The COVID-19 Crisis Outbreak: Healthcare Providers' Psychological State and Mental Health in Egypt

Marwa Abd El-fatah Ali El-slamoni [1,2], and Nashwa Ahmed Hussein Abdel Karim [1]

[1] Assistant Professor of Psychiatric and Mental Health Nursing, Faculty of Nursing - Zagazig University, Egypt, & [2] College of Nursing - Taif University, KSA

Corresponding authors: drmeros@yahoo.com and drnashwa34@gmail.com

Abstract

Background: The rapid global spread of the COVID-19 pandemic has resulted in significant levels of fear, worry, and anxiety. **Aim of the Study:** This study aimed to assess the psychological state and mental health of healthcare providers-specifically their levels of compassion satisfaction, compassion fatigue, anxiety, and positive/negative emotions-during the early stages of the COVID-19 outbreak. **Subjects and Methods; Design:** A cross-sectional study was conducted from April to June 2020 using an online survey. **Setting:** The study was carried out in several governorates in Egypt as, Cairo (Kasr El Ainy Teaching Hospital), Al-garbia AL-Santa Central Hospital, Al-Sharqiya University Hospital, Alexandria University Hospital, AL-Monufia & Al-Dakahlia University Hospital. **Subjects:** A purposive sample of 233 healthcare providers, including doctors, nurses, and other medical professionals, participated in the study. **Tools of Data Collection:** Four data collection tools were used: A socio-demographic data sheet, measures of compassion satisfaction and compassion fatigue, the Beck Anxiety Inventory, and the Positive and Negative Affect Schedule. **Results:** The results revealed that Prevalence of high Compassion satisfaction, high Positive affect level was 77.6%& 86.5% respectively, while Prevalence of high fatigue, high anxiety, and high negative emotion was 60.1%, 24.2%, and 30.5% respectively. It was noticed that high positive affect score, sufficient sleeping hours per day, long experience were positive significant predictors of compassion satisfaction. While negative affect score was inverse significant predictor of compassion satisfaction among studied health care providers during COVID crisis. **Conclusion:** the healthcare providers had psychosocial problems and some mental issues because of COVID-19 emergency. **Recommendation:** Recovery programs and mental health interventions for the healthcare providers during the COVID-19 crisis and later on.

Key words: COVID-19, Healthcare Providers, Psychological State, Mental Health, Egypt.

Introduction:

The outbreak of the newly identified respiratory virus, coronavirus disease 2019 (COVID-19) [1], represents a global health emergency anticipated to continue through the end of 2019. It is estimated that 15-20% of cases will require hospitalization, and 5-10% will need intensive care due to severe complications such as severe pneumonia, septic shock, acute respiratory distress syndrome, and multiple organ failure. Currently, there is limited information about the virus, known as severe acute respiratory syndrome coronavirus type 2 (SARS-CoV-2), and no known cure for the illness [2, 3].

Despite the challenges of continuous increasing cases number, enormous workload, personal protection equipment shortage, stress from media, lack of specific treatment or data, and feelings of being inadequately supported, healthcare providers are the front-line fighters, while we all are quarantined at home. They have sacrificed their own needs, well-being, health or even life to actively confront against crisis in self-denying way, which all may exceed their individual coping skills due to

overload for protracted time. They often had conflicting feelings between their roles as responsible professionals and as a society member may infect his family, friends, and colleagues, increasing psychological pressure [4].

Healthcare professionals are experiencing loneliness, anxiety, depression, fear, fatigue, sleep disorders, and various other physical and mental health issues due to the severe conditions brought about by the outbreaks of severe acute respiratory syndrome (SARS), Middle East respiratory syndrome (MERS), and other infectious diseases that habitually occur in current years. The government sent in fresh, inexperienced medical and nursing staff to make up for the lack and increase the workload, but they were unable to adapt to a completely new working environment in this stressful situation. Additionally, a lack of hospital beds and medical equipment forces them to ration care in an unethical manner. Long-term effects also result from these calamities because of extreme stress associated to economic decline, understaffing, uncertainty, and insufficient resilience following isolation, loss of social support, and risk or infections may have considerable effects on their mental well-being [5].

Effective and comprehensive measures should be adopted at the appropriate moment to alleviate the stress and safeguard their mental health because healthcare provider's safety and health are crucial for maintaining patient care as well as for controlling any epidemic. For instance, the Chinese government has made a number of steps, such as deploying more healthcare professionals to lighten the strain, providing more personal protective equipment, and providing helpful advice. Providing psychological intervention teams, counselling, coping mechanisms for psychological self-help, and psychotherapy, among other services. But, by assessing their mental health quality, these expensive and time-consuming interventions and mental health services must be supported by evidence [6].

