and transmitting it to family and friends are all variables that induce stress in this population. Laboratory personnel were also shown to have a high rate of stress (50 percent), due to laboratory working hours, handling of bio samples, and wearing personal protective equipment for long durations. Medical workers had to deal with a massive workload and often insufficient supplies, which leads to experiencing more stress. Also, HCWs who had adequate information about preventing and treating COVID-19 patients developed lower degree of stress. Furthermore, poor availability of PPE, working in health facilities which treats COVID-19 positive patients, working in isolation, working for prolonged time, and having frequent interaction with COVID-19 patients led to experiencing more stress [21].

In a study conducted in Singapore, it was found that working long hours, working night shifts, and being exposed to COVID-19 patient on a regular basis are all factors that contributed to increase in stress amongst healthcare workers apart from frequency of exposure. The effects of fatigue have been exacerbated by lack of resting periods and recharge time. The findings were consistent with earlier studies in highlighting the role of perceived risk and healthcare workers' in different healthcare facilities to influence the perceptions of risks of stress especially in the background that there may have been fear among HCWs due to misinformation. Out of 2744 participants 26 percent of them have shown to be under a lot of stress resulting in emotional exhaustion due to increase in the working hours and work burnout [22].

Having lesser understating of COVID-19, and having relatives who are COVID-19 positive are associated with high degree of anxiety. One of the top causes of stress and anxiety is being afraid of getting infected and transmitting COVID-19 to their co-workers [23].

In a study conducted among pediatric nurses, 2 protective factors and 2 risk factors were linked to stress, protective factors included working experience and servicing in isolation ward or fever clinics, while risk factors included occupational protection practices and personal protective equipment requirements [24].

In a study conducted in India regarding health care workers, it has been investigated that overloading and working overtime resulted in high stress levels particularly in doctors and nurses compared to other HCWs. It was also found that single and older HCWs were more prone to stress. In this very study, the correlation between high level of risk and stress was elucidated. Perceived stress was exacerbated by longer service, quarantine, and a higher level of risk. Healthcare workers that are exposed

to COVID patients in the medical ward exhibit more signs of stress because of the fear of the quarantine. Quarantine could accidentally revoke this privilege, resulting in an increase in unexpected physical strain and stress [25].

A cross-sectional study which was conducted among HCWs to check for relation between occupational stress on health workers mentality and COVID-19 pandemic observed that male community mental health workers (CMHWs) showed stronger self-efficacy, while non-single CMHWs had more positive affect. In an emerging disease outbreak, younger age and a lack of family support led to health workers' psychological distress, whereas males tended to have more positive attitudes regarding stressful occurrences. CMHWs with a greater degree of education may be more distressed during the pandemic. Community based work characteristics, such as access to personal protective equipment and workplace exposure to COVID-19, which were anxiety-inducing for healthcare professionals, put CMHWs' mental health in risk. The proportion of health workers with sadness and anxiety was considerably higher in the group exposed to infected patients in a high-risk work environment than in the group exposed to infected patients in a low-risk work environment. Working longer hours has a widespread negative impact on mental health. Excessive working hours become frequent during a disease outbreak. However, CMHWs with severely weakened mental health must be identified as soon as possible to minimize further injury [26].

A vast percentage of participants experienced depression, anxiety, and insomnia symptoms, and also a majority of them (70%) experienced psychological distress. The psychological sense and response of health care workers to a pandemic of contagious diseases is often mixed. Feelings of vulnerability or lack of control, as well as worry regarding one's own health, the spread of the virus, the health of one's family and others, changes at work, and isolation, may all be sources of distress. The idea of COVID-19 being human-to-human transmissible, associated with significant morbidity, and possibly lethal can augment people's fear of infection. Additionally, the unpredictable lack of supplies and a towering number of suspected and actual cases of COVID-19 contribute to the immense concerns of healthcare workers in the healthcare field [27].

Lifestyle comorbidities such as obesity play a significant role in the development of stress and anxiety among the general population and healthcare workers. In the course of an extended quarantine of more than 2 weeks, obese patients experienced a lot of stress that only made them way more susceptible to poor nutrition and sedentary lifestyle, thus increasing their overall weight. This might apply to doctors and nurses as well if in case they are tested positive for the virus. This leads to alienation in the workplace environment and not being able to go to work, which leads to their quarantine. Furthermore, the next social decline will also lead to greater consumption of junk foods as it is considerably cheaper. Eventually, that would lead to a further increase in the prevalence of obesity, especially in the financially poorer sections of society. A rising evidence has reported a significant role of obesity in the prognosis of COVID-19 [28].

In a recent study conducted which correlates between the relation of family

members and stress in health care workers, the continuous cycle of stressed responses amongst HCWs and their family members are affecting one another's health and quality of life. There was also a significant association between HCWs' reported risk of developing COVID-19 among themselves as well as their family members, implying that HCWs may be more concerned about their personal infection risk as well as the risk of infection for their family members and this dilemma could increase their level of stress and their ability to perform well on their jobs [29].

According to a study conducted among HCWs to investigate stressors during COVID-19 pandemic revealed that the most stressful factor for health workers is thinking about transmitting the disease to their families, relatives, and friends. Also, the majority of HCWs stated that they did not receive any support to reduce stress or reassurance from their family physicians or other doctors/therapists. Most people did not agree or disagree that they engaged in relaxation or exercise to assist them cope with stress. As a result, hospitals should concentrate on measures that integrate care by self and also limit shift duration, as the past outbreaks have shown [30].

2.4   Prevention of Stress

A study conducted among HCWs regarding occupational stress during COVID-19 pandemic observed that the well-organized lockdown procedures and resident compliance with wearing PPE (including masks) may contribute to such positive mental health outcomes, which might assist community mental health workers (CMHWs) cope with their workload and anxieties of COVID-19 infections [31]. Using coping mechanisms that are similar to healthy lifestyle activities often significantly enhance mentality and help to cope with stress. The World Health Organization recommends eating healthy foods, involving in daily exercise of any form, adopting proper sleep cleanliness if possible, and ensuring adequate rest by having a proper sleeping pattern. Engagement with mindfulness-based programs such as certain mindfulness health apps has been demonstrated to lessen symptoms of burnout among doctors, in conjunction to good lifestyle improvements. These apps help to strengthen flexibility and reduce burnout effectively. Additionally, research has demonstrated that certain relaxation methods centered on mindfulness aspects can lower anxiety symptoms as well as improve sleep quality. Avoiding detrimental coping methods which include alcohol consumption, narcotic abuse, indulging in high-risk activities (such as gambling) etc. is critical as such forms of recreational activity are very destructive if continued for a long time. Even social platforms have played a major role in allowing for digital contact and can be considered an effective "stress buster". Using it in a moderation may not harm the individual but it could with excessive use and may negatively impact the health of the individual especially healthcare workers. Also, some strategies such as maintaining a time table, keeping the personal protective kit available at all times, following institutional guidelines and safeguard measures and knowing your fellow colleagues on duty would help in lowering stress levels during these tough times

[32].
In a study conducted in Iran, communication, management support, change, and demand were the most significant stressors for HCWs. As a result, the degree of stress of the HCWs in various health institutions amid the COVID-19 epidemic can decrease by allowing people to people communication for those working in health center or medical wards, enhancing managerial support for HCWs, and lowering workplace demands which include workload cutting and bettering the workplace environment [33].

A research study concluded that concentrating on shaming or dishonoring reduction, providing health professionals with protective measures, and providing various support for those suffering from mental health disorders are all recommended ways to improve the mental wellbeing of health workers [34].

Another study, according to the data that was collected from HCWs, suggested that a sense of comradeship among the HCWs working side by side, also sharing witticism or humor with coworkers, were beneficial in reducing stress. This is in agreement with prior study that found optimism and positivity to be important in avoiding burnout, reducing emotional exhaustion, and increasing efficiency [35]. Nurses did not experience stress reduction due to the availability of PPE, implying that nurses were even stressed to greater extent than other groups as a result of lesser PPE availability. Despite the fact that all groups firmly agreed on the importance of using PPE, having access to suitable PPE is critical in reducing HCW stress levels in the future. In fact, all groups agreed that having enough PPE is a key component in their readiness to take part in any upcoming epidemics or pandemics [36].

In a study conducted in U.S., organizations should investigate the facilitators of feeling valued in an attempt to face burnout and promote the mental welfare of their workforces, as the study found that around 50% of workers don't really feel appreciated. Healthcare employees with immense stress, notably women and minority workers, might profit from involvements focused at enhancing sentiments of being valued by their employers. Peer support programs, adjustments in healthcare structure to promote support as well as advancements in keeping health records digitally are connected to increased telemedicine possibilities following the pandemic are also suggested as remedies. On a community level, psychosocial adjustments have been made and should be monitored during the course of the pandemic and the chronic mental health effects should be identified and anticipated. Studies from different nations reflect on the increased incidence of stress, anxiety and PTSD symptoms and accordingly, preventive measures were sought after [37].

In a study conducted to approximate the prevalence of stress, interventions are required to improve the lifestyles of healthcare workers, as well as to prevent the associated side effects, through regular monitoring of probable stress illnesses. Furthermore, because stress can be avoided in the first place and regulated and treated once it has developed, it is vital to provide comprehensive training to hospital staff on stress and how it can be avoided. Furthermore, stress problems must be controlled and treated as soon as feasible, and through quick diagnosis. Because of the high frequency of stress among front-line healthcare personnel

caring for COVID-19 patients, physicians should be more aware of the signs and symptoms of stress disorders. Furthermore, the media should give related information in order to raise awareness among healthcare practitioners and minimize delayed diagnosis [38].

According to one study, departments should promote team inclusion to make all healthcare professionals, regardless of role or tenure, feel like part of the team in order to reduce stress. This can be accomplished by actively soliciting the input of individuals who are most likely to be left out, such as new healthcare workers to the unit, temporary healthcare members, or those in lower-status posts. Such actions increase a sense of belonging among more marginal members while also reaffirming the team's borders and existence for all members. Our findings suggest that work team identification may be most beneficial to occupations with lower occupational status or that are particularly vulnerable. Surprisingly, team identification appears to have a diminishing effect on work stress with time. This could imply that while a stressor like COVID-19 persists, people grow more at ease due to more data transmission, familiarity with hospital processes, or the normalization of experience [39].

According to this study that has been conducted in different countries, the most effective way to alleviate symptoms is to eliminate the source of stress. During the pandemic, healthcare workers used a variety of ways to cope with their anxiety, including psychological, social, and religious/spiritual approaches. Positive thinking was used by healthcare personnel as a stress-reduction approach. People can manage their stress by listening to and encouraging one another, regulating emotion, and remaining resilient while they are in a social interaction. One of the main techniques of relieving stress, according to healthcare workers in this study, was to seek assistance from family. Prayers and visits to places of worship, as well as other religious and spiritual practices, have proven to be effective in reducing stress. Simple lifestyle changes such as getting enough sleep and eating a well-balanced diet should not be disregarded. This is the final of the key stress reduction techniques employed by healthcare personnel. According to recent studies, healthcare professionals should eat a lot of fruits and vegetables, stay hydrated, and bring down their caffeine use [40].

Limiting the workload for HCWs by letting the public know about preventive actions and applying community fines also aids in minimizing stress [41].

3. Materials & Methods

3.1 Research design

Cross-sectional study.

3.2 Study population

Health care workers in Thumbay Medcity.

- Inclusion criteria: Participants who gave informed consent and those who are above 18 years of age. All HCWs who took part in treating COVID-19.
- Exclusion criteria: Participant who didn't give consent.

3.3 Sample size calculation

The prevalence of work-related stress was found to be 59%.

p= 0.59
q= 0.41
L= 10%
Sample size = 4pq / L^2 = 4 x 0.59 x 0.41 / 0.1^2 = 97
the total sample size = 117 including the non-response error.

3.4 Study settings

Thumbay Medicity

3.5 Duration of study

The study took around six months.

3.6 Study instrument & validation procedure

The data was collected from people who gave an ethical consent. A self-administered questionnaire that includes information on socio-demographic information like gender, age, working years, marital status, academic level, occupation, etc. Other information such as previous infectious disease experience, and number of days spent caring for COVID-19 patients and availability of PPE was included. The questionnaire was validated by three experts.

3.7 Ethical issues

This research proposal was sent to IRB (Institutional Review Board) of GMU. The data was collected from people who gave the informed consent. Anonymity, privacy and confidentiality was maintained. Data was used only for research purposes and will not be published anywhere.

3.8 Methodology

After receiving ethical approval from the IRB, permission was granted by the hospital authorities. A pilot study was also conducted among five participants. The eligible participants were then approached. After explaining the aims of the study

and ensuring complete confidentiality of the information collected, informed consent was obtained from each of the interested participants after which they were given a set of self-administered questionnaires to be filled out. Wherever required the interviewee was available to clarify any doubts of the participants.

3.9 Details of data storage

The data will be stored for 3 years in the Community Medicine Department as per the GMU policy.

3.10 Data analysis

The data was entered into excel. Frequency, percentages and tables and graphs were used for descriptive statistics. Chi-square was used to find the association between categorical variables. Further analysis was done using SPSS version 27.

4. Results

Table 1: Sociodemographic Factors of Participants

Sociodemographic factors		Frequency	Percentage	Total
Age	≤ 30	54	46.6	116
	> 30	62	53.4	
Gender	Male	45	38.1	118
	Female	73	61.9	
Nationality	Indian	69	60.5	114
	Egyptian	6	5.3	
	Emirati	3	2.6	
	Others	36	31.6	
Work Experience	0-10 years	77	65.3	118
	10-20 years	28	23.7	
	More than 20 years	13	11	
Marital status	Married	80	68.4	117
	Single	37	31.6	
Academic level	Undergraduate	17	14.4	118
	Graduate	65	55.1	
	Postgraduate	29	24.6	
	Higher education	7	5.9	
Occupation	Medical practitioner	23	19.2	117
	Dentist	14	11.9	
	Nurse	42	35.6	
	Others	39	33.1	

The commonest sociodemographic factors of participants found are being an Indian female older than 30 years, married, and graduated nurses with 0 to 10 years of working experience.

Table 2: Stress Level among the Participants

Stress level	Frequency	Percentage	Total
Normal to moderate	44	40.7	108
Severe to extremely severe	64	59.3	108

More than half of the participants experienced a severe to extremely severe level of stress.

Table 3: Anxiety Level among the Participants

Anxiety level	Frequency	Percentage	Total
Moderate to severe	35	31.8	110
Extremely severe	75	68.2	110

Around two-thirds of patients experienced an extremely severe level of anxiety.

Table 4: Depression Level among the Participants

Depression Level	Frequency	Percentage	Total
Moderate to severe	74	66.7	111
Extremely severe	37	33.3	111

Around two third of patients experienced a moderate to severe level of depression.

Table 5: COVID-19 Related Factors among the Participants

COVID-19 related		Frequency	Percentage	Total
Previous infectious disease experience	No	71	60.2	118
	Yes	47	39.8	
Hrs/day caring for COVID-19	<8hrs	42	38.9	108
	≥8hrs	66	61.1	
Hrs/day caring for COVID-19 with colleagues	<8hrs	41	41	100
	≥8hrs	59	59	
Reliability on verified Information sources for COVID-19 updates	No	10	8.5	117
	Yes	107	91.5	
Working in a COVID-19 treatment exclusive setting	No	70	60.3	116
	Yes	46	39.7	

Most participants did not experience any previous infectious disease, working 8 hours or more alone and with colleagues caring for COVID-19 patients. Almost all participants rely on verified information sources for updates about COVID-19. However, only around 40% of participants worked in a setting exclusive for the treatment of COVID-19 patients.