In the context of disaster situations, professional quality of life encompasses both positive and negative aspects of compassion satisfaction and compassion fatigue. Compassion satisfaction refers to the pleasure and fulfillment derived from helping others and making a meaningful contribution to society, which enhances a person's sense of accomplishment and effectiveness in their role [7]. Previous literature describes compassion satisfaction as the enjoyment and self-appreciation experienced when supporting others through their suffering and helping them improve their circumstances, which in turn fosters motivation and nourishment for healthcare providers in their caregiving roles [8].

In contrast, compassion fatigue is characterized by profound psychological exhaustion and acute emotional distress resulting from an unsupportive work environment, heavy workloads, and frequent exposure to indirect trauma from patients that exceeds one's capacity to cope. This condition can lead to various negative symptoms, including disturbances in sleep and memory, nightmares, anxiety, quick anger, depersonalization, feelings of helplessness and disappointment, difficulty achieving work goals, and reduced self-efficacy in working with clients. Consequently, compassion fatigue not only adversely affects healthcare providers' well-being, job satisfaction, and job retention but can also impact patient outcomes and satisfaction due to increased staff turnover and reduced productivity among health professionals [9].

Significance of the study:

As of May 21, 2020, there has been a significant decline in both the epidemic growth rate and the R0 value. However, the incidence

proportion has increased to 14 cases per 100,000 people [10]. The study titled "The COVID-19 Crisis Outbreak: Healthcare Providers' Psychological State and Mental Health in Egypt" is highly relevant for public health and healthcare systems. During the global pandemic, healthcare providers in Egypt are confronting unprecedented challenges such as high patient volumes, scarce resources, and personal health risks. Understanding the psychological state and mental health of these frontline workers is essential for evaluating the broader impact of the crisis on public health and healthcare delivery. This research aims to explore the prevalence and nature of psychological distress among healthcare providers, which can guide the development of targeted interventions and support systems to alleviate negative effects on individual well-being and patient care quality. Additionally, the study's findings can inform evidence-based policymaking and resource allocation to enhance the resilience and coping abilities of healthcare professionals in Egypt, thereby strengthening the healthcare system's response to the ongoing COVID-19 crisis.

Aim of the study:

The aim of the study was to investigate the psychological impact and mental health status of healthcare providers in Egypt during the COVID-19 pandemic.

Research Questions:

- **Q1:** What are the levels of psychological state and mental health among healthcare providers during the COVID-19 outbreak?
- **Q2:** Are there correlations between socioeconomic status and the psychological state and mental health of healthcare providers during the COVID-19 outbreak?

Subjects and Method:

Design:

A cross-sectional study was carried out, with data collected online.

Setting:

The study was conducted in various governorates of Egypt, as Cairo (Kasr El Ainy Teaching Hospital), Al-garbia AL-Santa Central Hospital, Al-Sharqiya University Hospital, Alexandria University Hospital, AL-Monufia, and Al-Dakahlia University Hospital.

Subjects:

A purposive sample of 233 participants of healthcare providers and included; doctors, nurses and other medical professionals. Participants were selected based on the following **inclusion criteria:**

- Willingness to participate in the study.
- Representation of both genders (male and female).
- An average age range of 20 to 50 years.

Exclusion criteria:

- The sample having any physical or mental disease.

Tools for data collection:

An online survey-based study was conducted among Egypt governments from April to June, 2020. Social networks such as WhatsApp and Facebook have been the main platforms for distribution of the questionnaire.

Tool I: Socio-demographic data sheet: It was developed by the researchers after reviewing the related literature, and includes questions about age, gender, residence, marital status, career, type of hospital, level of education and degree, years of experience, working hours during the week, sleeping hours…etc.

Tool II: Compassion Satisfaction and Compassion Fatigue: This scale developed by **Stamm** [11] to assess compassion satisfaction and compassion fatigue

through 30 items related to the pleasure derived from performing one's job effectively. For example, it measures how fulfilling it is to help others through work, feelings about colleagues, or contributions to the work environment and society. Responses are recorded on a 5-point scale (1=never, 2=rarely, 3=sometimes, 4=often, and 5=very often).

Scoring System:

Higher scores indicate greater satisfaction with one's effectiveness as a caregiver. The average score is 50, categorized as follows: High satisfaction ≥ 33, moderate satisfaction = 17-33, and low satisfaction ≤ 17.

Tool III: Beck Anxiety Inventory (BAI): This scale developed by **Beck et al.** [12], consisted of 21-item self-report inventory measures the severity of anxiety.

Scoring System:

The total score ranges up to 24, with classifications as: low anxiety ≤ 8, moderate anxiety = 8-16, and high anxiety ≥ 16.

Tool IV: The Positive and Negative Affect Schedule (PANAS): The scale created by **Magyar-Moe** [13], this scale includes 20 items divided into two subscales: positive emotion (10 items) and negative emotion (10 items). Each item is rated on a five-point scale: 1 (Very slightly or not at all), 2 (A little), 3 (Moderately), 4 (Quite a bit), and 5 (Extremely).

Scoring System:

The total score for the Positive Affect Scale is the sum of the positive items, with higher scores indicating more positive emotions. The Negative Affect Scale total score is the sum of the negative items, with higher scores reflecting more negative emotions. A total score ≤ 13 indicates less positive or negative emotion.

Content validity and reliability:

The tools were translated into Arabic using translation and back-translation methods to ensure validity. Content validity was assessed by five specialists from the Nursing Faculty at Zagazig University (Psychiatric and Mental Health Nursing), who reviewed the instruments for clarity, relevance, comprehensiveness, and ease of use. Their feedback was incorporated into the final versions. Reliability was evaluated using Cronbach's alpha in SPSS version 23, showing good reliability: compassion satisfaction (α = 0.704), compassion fatigue (α = 0.84), anxiety scale (α = 0.7), positive affect scale (α = 0.73), and negative affect scale (α = 0.71).

Field work:

The fieldwork spanned three months, from early April 2020 to the end of June 2020. We conducted an online survey to assess the psychological state and mental health of healthcare providers during the COVID-19 pandemic. Participants received a link to the survey and responded online. The pilot study showed that completing all the instruments, including the socio-demographic data sheet, psychological state, and mental health assessments, took an average of 15-20 minutes. Filling out the socio-demographic data sheet and assessing both positive and negative mental health aspects took approximately 5 minutes each. After data collection, the researcher, along with a statistics specialist, performed all necessary steps to ensure data completeness and proceeded with scoring the participants' responses.

Pilot study:

A pilot study was conducted on 10 % of the recruited sample to assess the clarity and significance of the instruments, as well as to estimate the required time for filling in the tools. The researchers requested participants to fill in the questionnaire and to note any questions that were vague or troublesome to reply. The required changes were done as specific rephrasing, using easier semantic for the explanations. Those who shared in

the pilot study were excluded from the main study sample.

Administrative and Ethical considerations:

The researchers took an online permission from the participants to engage in the study. All subjects gave their informed consent electronically. There were two alternatives (Yes/No) on the informed consent page. Only those who selected “Yes” were directed to the questionnaire page, where they were informed that they had the right to withdraw from the study at any time without giving a reason.

The study proposal received approval from the Institutional Research Board (IRB), with the code ZU-IRB#1049, from the Faculty of Medicine at Zagazig University. Online Written consent was obtained. This approach was approved by the Ethics Committee of Zagazig University.

Statistical analysis:

All data were collected, organized, and analyzed statistically using SPSS 23.0 for Windows (SPSS Inc., Chicago, IL, USA). Quantitative data were presented as the mean ± SD with range, while qualitative data were displayed as absolute frequencies (numbers) and relative frequencies (percentages). Percentages of categorical variables were compared using the Chi-square test. Spearman's rank correlation coefficient was calculated to evaluate the relationships between various study variables, with a (+) sign indicating a direct correlation and a (-) sign indicating an inverse correlation. Values close to 1 suggest a strong correlation, while values near 0 suggest a weak correlation. Multivariate linear regression was employed to predict satisfaction and compassion among healthcare providers during the COVID crisis. All tests were two-sided, with a p-value < 0.05 considered statistically significant. A p-value ≥ 0.05 was deemed statistically insignificant.

Results:

Table (1): Shows that 55.8% of the studied healthcare providers were females, and 55.8% of them aged from 20 to 30 years. More than one half of them (55.6%) were married, 48.5% of studied of them were doctors, 42.1% of them had bachelors qualification, 59.7% of them working from 30 to 40 hours per week, and 38.2% of them had experience for (5-10) years. Few of them only (5.2%) did not fear to be infected by COVID-19 virus and 2.6% of them did not worry about transmitting COVID-19 infection to others.