Table 6: Sleep-quality among the Participant

Sleep-quality		Frequency	Percentage	Total
Irregular Sleeping patterns During the pandemic	No	42	36.2	116
	Yes	74	63.8	
Duration of sleep during the pandemic	Less than 4 hrs	8	6.8	118
	4-6 hrs	58	49.2	
	6-8 hrs	46	39	
	More than 8 hrs	6	5.1	
Lack of sleep Affecting work	No	45	38.5	117
	Yes	72	61.5	

Most participants have irregular sleeping patterns during the pandemic with around half of them sleeping for a duration of 4-6 hrs. More participants agreed that lack of sleep affected their work.

Table 7: Social-support among the Participants

Social-support		Frequency	Percentage	Total
Constant contact with friends and family	No	29	24.8	117
	Yes	88	75.2	
Having someone to turn to for support	No	25	21.2	118
	Yes	93	78.8	
Presentation with psychosocial support	No	89	75.2	118
	Yes	29	24.6	
Consideration of receiving support	No	43	47.8	90
	Yes	47	52.2	
Worrying about own health or health of loved ones	No	9	7.6	118
	Yes	109	92.4	

Around 75% of participants have had constant contact with family and friends, making them more susceptible to a COVID-19 infection. Around 78% of participants have someone to turn to for support during their toughest times. Around 75% of participants have not presented with any psychosocial support in the past and 52% of them would consider receiving support, if available. The majority of them worry about their own health and those of their loved ones.

Table 8: Self-efficacy among the Participant

Self-efficacy		Frequency	Percentage	Total
Effect of work schedules on wellbeing during the pandemic	No	33	28	118
	Yes	85	72	
Solutions creativity amid tough situations	No	28	23.9	117
	Yes	89	76.1	
Work discouragement in tough situations	No	48	40.7	118
	Yes	70	59.3	

Most of the participants admitted that work schedules take a toll on their well being and bring up effective solutions amid tough situations. A little more than half of the participants experience work discouragement in tough situations.

Table 9: Occupation of Participants

Occupation	Normal to moderate	Severe to extremely severe	Total
General medical practitioners	10	13	23
Dentists	7	6	13
Nurse	14	23	37
Other health professions	13	22	35
Total	44	64	108

Mostly, nurses were more in responses and were found to have experienced normal to moderate as well as severe to extremely severe stress.

Table 10: Personal Protective Equipment Availability among the Participants

Personal protective equipment availability	Frequency	Percentage	Total
Not confident at all	4	3.4	118
A little confident	6	5.1	118
Somewhat confident	42	35.6	118
Confident	52	44.1	118
Very confident	14	11.9	118

Around 44% of participants were confident with the PPE available for them followed by more than 35% of participants were somewhat confident.
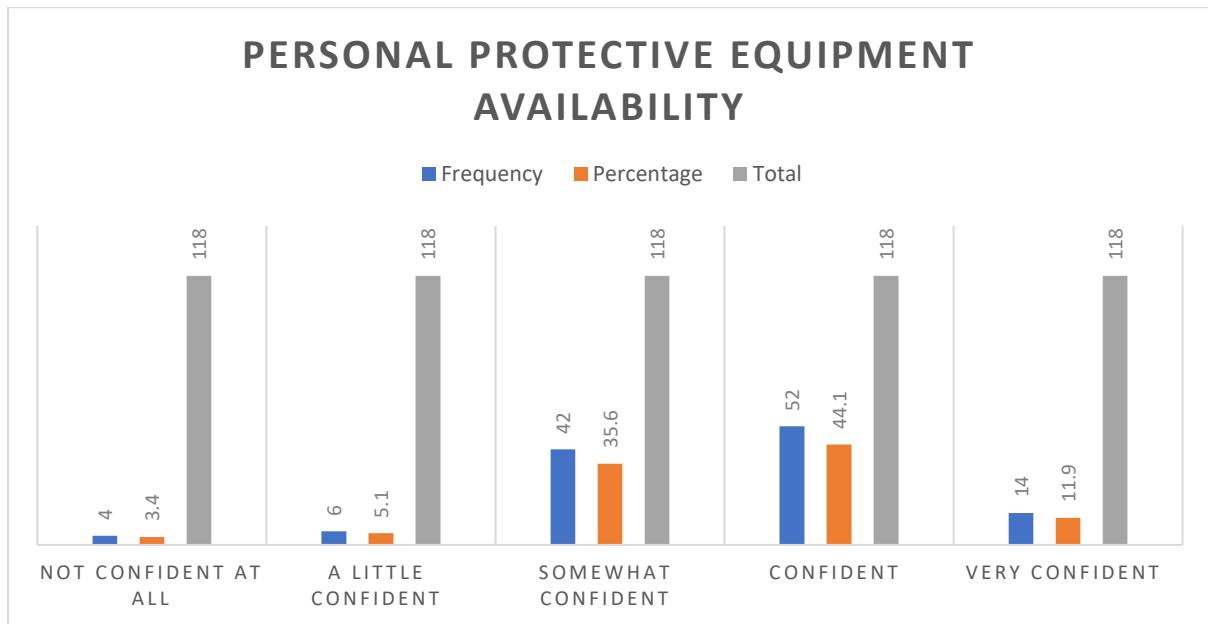
Figure 1- Personal Protective Equipment Availability among the Participants

Around 44% of participants were confident with the PPE available for them followed by more than 35% of participants were somewhat confident.

Table 11: Association between Sociodemographic Factors and Stress

Variable		Stress		P value
		Normal to moderate	Severe to extremely severe	
Gender	Male	17 (40.5)	25 (59.5)	NS (> 0.05)
	Female	27 (40.9)	39 (59.1)	
Age	Lower than 30	15 (31.3)	33 (68.8)	NS(> 0.05)
	More than 31	28 (48.3)	30 (51.7)	
Nationality	Indian	24 (39.3)	37 (60.7)	-
	Egyptian	1 (16.7)	5 (83.3)	
	Emirati	2 (66.7)	1 (33.3)	
	Others	16 (47.1)	18 (52.9)	
Marital status	Married	31 (42.5)	42 (57.5)	NS(> 0.05)
	Single	12 (35.3)	22 (64.7)	
Work experience	10 years or less	25 (36.8)	43 (63.2)	NS(> 0.05)
	More than 10 years	19 (47.5)	21 (52.5)	
Academic level	Undergraduate	4 (25)	12 (75)	-
	Graduate	24 (40.7)	35 (59.3)	
	Postgraduate	15 (55.6)	12 (44.4)	
	Higher education	1 (16.7)	5 (83.3)	

In association between sociodemographic factors and stress; age, gender, marital status and work experience all showed to be nonsignificant.

Table 12: Association between Occupation and Stress

Variable		Stress		P value
		Normal to moderate	Severe to extremely sever	NS (> 0.05)
Occupation	Medical practitioners	10 (43.5)	13 (56.5)	
	Dentists	7 (53.8)	6 (46.2)	
	Nurses	14 (37.8)	23 (62.2)	
	Other health professions	13 (37.1)	22 (62.9)	

Although 62% of nurses showed stress levels of server to extremely sever there was still no significant relation between the occupation and the severity of stress amongst the participants.