As detailed in **Table (2),** a statistically significant relationship ($p<0.05$) was found between compassion satisfaction levels and several characteristics of the studied healthcare providers, including age, sex, marital status, occupation, qualification, weekly working hours, and years of experience. Notably, male doctors over the age of 40 who were married exhibited higher levels of compassion satisfaction. Additionally, healthcare providers with an MD or diploma who had over 10 years of experience and worked more than 50 hours per week reported higher levels of satisfaction.

Table (3): Shows a statistically significant relationship ($p<0.05$) between compassion fatigue levels and certain characteristics of the studied healthcare providers, such as sex, occupation, fear of infection, and concern about transmitting the virus to others. Specifically, female technical health providers who did not fear infection or worry about spreading COVID-19 had moderate levels of compassion fatigue, which was lower compared to male doctors who expressed fear and concern.

Table (4): Reveals a statistically significant relationship ($p<0.05$) between anxiety levels and various characteristics of the studied healthcare providers, including age, sex, occupation, qualification, years of experience, fear of infection, and worry

about transmitting the virus. Specifically, male technical healthcare providers over the age of 40 exhibited mild anxiety levels. Additionally, those with a master's degree or MD, over 10 years of experience, and who did not fear infection or worry about spreading COVID-19 also reported mild anxiety levels.

Table (5): Indicates a statistically significant relationship ($p<0.05$) between the level of positive affect and characteristics such as age, occupation, and qualification. Technical healthcare providers over the age of 40 and those with an MD qualification demonstrated higher levels of positive affect.

Table (6): Shows a statistically significant relationship ($p<0.05$) between negative affect and characteristics including age, occupation, qualification, weekly working hours, and fear of infection. Technical healthcare providers aged 20-30 with a diploma qualification had higher levels of negative emotions. Additionally, those working fewer than 30 hours per week and who feared contracting COVID-19 also reported higher negative emotion levels.

Table (7): Describes the feelings and emotions of the studied healthcare providers, showing that 77.6% had high compassion satisfaction, 60.1% experienced high compassion fatigue, 62.3% had moderate anxiety, 86.5% had positive affect, and 30.5% had negative affect.

Table (8): Highlights a highly significant positive correlation ($p=0.0001$) between compassion satisfaction and positive emotions among the studied healthcare providers. Conversely, a significant negative correlation ($p=0.0001$) was found between compassion satisfaction and negative emotions. Additionally, significant positive correlations ($p=0.0001$) were observed between compassion fatigue and both anxiety and both positive and negative emotions. Furthermore, a significant positive correlation ($p=0.0001$) was found between anxiety and negative emotions.

Table (9): Notes that positive affect, sleeping hours per day and experience were positive significant predictors of compassion satisfaction among studied health care providers during COVID crisis. While negative affect was inverse significant predictor of compassion satisfaction during COVID crisis. Otherwise there is no significant parameters, $p>0.05$.

Discussion:

Increased prevalence of psychiatric morbidity and burnout or stress-related psychiatric disorders among healthcare providers worldwide during and after COVID-19 outbreak can affect the entire public health workforce. This manifested by converting of each significant, meaningful and exciting work into unpleasant, unrewarding, and meaningless. Thus, power converts into exhaustion, participating becomes cynicism, and efficacy switches into ineffectiveness, leading to suboptimal patient care due to major medical errors. Burnout also may cause alteration in behaviors as alcohol and drug abuse, disengagement with co-workers, as well as increased work absence, late arrival and leaving early, and employee turnover. An extreme to stress can be suicide [(14)].

This is the first study focusing and evaluating the psychological and mental state of healthcare providers in Egypt during the early stages of COVID-19 outbreak.

Concerning personal characteristics of the studied samples, more than half of healthcare providers were married females at twenty to thirty years old and working for thirty to forty hours per week. Exactly half of the samples were doctors and nurses and about more than one third have bachelors' qualification and working experience ranged from five to ten years, while only minority of them did not worry

about transmit CODID-19 virus to others and did not fear to be infected by COVID-19 virus.