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Table 13: Association between Social-support and Stress

Variable		Stress		P value
Social-support		Normal to moderate	Severe to extremely severe	
Constant contact with friends and family	No	9 (36)	16 (64)	NS (> 0.05)
	Yes	35 (42.7)	47 (57.3)	
Having someone to turn to for support	No	13 (56.5)	10 (43.5)	NS (> 0.05)
	Yes	31 (36.5)	54 (63.5)	
Presentation with psychosocial support	No	36 (45)	44 (55)	NS(> 0.05)
	Yes	8 (28.6)	20 (71.4)	
Consideration of receiving support	No	22 (55)	18 (45)	NS(> 0.05)
	Yes	15 (36.6)	26 (63.4)	
Worrying about own health or health of loved ones	No	6 (66.7)	3 (33.3)	NS(> 0.05)
	Yes	38 (38.4)	61 (61.6)	

Around 57% of participants showed severe to extremely severe stress levels upon constant contact with family and friends, making them more susceptible to a COVID-19 infection. Around 63% of participants showed severe to extremely severe stress levels even though they have someone to turn to for support during their toughest times. Around 71% of participants have not presented with any psychosocial support in the past and showed severe to extremely severe stress levels. Majority of them worry about their own health and those of their loved ones. However, there was still no significant relation between social support and stress levels.

Table 14: Association between Sleep-quality and Stress

Sleep-quality		Stress		P value
		Normal to moderate	Severe to extremely severe	
Irregular sleeping patterns during the pandemic	No	18 (46.2)	21 (53.8)	NS(> 0.05)
	Yes	25 (37.3)	42 (62.7)	
Duration of sleep during the pandemic	Less than 4 hrs	3 (37.5)	5 (62.5)	NS(> 0.05)
	4-6 hrs	21 (40.8)	31 (59.6)	
	6-8 hrs	19 (45.2)	23 (54.8)	
	More than 8 hrs	1 (16.7)	5 (83.3)	
Lack of sleep affecting work	No	17 (39.5)	26 (60.5)	NS(> 0.05)
	Yes	27 (42.2)	37 (57.8)	

It was observed that around 63% participants showed severe to extremely severe levels of stress while having irregular sleeping patterns during the pandemic. It was also observed that around 83% of the participants sleeping more than 8 hours showed severe to extremely severe levels of stress. Lack of sleep did not have any significant effect on work. However, there was still no significant relation between sleep quality and stress levels.

Table 15: Association between Self-efficacy and Stres

Self-efficacy		Stress		P value
		Normal to moderate	Severe to extremely severe	
Effect of work schedules on wellbeing during the pandemic	No	19 (59.4)	13 (40.6)	
	Yes	25 (32.9)	51 (67.1)	S (< 0.05)
Solutions creativity amid tough situations	No	12 (44.4)	15 (55.6)	NS(> 0.05)
	Yes	31 (38.8)	49 (61.3)	
Work discouragement in tough situations	No	23 (52.3)	21 (47.7)	S (< 0.05)
	Yes	21 (32.8)	43 (67.2)	

Around 67% of the participants showed a significant relationship between extreme levels of stress and effect of work schedule on their wellbeing during the pandemic. There was no significant relation between stress levels and solutions creativity amid tough situations even though 61% of the participants showed severe to extremely severe levels of stress. It was also observed that there was a significant relation between stress levels and work discouragement in tough situations as 67% of the participants showed severe to extremely severe levels of stress.

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Table 16: Association between Sociodemographic Factors and Anxiety

Variable		Anxiety		P value
		Moderate to severe	Extremely severe	
Gender	Male	17 (37.8)	28 (62.2)	NS(> 0.05)
	Female	18 (27.7)	47 (72.3)	
Age	Lower than 30	10 (19.6)	41 (80.4)	S (< 0.05)
	More than 31	24 (41.4)	34 (58.6)	
Nationality	Indian	19 (30.3)	44 (69.8)	NS(> 0.05)
	Egyptian	2 (33.3)	4 (66.7)	
	Emirati	0 (0)	3 (100)	
	Others	14 (40)	21 (60)	
Marital status	Married	24 (32.4)	50 (67.6)	NS(> 0.05)
	Single	10 (28.6)	25 (71.4)	
Work experience	10 years or less	25 (36.8)	43 (63.2)	NS(> 0.05)
	More than 10 years	19 (47.5)	21 (52.5)	
Academic level	Undergraduate	4 (23.5)	13 (76.5)	NS(> 0.05)
	Graduate	18 (30.5)	41 (69.5)	
	Postgraduate	12 (42.9)	16 (57.1)	
	Higher education	1 (16.7)	5 (83.3)	

It was observed that among the sociodemographic factors, age was shown to have a significant relation with anxiety. Around 80% of the participants who are below the age of 30 showed extremely severe anxiety.

Table 17: Association between Occupation and Anxiety

Variable		Anxiety		P value
		Moderate to severe	Extremely severe	
Occupation	Medical practitioners	9 (39.1)	14 (60.9)	NS(> 0.05)
	Dentists	4 (28.6)	10 (71.4)	
	Nurses	11 (29.7)	26 (70.3)	
	Other health professions	11 (30.6)	25 (69.4)	

There was no significant relation between levels of anxiety and occupation although it was observed that 71% of the dentists suffered from extreme levels of anxiety.

Table 18: Association between Social-support and Anxiety

Variable		Anxiety		P value
Social-support		Moderate to severe	Extremely severe	
Constant contact with friends and family	No	9 (36)	16 (64)	NS(> 0.05)
	Yes	26 (31)	58 (69)	
Having someone to turn to for support	No	10 (47.6)	11 (52.4)	NS(> 0.05)
	Yes	25 (28.1)	64 (71.9)	
Presentation with psychosocial support	No	28 (33.3)	56 (66.7)	NS(> 0.05)
	Yes	7 (26.9)	19 (73.1)	
Consideration of receiving support	No	18 (46.2)	21 (53.8)	S (< 0.05)
	Yes	10 (22.2)	35 (77.8)	
Worrying about own health or health of	No	4 (50)	4 (50)	NS(> 0.05)
	Yes	31 (30.4)	71 (69.6)	

More than 77% of participants who showed an extreme level of anxiety, would consider receiving social support if available, and it was statistically significant.

Table 19: Association between Sleep-quality and Anxiety

Sleep-quality		Anxiety		P value
		Moderate to severe	Extremely severe	
Irregular sleeping patterns during the pandemic	No	12 (30.8)	27 (69.2)	NS(> 0.05)
	Yes	22 (31.9)	47 (68.1)	
Duration of sleep during the pandemic	Less than 4 hrs	2 (25)	6 (75)	NS(> 0.05)
	4-6 hrs	15 (27.3)	40 (72.7)	
	6-8 hrs	17 (39.5)	26 (60.5)	
	More than 8 hrs	1 (25)	3 (75)	
Lack of sleep affecting work	No	15 (35.7)	27 (64.3)	NS(> 0.05)
	Yes	20 (29.9)	47 (70.1)	

Although around 70% of participants who were extremely severely anxious showed to have irregular sleeping patterns and during the pandemic that affected their work, it wasn't statistically significant.

Table 20: Association between Self-efficacy and Anxiety

Self-efficacy		Anxiety		P value
		Moderate to severe	Extremely severe	
Effect of work schedules on wellbeing during the pandemic	No	14 (45.2)	17 (54.8)	NS(> 0.05)
	Yes	21 (26.6)	58 (73.4)	
Solutions creativity amid tough situations	No	9 (37.5)	15 (62.5)	NS(> 0.05)
	Yes	26 (30.6)	59 (69.4)	
Work discouragement in tough situations	No	18 (41.9)	25 (58.1)	NS(> 0.05)
	Yes	17 (25.4)	50 (74.6)	

Although around 70% of participants agreed that self-efficacy was affected by the pandemic which also affected their well-being and their working experience, it wasn't statistically significant.