Likewise, **Du et al.** [15] found less than two third were female, about more than one third were nurses, exactly half had college degree, the majority were married without any experience with emergency response. The study is contradicted with **Chu et al.** [16], who revealed that less than less than one fourth of participants were doctors and more than the majority were female nurses at twenty five to forty years old with an educational level of undergraduate or less. In the same line, **Chu et al.** [16] reported that about the vast majority were females with mean age 33.15 years, and mean working time 11.33 years. Also, nearly more than two third of the nurses had Bachelor degree, married and had fear of infecting family members. These differences might be due to different gender, race, tradition, and sample size.

The current study displayed that the compassion satisfaction level is statistically significant ($p<0.05$) related to most characteristics of studied healthcare providers. It is obvious that many factors as male gender, doctor job, age more than 40 years, MD qualification, experience more than 10 years, and working hours more than 50 hours/week increased the compassion satisfaction level.

This result is congruent with, **Ramaci et al.** [17] who represented that there was a statistically significant correlation ($p < 0.05$) between age and satisfaction while no differences between doctors and nurses in the weekly working hours too. The reasons for these findings may be that as healthcare providers age, they become more knowledgeable, experienced, and competent due to prolonged exposure to various and challenging situations.

The results indicated a statistically significant association between compassion fatigue and specific characteristics of the studied healthcare providers, including sex, occupation, fear of infection, and worry about transmitting the virus. Male doctors who feared infection and occasionally worried about spreading COVID-19 experienced higher levels of compassion fatigue. This contrasts with the findings of a study by **Wu et al.** [18], which found that frontline health professionals who were less concerned about infection had lower levels of burnout (compassion fatigue). Similarly, **Ramaci et al.** [17] reported that women had higher levels of compassion fatigue, with these levels positively correlated with age. Furthermore, job category did not impact compassion fatigue levels, which differs from the study results and may be attributed to cultural differences. Additionally, contrary to expectations, weekly working hours did not influence compassion fatigue scores, as also observed in the study.

Regarding the relationship between anxiety level and characteristics of studied healthcare providers, we noticed that anxiety level is significantly linked to their age, sex, occupation, qualification, experience, fear of infection and worry about transmitting of virus to others. It is obvious that male doctors aged 30-40 years who had diploma, experience more than five years, fear to be infected and worry about transmitting COVID-19 virus to others had higher level of anxiety level.

The result is comparable with **Du et al.** [15] who informed that higher education achievement, and fear of getting infected or contaminate others increased anxiety symptoms. This may attributed to few available formal psychological supports, direct medical information about the epidemic, effective training and infection control measures augmented the fear and anxiety level. In opposite way of the results, **Pappa et al.** [19] estimated that anxiety had more prevalence among female nurses than male doctors with

mild degree. Mild anxiety is the spark that drives the healthcare workers for more achievement and adaptation to critical situations and challenges.

The present study revealed that positive emotions among healthcare providers are significantly associated with their age, occupation, and qualifications. Specifically, older technical staff and MD-qualified healthcare providers exhibited more positive emotions. Many healthcare providers developed psychologically under stress by reaffirming their values and finding positive aspects such as increased appreciation, responsibility due to professional ethics, and growth from their experiences in previous pandemics.

This aligns with the findings of **Aoyagi et al.** [20], who suggested that factors like gender and career influence work motivation, though awareness, role appreciation, confidence in skills, communication abilities, and pandemic preparedness training also play significant roles. Similarly, **Kang et al.** [21] highlighted that early training and confidence in safety and professional skills enhance healthcare providers' willingness to engage actively in epidemic response efforts.

The present study displayed that the negative emotions are significantly interrelated with of studied healthcare providers' age, occupation, qualification, working hours per week, and fear to be infected. It is remarkable that doctors aged more than 40 years who had MD or even Master qualification, working 50-60 hours/week and sometimes fear to be infected have few negative emotions due to rich experiences and coping strategy as mentioned formerly.

The finding is similar to that of **Brooks et al.** [22], who revealed that that those healthcare providers who are infected and quarantined feel guilty about leaving front lines causing their workplaces understaffed and overloaded, fear of infecting their families and confusion between their roles. They also suffer from boredom, exhaustion and isolation during the outbreak and feeling anxious or reluctant to return to their work area post- crisis. Similarly, **Ho et al.** [23] exposed that communication with patients is made more complicated by protocols and personal protective equipment during pandemic as covering most of the face, and having less time to care for each patient.

In terms of the feelings and emotions of the studied healthcare providers, the current study found that most had high levels of compassion satisfaction and compassion fatigue, moderate anxiety, and more positive emotions, while only a small minority experienced high negative emotions.

This aligns with **Wu and McGoogan** [24], which reported that half of their participants had depressive symptoms, over half experienced anxiety, and more than one-third suffered from sleep disturbances. They noted that the impact of epidemics on healthcare providers can be extensive and enduring, leading to a range of negative emotions such as fear, anxiety, physical exhaustion, psychological helplessness, health threats, and interpersonal challenges. Coping strategies such as breathing exercises, music, meditation, mindfulness, cognitive evaluation, and social support can help mitigate these stresses.

Additionally, **Sun et al.** [25] observed that the demand for healthcare services increases significantly during pandemics, leading to higher workloads, fears of infection, quarantine, and isolation, which contribute to physical exhaustion, fear, emotional disturbances, and sleep disorders. Their study also indicated that frontline healthcare providers experience both positive and negative emotions during an epidemic. Initially, negative emotions were more prevalent, but positive emotions emerged progressively due to self-

coping strategies and psychological growth. Thus, actively guiding and encouraging healthcare providers to recognize their psychological growth during an epidemic can positively influence their psychological adjustment.

Regarding the correlation between feelings and emotions of healthcare providers, the present study found significant positive relationships between compassion fatigue, anxiety, and both positive and negative emotions among the providers. Specifically, compassion satisfaction was positively correlated with positive emotions and negatively correlated with negative emotions.

Similar results have been reported by **Burtson and Stichler** [26], who found significant relationships between nurse caring and compassion satisfaction, job satisfaction subscales, stress, and compassion fatigue. Changes in the environment often lead to feelings of anxiety, fear, and insecurity, especially when dealing with uncertain factors in infectious disease outbreaks like COVID-19, which can increase depression and post-traumatic stress disorder.

Despite these challenges, healthcare providers continue to manage the required care [27]. Additionally, **Zhang et al.** [9] reported that compassion fatigue is strongly positively associated with burnout, while compassion satisfaction is inversely related to burnout. Stress and negative emotions can contribute to compassion fatigue, whereas positive emotions and social interactions can enhance compassion satisfaction.

Conclusion:

It was concluded that healthcare workers experienced a high prevalence of psychological symptoms and elevated levels of compassion fatigue during COVID-19. Male doctors over 40 years old and married showed higher levels of satisfaction. Additionally, a statistically significant relationship was observed between anxiety levels and several characteristics of the studied healthcare providers, including age, sex, occupation, qualification, years of experience, fear of infection, and concern about transmitting the virus to others. A significant positive correlation was also found between compassion fatigue, anxiety, and both positive and negative affect among healthcare providers. Thus, fear of infection or transmitting the virus may contribute to increased compassion fatigue, anxiety, and negative emotions, likely due to inadequate protection and awareness about the virus.

Recommendations:

- Frontline healthcare providers need comprehensive support, including adequate personal protective equipment, well-organized work schedules, effective communication, and supervision of infection control.
- Training is crucial for healthcare providers who lack expertise in managing pandemics.
- Following an outbreak, providing counseling services and support programs to help healthcare providers share their experiences and emotions is important.
- Additionally, developing effective mental health interventions that are time-limited, culturally sensitive, and practical for healthcare workers is necessary.
- When returning to routine work, support should be provided through positive feedback from peers. Hospitals should also implement programs to reward and appreciate healthcare workers for their efforts during the outbreak.

Table (1): Characteristics of studied healthcare providers (n=233)

Characteristics of studied healthcare providers	Number	%	Characteristic of studied healthcare providers	Number	%
Age per years			**Sleep pattern**		
20-30	130	55.8	Little	133	57.1
30-40	75	32.2	Enough hours	100	42.9
>40	28	12.0	**Sleeping hours**		
Sex			<4 hours	40	17.2
Female	130	55.8	5-6 hours	117	50.0
Male	103	44.2	6-7 hours	60	25.8
Marital status			≥8 hours	16	7
Single	104	44.6	**Experience**		
Married	129	55.4	<3 years	54	23.2
Occupation			3-5	52	22.3
Doctors	113	48.5	5-10	89	38.2
Nurses	110	47.2	>10	38	16.3
Technical	10	4.3	**Family responsibility**		
Work affiliation			Yourself	48	20.6
University Hospitals	90	38.6	Spouse	6	2.6
Educational Hospitals	30	12.9	Spouse and children	68	29.2
Private Hospitals	16	7	Parents	44	19.0
Military Hospitals	14	6.0	Spouse and children and parents	33	14.0
Specialties Hospitals	9	3.9	**Fear to be infected**		
Qualification			No	12	5.2
Bachelors	98	42.1	Sometimes	96	41.2
Master	56	24.0	Yes	125	53.6
Diploma	22	9.4	**Worry transmit virus to others**		
MD	57	24.5	No	6	2.6
Working hours weeks			Sometimes	22	9.4
30-40	139	59.7	Yes	205	88.0
40-50	34	14.6			
50-60	14	6.0			
60-70	12	5.2			

MD: Doctor of Medicine.