Table 21: Association between Sociodemographic Factors and Depression

Variable		Depression		P value
		Moderate to severe	Extremely severe	
Gender	Male	30 (68.2)	14 (31.8)	NS (> 0.05)
	Female	44 (65.7)	23 (34.3)	
Age	Lower than 30	28 (54.9)	23 (45.1)	S (< 0.05)
	More than 31	44 (75.9)	14 (24.1)	
Nationality	Indian	45 (70.3)	19 (29.7)	NS (> 0.05)
	Egyptian	4 (66.7)	2 (33.3)	
	Emirati	2 (66.7)	1 (33.3)	
	Others	20 (58.8)	14 (41.2)	
Marital status	Married	53 (70.7)	22 (29.3)	NS (> 0.05)
	Single	20 (57.1)	15 (42.9)	
Work experience	10 years or less	45 (61.6)	28 (38.4)	S (< 0.05)
	More than 10 years	29 (76.3)	9 (23.7)	
Academic level	Undergraduate	10 (58.8)	7 (41.2)	NS (> 0.05)
	Graduate	40 (65.6)	21 (34.4)	
	Postgraduat	20 (71.4)	8 (28.6)	
	Higher education 30 (68.2)	4 (80)	1 (20)	

Both age and work experience showed to have a significant relation with depression. About 76% of participants of age 31 or more, and about 55% less than 30 years experienced moderate to severe depression. Also, 76% of participants who worked for more than 10 years and 61% who worked less than 10 years showed signs of moderate to severe depression.

Table 22: Association between Occupation and Depression

Variable		Depression		P value
		Moderate to severe	Extremely severe	NS (> 0.05)
Occupation	Medical practitioners	15 (65.2)	8 (34.8)	
	Dentists	9 (64.3)	5 (35.7)	
	Nurses	27 (71.1)	11 (28.9)	
	Other health professions	23 (63.9)	13 (36.1)	

Although statistically insignificant, around 65% of HCWs experienced a moderate to severe level of depression, accounting mostly for nurses with a 71%.

Table 23: Association between Social-support and Depression

Variable		Depression		P value
Social-support		Moderate to severe	Extremely severe	
Constant contact with friends and family	No	16 (59.3)	11 (40.7)	NS (> 0.05)
	Yes	57 (68.7)	26 (31.3)	
Having someone to turn to for support	No	17 (70.8)	7 (29.2)	NS (> 0.05)
	Yes	57 (65.5)	30 (34.5)	
Presentation with psychosocial support	No	62 (72.1)	24 (27.9)	NS (> 0.05)
	Yes	12 (48)	13 (52)	
Consideration of receiving support	No	30 (71.4)	12 (28.6)	NS (> 0.05)
	Yes	32 (71.1)	13 (28.9)	
Worrying about own health or health of loved ones	No	5 (62.5)	3 (37.5)	NS (> 0.05)
	Yes	69 (67)	34 (33)	

Around 69% of participants showed moderate to severe depression levels upon constant contact with family and friends, making them more susceptible to a COVID-19 infection. Around 65% of participants showed moderate to severe depression levels even though they have someone to turn to for support during their toughest times. Around 71% of participants have not presented with any psychosocial support in the past and showed moderate to severe depression levels. Majority of them worry about their own health and those of their loved ones. However, there was still no significant relation between social support and depression levels.

Table 24: Association between Sleep-quality and Depression

Sleep-quality		Depression		P value
		Moderate to severe	Extremely severe	
Irregular sleeping patterns during the pandemic	No	27 (67.5)	13 (32.5)	NS (> 0.05)
	Yes	45 (65.2)	24 (34.8)	
Duration of sleep during the pandemic	Less than 4 hrs	6 (75)	2 (25)	S (< 0.05)
	4-6 hrs	35 (63.6)	20 (36.4)	
	6-8 hrs	32 (76.2)	10 (23.8)	
	More than 8 hrs	1 (16.7)	5 (83.3)	
Lack of sleep affecting work	No	26 (61.9)	16 (38.1)	NS (> 0.05)
	Yes	47 (69.1)	21 (30.9)	

Most participants who experienced a moderate to severe depression level proved to have irregular sleeping patterns during the pandemic. The group which showed the most prevalent moderate to severe depressive signs is the group which had a sleep duration of 6 to 8 hours daily, which was statistically significant.

Table 25: Association between Self-efficacy and Depression

Self-efficacy		Depression		P value
		Moderate to severe	Extremely severe	
Effect of work schedules on wellbeing during the pandemic	No	22 (66.7)	11 (33.3)	NS (> 0.05)
	Yes	52 (66.7)	26 (33.3)	
Solutions creativity amid tough situations	No	15 (57.7)	11 (42.3)	NS (> 0.05)
	Yes	58 (69)	26 (31)	
Work discouragement in tough situations	No	29 (65.9)	15 (34.1)	NS (> 0.05)
	Yes	45 (67.2)	22 (32.8)	

Although more than 60% of participants agreed that self-efficacy was affected by the pandemic which affected their well-being and their working experience, it wasn't statistically significant.

5. Discussion

This study was designed to determine the prevalence of depression, anxiety and stress levels among HCWs and comparing the stress levels among different healthcare professionals treating patients during the COVID-19 pandemic. It was also aimed to find the association between different factors like social support, sleep quality and self-efficacy among HCWs. The study was conducted in the ongoing wave of the pandemic in UAE from the start of January 2021 to the start of December 2021. This study found a significant prevalence of the aforementioned problems of stress, anxiety and depression. According to the stress factor, it was observed that 40.7% of healthcare workers showed normal to moderate stress and 59.3% showed severe to extremely severe stress. According to the anxiety factor, 31.8% showed moderate to severe anxiety whereas 68.2% showed severe to extremely severe anxiety. According to the depression factor, 66.7% showed moderate to severe depression whereas 33.3% showed severe to extremely depression. However, a Chinese study published on June 23rd, 2020 showed slightly less prevalence of stress (35%) among HCW whereas it showed very less prevalence of anxiety (12.3%) and depression (14.8%) [42].

HCW perceived social factors like self-efficacy were mostly significantly associated with stress levels but not with anxiety and depression levels. Effect of work schedules on well being and work discouragement were both associated with increased stress levels but not with anxiety and depression levels. In this study, younger age groups (those lower than 30) were linked to increased anxiety levels (80.4%). The results were similar to a meta analysis study where increased rates of anxiety were found to be associated with younger age. It is believed that uncertainty about future jobs and careers might be a driving force for anxiety at such a young age. Younger participants' excessive smartphone use, financial worry, social and intimate relationship worry etc. are found to be caused by increased anxiety. The comparatively older population may have experienced high anxiety levels mostly due to the pandemic and frequent exposure to the virus itself which were seen in some articles. In our study, social support was found to be associated to anxiety among HCW who took the survey. Around 77% of them reported to have extremely severe anxiety and considered receiving support if available [43].

This study showed significant associations for age and work experience with depression. Another study had emphasized on stress and mental health during the outbreak in China. However, it had revealed that HCWs did not show a high prevalence of anxiety and depression based on work experience. Furthermore, it is crucial to notice that cumulative occupational stress has a possible negative association causing severe psychological impact, which may be a warning sign considering there is a shortage of health workers worldwide. HCWs younger than 30 years had experienced higher level of depression in the study in China contrary to this study where older people had a more higher prevalence of depression (75.9%). Older workers were less likely to develop depressive symptoms [44].

This study had showed that most of the participants who had a sleep duration of 4-

6 hours on average had experienced moderate to severe depression. It also stated that healthcare workers from all areas of work with moderate to severe depression had irregular sleeping patterns (65.2%). Another study conducted had revealed a 41.6% prevalence of sleep disturbances among physicians which shows a comparatively lesser prevalence when taken by occupation overall. The prevalence among nurses were 34.8%. An Iraqi study presented with 68.3% prevalence of sleep disturbances in physicians. Previous studies have shown that there was a significant association between irregular sleeping patterns and occupation like physicians and nurses. In these times, nurses and physicians are stepping forward to combat COVID-19. These groups are always subjected to high risk of infection, longer working hours, shortage of medical equipment etc. Longer working hours in particular can increase chances of irregular sleeping patterns and shorter sleep which only enhances fatigue, drowsiness and loss of appetite [45].