Table (2): The relation between compassion satisfaction level and characteristics of studied healthcare providers (n=233)

Variables	Satisfaction level				χ^2	P
	High Satisfaction (n=181)		Moderate Satisfaction (n=52)			
	No.	%	No.	%		
Age per years						
20-30	94	51.9	36	69.2	12.2	0.006*
30-40	59	32.6	16	30.8		
>40	28	15.5	0	.0		
Sex						
Female	92	50.8	38	73.1	8.1	0.004*
Male	89	49.2	14	26.9		
Marital status						
Single	74	40.9	30	57.7	4.6	0.032*
Married	107	59.1	22	42.3		
Occupation						
Doctors	101	55.8	12	23.1	18.4	0.0001*
Nurses	72	39.8	38	73.1		
Technical	8	4.4	2	3.8		
Qualification						
Bachelors	64	35.4	34	65.4		
Master	44	24.3	12	23.1	18.6	0.0001*
Diploma	20	11.0	2	3.8		
MD	53	29.3	4	7.7		
Working hours weeks						
<30 hours	20	11.0	14	26.9		
30-40	109	60.2	30	57.7	14.5	0.006*
40-50	26	14.4	8	15.4		
50-60	14	7.7	0	.0		
60-70	12	6.6	0	.0		
Sleep pattern						
Little	105	58.0	28	53.8	0.28	0.59
Enough hours	76	42.0	24	46.2		
Experience per years						
<3 years	34	18.8	20	38.5		
3-5	44	24.3	8	15.4	11.2	0. 01*
5-10	69	38.1	20	38.5		
>10	34	18.8	4	7.7		
Fear to be infected						
No	10	5.5	2	3.8		
Sometimes	78	43.1	18	34.6	1.7	0.43
Yes	93	51.4	32	61.5		
Worry transmit virus to others						
No	6	3.3	0	.0	2.3	0.36
Sometimes	16	8.8	6	11.5		
Yes	159	87.8	46	88.5		

χ^2 Chi square test of significant, *p<0.05: significant and MD: Doctor of Medicine.

Table (3): The relation between compassion fatigue level and characteristics of studied healthcare providers (n=233)

Variables	Compassion fatigue				χ^2	p
	moderate fatigue n.97		high fatigue n.136			
	No.	%	No.	%		
Age						
20-30	56	57.7	74	54.4	0.52	0.77
30-40	31	32.0	44	32.4		
>40	10	10.3	18	13.2		
Sex						
Female	64	66.0	66	48.5	6.9	0.008*
Male	33	34.0	70	51.5		
Marital status						
Single	40	41.2	64	47.1	0.78	0.39
Married	57	58.8	72	52.9		
Occupation						
Doctors	39	40.2	74	54.4	9.1	0.01*
Nurses	50	51.5	60	44.1		
Technical	8	8.2	2	1.5		
Qualification						
Bachelors	46	47.4	52	38.2	5.1	0.19
Master	20	20.6	36	26.5		
Diploma	12	12.4	10	7.4		
MD	19	19.6	38	27.9		
Working hours weeks						
<30 hours	18	18.6	16	11.8	4.9	0.3
30-40	57	58.8	82	60.3		
40-50	14	14.4	20	14.7		
50-60	6	6.2	8	5.9		
60-70	2	2.1	10	7.4		
Sleep pattern						
Little	55	56.7	78	57.4	0.01	0.92
Enough hours	42	43.3	58	42.6		
Experience per years						
<3 years	24	24.7	30	22.1	2.8	0.42
3-5	24	24.7	28	20.6		
5-10	31	32.0	58	42.6		
>10	18	18.6	20	14.7		
Fear to be infected						
No	12	12.4	0	.0	34.9	0.0001*
Sometimes	52	53.6	44	32.4		
Yes	33	34.0	92	67.6		
Worry about transmit virus to others						
No	6	6.2	0	.0	26.1	0.0001*
Sometimes	18	18.6	4	2.9		
Yes	73	75.3	132	97.1		

χ^2 Chi square test of significant, *p<0.05: significant and MD: Doctor of Medicine.