5.1   Limitations

Not enough participants had the time to answer the questionnaire. The head of research limited us to thumbay hospitals only which opposed as a challenge due to the far distance between in each hospital. Another limitation that we had during the research is that different healthcare workers have different working hours which prolonged our data collection. Transportation was another obstacle that we had to overcome, because of the long distance between each hospital and the fact that we had to use public transportation.

6. Conclusion

This study aimed to determine the prevalence of stress, depression and anxiety among HCWs during COVID-19 pandemic. In association between sociodemographic factors and stress; age, gender, marital status and work experience all showed to be non-significant. It was observed that among the sociodemographic factors, age was shown to have a significant relation with anxiety. Both age and woke experience showed to have a significant relation with depression. About 76% of particepent of age 31 or more, and about 55% less than 30 years experienced a moderate to sevre depression. Also, 76% of participants whp worked for more than 10 years and 61% who worled less than 10 years showed signs of a moderate to severe depression. Also, it compared the stress level among different health care professionals treating COVID-19 patients. 62% of nurses showed stress levels of sever to extremely severe, however, there was still no significant releation between the occupation and the severity of stress amongst the participants. Furthermore, the study determined the association between different factors like: social support, sleep quality and self-efficacy among HCWs. More than 77% of participants who shoed an extreme level of anxiety, would consider receving social support if avalible, and it was statistaclly significant. Most of participants who experinced a moderate to severe depression level proved to have an irregular sleeping patterns during the pandemic. The group which showed the most prevelant

a moderate to severe depressive signs is the group which had a sleep duration of 6 to 8 hours daily, which was a stattiscaly significant. Around 67% of the participants showed a significant relationship between extreme levels of stress and effect of work schedule on the wellbeing during the pandemic. There was no significant relation between stress levels and solutions creativity amid tough situation even though 61% of the participants showed severe to extremely severe levels of stress. It was also observed that there was a significant relation between stress levels and work discouragment in tough situations as 67% of the participants showed severe to extremely severe levels of stress.

6.1   Recommendation

Our Research highlights the levels of stress amongst health care workers and the major ways of preventing them. This research has been conducted to have a sufficient knowledge on how HCWs can deal and cope with stress in future pandemics, and to recommend efficient preventive measurements. It would be wise if the junior HCWs assist the senior HCWs on dealing with COVID patients so as to reduce the workload of the senior HCWs. We can recommend the health care workers to adopt to a healthy lifestyle such as eating healthy foods, involving in daily exercise or any other recreational activity, adopting proper sleep cleanliness if possible, and ensuring adequate rest by having a proper sleeping pattern. Providing enough PPE supplies proved to be an effective measurement in reducing work related stress. Making sure that the management gives HCWs sufficient time to rest and spend time with their loved once can help them to cope with stress, anxiety and depression. To ensure that the HCWs keep receiving moral support and motivation not only from the loved ones, but also from the public as well as patients.

References

[1]   Talaee N, Varahram M, Jamaati H, Salimi A, Attarchi M, Kazempour dizaji M, et al. Stress and burnout in health care workers during COVID-19 pandemic: Validation of a questionnaire - Journal of Public Health [Internet]. SpringerLink. Springer Berlin Heidelberg; 2020 [cited 2021Dec18]. Available from: https://link.springer.com/article/10.1007%2Fs10389-020-01313-z

[2]   Coronavirus cases: [Internet]. Worldometer. [cited 2021Dec18]. Available from: https://www.worldometers.info/coronavirus/

[3]   Singhal T. A review of Coronavirus Disease-2019 (COVID-19) - indian journal of pediatrics [Internet]. SpringerLink. Springer India; 2020 [cited 2021Dec18]. Available from:
       https://link.springer.com/article/10.1007/s12098-020-03263-6

[4]   Kushal A, Gupta S, Metha M, Singh MM. Study of stress among health care professionals: A systemic review. Int J Res Foundation Hosp Healthcare Adm. 2018 Jan;6:6-11.

[5]   Vizheh M, Qorbani M, Arzaghi SM, Muhidin S, Javanmard Z, Esmaeili M. The mental health of healthcare workers in the COVID-19 pandemic: A

systematic review. Journal of Diabetes & Metabolic Disorders. 2020 Oct 26:1-2.

[6] Elizabeth Scott PD. How is stress affecting my health? [Internet]. Verywell Mind. Verywell 2020 [cited 2021Dec18]. Available from: https://www.verywellmind.com/stress-and-health-3145086

[7] Stress and happiness in the UAE [Internet]. ERS. [cited 2021Dec18]. Available from: https://ers.ae/news/512

[8] Team the HE. Everything to know about stress: Causes, prevention, and more [Internet]. Healthline. Healthline Media; 2020 [cited 2021Dec18]. Available from: https://www.healthline.com/health/stress#causes

[9] Salari N, Khazaie H, Hosseinian-Far A, Khaledi-Paveh B, Kazeminia M, Mohammadi M, et al. The prevalence of stress, anxiety and depression within front line healthcare workers caring for covid-19 patients: A systematic review and meta regression - human resources for health [Internet]. BioMed Central. BioMed Central; 2020 [cited 2021Dec18]. Available from: https://human-resources health.biomedcentral.com/articles/10.1186/s12960-020-00544-1

[10] Aly HM, Nemr NA, Kishk RM, Elsaid NMAbakr. Stress, anxiety and depression among healthcare workers facing covid-19 pandemic in Egypt: A cross-sectional online-based study [Internet]. BMJ Open. British Medical Journal Publishing Group; 2021 [cited 2021Dec18]. Available from: https://bmjopen.bmj.com/content/11/4/e045281

[11] Wilkins K. Work stress among health care providers Work stress among health care providers Work stress among health care providers [Internet]. greylit.pbworks.com. 2021 [cited 2021Dec19]. Available from: http://greylit.pbworks.com/f/Work%20Stress%20Among%20Health%20Care%20Providers.pdf

[12] Shechter A., Diaz F., Moise N., Anstey D.E., Ye S., Agarwal S., Birk J.L., Brodie D., Cannone D.E., Chang B., Claassen J., Cornelius T., Derby L., Dong M., Givens R.C., Hochman B., Homma S., Kronish I.M., Lee S.A.J., Manzano W., Mayer L.E.S., McMurry C.L., Moitra V., Pham P., Rabbani L., Rivera R.R., Schwartz A., Schwa. Psychological distress, coping behaviors, and preferences for support among New York healthcare workers during the COVID-19 pandemic [Internet]. General hospital psychiatry. U.S. National Library of Medicine; [cited 2021Dec18]. Available from: https://pubmed.ncbi.nlm.nih.gov/32590254/

[13] Badru OA, Oloko KO, Hassan AO, Yusuf OB, Abdur-Razaq UA, Yakub S. Prevalence and correlates of psychological distress amongst healthcare workers during the COVID-19 pandemic: An online survey [Internet]. The South African journal of psychiatry : SAJP : the journal of the Society of Psychiatrists of South Africa. AOSIS; 2021 [cited 2021Dec18]. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8335756/

[14] Vizheh M; Qorbani M; Arzaghi SM; Muhidin S; Javanmard Z; Esmaeili M; The mental health of healthcare workers in the COVID-19 pandemic: A systematic review [Internet]. Journal of diabetes and metabolic disorders. U.S.

National Library of Medicine; [cited 2021Dec18]. Available from: https://pubmed.ncbi.nlm.nih.gov/33134211/

[15] Prasad K;McLoughlin C;Stillman M;Poplau S;Goelz E;Taylor S;Nankivil N;Brown R;Linzer M;Cappelucci K;Barbouche M;Sinsky CA; Prevalence and correlates of stress and burnout among U.S. healthcare workers during the COVID-19 pandemic: A National Cross-sectional Survey Study [Internet]. EClinicalMedicine. U.S. National Library of Medicine; [cited 2021Dec18]. Available from: https://pubmed.ncbi.nlm.nih.gov/34041456/

[16] Alenazi TH;BinDhim NF;Alenazi MH;Tamim H;Almagrabi RS;Aljohani SM;H Basyouni M;Almubark RA;Althumiri NA;Alqahtani SA; Prevalence and predictors of anxiety among healthcare workers in Saudi Arabia during the covid-19 pandemic [Internet]. Journal of infection and public health. U.S. National Library of Medicine; [cited 2021Dec18]. Available from: https://pubmed.ncbi.nlm.nih.gov/33032969/

[17] Monita Karmakar PD. Association of sociodemographic factors with covid-19 incidence and death rates in the US [Internet]. JAMA Network Open. JAMA Network; 2021 [cited 2021Dec18]. Available from: https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2775732#:~:t ext=Conclusions%20and%20Relevance%20In%20this,COVID%2D19%20in cidence %20and%20mortality

[18] Elbay RY, Kurtulmuş A, Arpacıoğlu S, Karadere E. Depression, anxiety, stress levels of physicians and associated factors in covid-19 pandemics [Internet]. Psychiatry Research. Elsevier; 2020 [cited 2021Dec18]. Available from: https://www.sciencedirect.com/science/article/pii/S0165178120312038

[19] Ping Wu YF. The psychological impact of the SARS epidemic on hospital employees in China: Exposure, risk perception, and altruistic acceptance of risk - Ping Wu, Yunyun Fang, Zhiqiang Guan, bin fan, Junhui Kong, Zhongling Yao, Xinhua Liu, Cordelia J Fuller, Ezra Susser, Jin Lu, Christina W Hoven, 2009 [Internet]. SAGE Journals. [cited 2021Dec18]. Available from: https://journals.sagepub.com/doi/abs/10.1177/070674370905400504

[20] Zhu Z, Wang W, Liu J, Hu J, Chen Y, Fan Y, et al. COVID-19 in Wuhan: Sociodemographic characteristics and hospital support measures associated with the immediate psychological impact on healthcare workers [Internet]. EClinicalMedicine. THE LANCET; [cited 2021Dec18]. Available from: https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370(20)30187 5/fulltext

[21] Nguyen NPT, Le DD, Colebunders R, Siewe Fodjo JN, Tran TD, Vo TV. Stress and associated factors among frontline healthcare workers in the COVID-19 epicenter of Da Nang City, Vietnam [Internet]. International journal of environmental research and public health. MDPI; 2021 [cited 2021Dec18]. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8303910/

[22] Teo I, Chay J, Cheung YB, Sung SC, Tewani KG, Yeo LF, et al. Healthcare worker stress, anxiety and burnout during the COVID-19 pandemic in

Singapore: A 6 month multi-centre prospective study [Internet]. PLOS ONE. Public Library of Science; [cited 2021Dec18]. Available from: https://journals.plos.org/plosone/article?id=10.1371%2Fjournal.pone.025886 6

[23] Du J, Dong L, Wang T, Yuan C, Fu R, Zhang L, et al. Psychological symptoms among frontline healthcare workers during COVID-19 outbreak in Wuhan [Internet]. General Hospital Psychiatry. Elsevier; 2020 [cited 2021Dec18]. Available from: https://www.sciencedirect.com/science/article/pii/S0163834320300451

[24] Zheng R, Zhou Y, Qiu M, Yan Y, Yue J, Yu L, et al. Prevalence and associated factors of depression, anxiety, and stress among Hubei pediatric nurses during COVID-19 pandemic [Internet]. Comprehensive Psychiatry. W.B. Saunders; 2020 [cited 2021Dec18]. Available from: https://www.sciencedirect.com/science/article/pii/S0010440X20300596

[25] Chatterjee SS, Chakrabarty M, Banerjee D, Grover S, Chatterjee SS, Dan U. Stress, sleep and psychological impact in healthcare workers during the early phase of COVID-19 in India: A factor analysis [Internet]. Frontiers. Frontiers; 1AD [cited 2021Dec18]. Available from: https://www.frontiersin.org/articles/10.3389/fpsyg.2021.611314/full

[26] Yaoyao Sun HS. Occupational stress, mental health, and self-efficacy among community mental health workers: A cross-sectional study during COVID-19 pandemic - Yaoyao Sun, Haidong song, Hong Liu, Fangxiang Mao, Xiaohua Sun, Fenglin Cao, 2020 [Internet]. SAGE Journals. [cited 2021Dec18]. Available from: https://journals.sagepub.com/doi/full/10.1177/0020764020972131

[27] Jianbo Lai MS. Mental health outcomes among health care workers exposed to COVID-19 [Internet]. JAMA Network Open. JAMA Network; 2020 [cited 2021Dec18]. Available from: https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2763229

[28] Mattioli AV, Pinti M, Farinetti A, Nasi M. Obesity risk during collective quarantine for the covid-19 epidemic [Internet]. Obesity Medicine. Elsevier; 2020 [cited 2021Dec18]. Available from: https://www.sciencedirect.com/science/article/pii/S245184762030083X

[29] Chua GT, Tung KTS, Kwan MYW, Wong RS, Chui CSL, Li X, et al. Multilevel factors affecting healthcare workers' perceived stress and risk of infection during COVID-19 pandemic [Internet]. Frontiers. Frontiers; 1AD [cited 2021Dec18]. Available from: https://www.ssphjournal.org/articles/10.3389/ijph.2021.599408/full

[30] Rose S, Hartnett J, Pillai S. Healthcare Worker's emotions, perceived stressors and coping mechanisms during the COVID-19 pandemic [Internet]. PLOS ONE. Public Library of Science; [cited 2021Dec18]. Available from: https://journals.plos.org/plosone/article?id=10.1371%2Fjournal.pone.025425 2

[31] Yaoyao Sun HS. Occupational stress, mental health, and self-efficacy among community mental health workers: A cross-sectional study during COVID-19 pandemic - Yaoyao Sun, Haidong song, Hong Liu, Fangxiang Mao, Xiaohua Sun,Fenglin Cao, 2020 [Internet]. SAGE Journals. [cited 2021Dec18]. Available from: https://journals.sagepub.com/doi/full/10.1177/0020764020972131

[32] Balasubramanian A, Paleri V, Bennett R, Paleri V. Impact of Covid-19 on the Mental Health of Surgeons and coping strategies [Internet]. Wiley Online Library. John Wiley & Sons, Ltd; 2020 [cited 2021Dec18]. Available from: https://onlinelibrary.wiley.com/doi/full/10.1002/hed.26291

[33] Zare S, dameneh MM, Esmaeili R, Kazemi R, Naseri S, Panahi D. Occupational Stress Assessment of Health Care Workers (hcws) facing covid-19 patients in Kerman Province Hospitals in Iran [Internet]. Heliyon. Elsevier; 2021 [cited 2021Dec18]. Available from: https://www.sciencedirect.com/science/article/pii/S2405844021011385

[34] Khanal P, Devkota N, Dahal M, Paudel K, Joshi D. Mental health impacts among health workers during COVID-19 in a low resource setting: A cross-sectional survey from Nepal - globalization and health [Internet]. BioMed Central. BioMed Central; 2020 [cited 2021Dec18]. Available from: https://globalizationandhealth.biomedcentral.com/articles/10.1186/s12992-020 00621-z

[35] Rose S, Hartnett J, Pillai S. Healthcare Worker's emotions, perceived stressors and coping mechanisms during the COVID-19 pandemic [Internet]. PLOS ONE. Public Library of Science; [cited 2021Dec18]. Available from: https://journals.plos.org/plosone/article?id=10.1371%2Fjournal.pone.0254252#po ne.0254252.ref013

[36] Rose S, Hartnett J, Pillai S. Healthcare Worker's emotions, perceived stressors and coping mechanisms during the COVID-19 pandemic [Internet]. PLOS ONE. Public Library of Science; [cited 2021Dec18]. Available from: https://journals.plos.org/plosone/article?id=10.1371%2Fjournal.pone.0254252

[37] Prasad K, Loughlin CM, Stillman M, Poplau S, Goelz E, Taylor S, et al. Prevalence and correlates of stress and burnout among U.S. healthcare workers during the COVID-19 pandemic: A national cross-sectional survey study [Internet]. EClinicalMedicine. THE LANCET; [cited 2021Dec18]. Available from: https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370(21)00159 0/fulltext

[38] Salari N, Khazaie H, Hosseinian-Far A, Khaledi-Paveh B, Kazeminia M, Mohammadi M, et al. The prevalence of stress, anxiety and depression within front line healthcare workers caring for covid-19 patients: A systematic review and meta regression - human resources for health [Internet]. BioMed Central. BioMed Central; 2020 [cited 2021Dec18]. Available from: https://human-resources health.biomedcentral.com/articles/10.1186/s12960-020-00544-1

[39] Sangal RB, Wrzesniewski A, DiBenigno J, Reid E, Ulrich A, Liebhardt B, et al. Work team identification associated with less stress and burnout among front-line emergency department staff amid the COVID-19 pandemic [Internet]. BMJ Leader. BMJ Specialist Journals; 2021 [cited 2021Dec18]. Available from: https://bmjleader.bmj.com/content/5/1/51

[40] Htay MNN, Marzo RR, Bahari R, AlRifai A, Kamberi F, El-Abasiri RA, et al. How healthcare workers are coping with mental health challenges during COVID-19 pandemic? - A cross-sectional multi-countries study [Internet]. Clinical Epidemiology and Global Health. [cited 2021Dec18]. Available from: https://cegh.net/article/S2213-3984(21)00063-4/fulltext

[41] Beesan Maraqa ZN. Palestinian health care workers' stress and stressors during COVID-19 pandemic: A cross-sectional study - beesan maraqa, Zaher Nazzal, Therese Zink, 2020 [Internet]. SAGE Journals. [cited 2021Dec18]. Available from: https://journals.sagepub.com/doi/full/10.1177/2150132720955026

[42] Define_me. [cited 2022Feb12]. Available from: https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370(20)30187 5/fulltext

[43] Santabárbara J, Lasheras I, Lipnicki DM, Bueno-Notivol J, Pérez-Moreno M, López-Antón R, et al. Prevalence of anxiety in the COVID-19 pandemic: An updated meta-analysis of community-based studies [Internet]. Progress in Neuro Psychopharmacology and Biological Psychiatry. Elsevier; 2020 [cited 2022Feb12]. Available from: https://www.sciencedirect.com/science/article/pii/S0278584620305236#bb00 45

[44] Yaoyao Sun, Hong Liu, Fangxiang Mao, Xiaohua Sun, Fenglin Cao. Occupational stress, mental health, and self-efficacy among community mental health workers: A cross-sectional study during COVID-19 pandemic [cited 2022Feb12]. Available from: https://journals.sagepub.com/doi/full/10.1177/0020764020972131

[45] Salari N, Khazaie H, Hosseinian-Far A, Ghasemi H, Mohammadi M, Shohaimi S, et al. The prevalence of sleep disturbances among physicians and nurses facing the COVID-19 patients: A systematic review and meta-analysis - globalization and health [Internet]. BioMed Central. BioMed Central; 2020 [cited 2022Feb12]. Available from: https://globalizationandhealth.biomedcentral.com/articles/10.1186/s12992-020 00620-0.

Appendix
Questionnaire
Sociodemographic Questionnaire

1. Gender:
a. Male
b. Female

2. Age: _____

3. Nationality: _____

4. Work experience:
a. 0-10 years
b. 10-20 years
c. More than 20 years

5. Marital status:
a. Married
b. Single

6. Academic level:
a. Undergraduate
b. Graduate
c. Postgraduate
d. Higher Education

7. Occupation:
a. Generalist medical practitioners
b. Specialist medical practitioners
c. Dentists
d. Paramedical practitioners
e. Nurse
f. Pharmacists
g. Physiotherapists
h. Other Health Professions

Part A:
1. Have you had any previous infectious disease experience?
a. Yes
b. No

2. How many hours/days have you spent in caring for COVID-19 patients? _____

3. How many hours/days have you spent with your colleagues in treating COVID-19? _____

4. Do you feel that the PPE available to you is enough to protect you while managing patients with COVID-19?
a. Not confident at all
b. A little confident
c. Somewhat confident confident
d. Confident
e. Very

5. Have you worked in a setting exclusive for treating COVID-19 patients?
a. Yes
b. No

6. Do you rely on verified information sources for COVID-19 updates?
a. Yes
b. No

7. Are work schedules having an effect on your wellbeing during the pandemic?
a. Yes
b. No

8. Have you had irregular sleeping patterns during the pandemic?
a. Yes
b. No

9. How many hours of sleep do you get each day during the pandemic?
a. Less than 4 hours
b. 4 to 6 hours
c. 6 to 8 hours
d. more than 8 hours

10. Lack of sleep makes me lose interest in work?
a. Yes
b. No

11.   Do tough situations make you competent to create effective solutions?
a. Yes
b. No

12. If something goes wrong during your work, do you feel very discouraged about it?
a. Yes
b. No

13. Were you in constant contact with your family and friends?
a. Yes
b. No

14. Have you had any episodes of stress?
a. Yes
b. No

15. When I need suggestions on how to deal with a personal problem, I know someone I can turn to.
a. Yes
b. No

16. Were you presented with any psychosocial support?
a. Yes
b. No

17. If no, would you consider receiving support if available?
a. Yes
b. No

18. Were you concerned about your health or the health of your loved ones?
a. Yes
b. No

Part B
Please read each statement and circle a number 0, 1, 2, or 3, which indicates how much the statement applied to you over the past week.

    0- Did not apply to me at all
    1- Applied to me to some degree, or some of the time
    2- Applied to me to a considerable degree or a good part of time
    3- Applied to me very much or most of the time.

No.	Statement	0	1	2	3
1 (s)	I found it hard to wind down				
2 (a)	I was aware of dryness of my mouth				
3 (d)	I couldn't seem to experience any positive feeling at all				
4 (a)	I experienced breathing difficulty (eg. Excessively rapid breathing, breathlessness in the absence of physical exertion)				
5 (d)	I found it difficult to work up the initiative to do things				
6 (s)	I tended to over-react to situations				
7 (a)	I experienced trembling (e.g. in the hands)				
8 (s)	I felt that I was using a lot of nervous energy				
9 (a)	I was worried about situations in which I might panic and make a fool of myself				
10 (d)	I felt that I had nothing to look forward to				
11 (s)	I found myself getting agitated				
12 (s)	I found it difficult to relax				
13 (d)	I felt downhearted and blue				
14 (s)	I was intolerant of any thing that kept me from getting on with what I was doing				
15 (a)	I felt I was close to panic				
16 (d)	I was unable to become enthusiastic about anything				
17 (d)	I felt I wasn't worth much as a person				
18 (s)	I felt that I was rather touchy				
19 (a)	I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat)				
20 (a)	I felt scared without any good reason				
21 (d)	I felt that life was meaningless				