Table (4): The relation between anxiety level and characteristics of studied healthcare providers (n=233)

Variables	Anxiety						χ^2	p
	low anxiety n.34		Moderate anxiety n.143		high anxiety n.56			
	No.	%	No.	%	no	%		
Age								
20-30	12	35.3	92	64.3	26	46.4	13.7	0.008*
30-40	14	41.2	39	27.3	22	39.3		
>40	8	23.5	12	8.4	8	14.3		
Sex								
Female	14	41.2	92	64.3	24	42.9	10.7	0.004*
Male	20	58.8	51	35.7	32	57.1		
Marital status								
Single	14	41.2	72	50.3	18	32.1	5.6	0.061
Married	20	58.8	71	49.7	38	67.9		
Occupation								
Doctors	22	64.7	59	41.3	32	57.1	15.6	0.002*
Nurses	8	23.5	80	55.9	22	39.3		
Technical	4	11.8	4	2.8	2	3.6		
Qualification								
Bachelors	14	41.2	66	46.2	18	32.1		
Master	10	29.4	38	26.6	8	14.3	17.5	0.008*
Diploma	0	.0	12	8.4	10	17.9		
MD	10	29.4	27	18.9	20	35.7		
Working hours weeks								
<30 hours	6	17.6	20	14.0	8	14.3		
30-40	14	41.2	89	62.2	36	64.3	15.4	0.051
40-50	8	23.5	20	14.0	6	10.7		
50-60	4	11.8	10	7.0	0	.0		
60-70	2	5.9	4	2.8	6	10.7		
Sleep pattern								
Little	20	58.8	79	55.2	34	60.7	0.54	0.76
Enough hours	14	41.2	64	44.8	22	39.3		
Experience per years								
<3 years	6	17.6	38	26.6	10	17.9		
3-5	6	17.6	34	23.8	12	21.4	13.2	0.039*
5-10	10	29.4	55	38.5	24	42.9		
>10	12	35.3	16	11.2	10	17.9		
Fear to be infected								
No	10	29.4	2	1.4	0	.0		
Sometimes	16	47.1	76	53.1	4	7.1	90.2	0.0001*
Yes	8	23.5	65	45.5	52	92.9		
Worry about transmit virus to others								
No	6	17.6	0	.0	0	.0	73.2	0.0001*
Sometimes	12	35.3	10	7.0	0	.0		
Yes	16	47.1	133	93.0	56	100.0		

χ^2 Chi square test of significant, *p<0.05: significant and MD: Doctor of Medicine.

Table (5): The relation between positive emotion affect and characteristics of studied healthcare providers (n=233)

Variables	Positive emotion				χ^2	P
	high positive emotion n.203		low positive emotion n.30			
	No.	%	No.	%		
Age						
20-30	104	51.2	26	86.7	13.8	0.001*
30-40	71	35.0	4	13.3		
>40	28	13.8	0	.0		
Sex						
Female	112	55.2	18	60.0	0.25	0.62
Male	91	44.8	12	40.0		
Marital status						
Single	86	42.4	18	60.0	3.3	0.07
Married	117	57.6	12	40.0		
Occupation						
Doctors	105	51.7	8	26.7	9.8	0.007*
Nurses	88	43.3	22	73.3		
Technical	10	4.9	0	.0		
Qualification						
Bachelors	80	39.4	18	60.0		
Master	52	25.6	4	13.3	12.8	0.005*
Diploma	16	7.9	6	20.0		
MD	55	27.1	2	6.7		
Working hours weeks						
<30 hours	30	14.8	4	13.3		
30-40	119	58.6	20	66.7		
40-50	30	14.8	4	13.3	2.8	0.63
50-60	14	6.9	0	.0		
60-70	10	4.9	2	6.7		
Sleep pattern						
Little	119	58.6	14	46.7	1.5	0.22
Enough hours	84	41.4	16	53.3		
Experience per years						
<3 years	46	22.7	8	26.7		
3-5	42	20.7	10	33.3	7.7	0.053
5-10	77	37.9	12	40.0		
>10	38	18.7	0	.0		
Fear to be infected						
No	10	4.9	2	6.7		
Sometimes	84	41.4	12	40.0	0.17	0.92
Yes	109	53.7	16	53.3		
Worry transmit virus to others						
No	6	3.0	0	.0	4.7	0.1
Sometimes	22	10.8	0	.0		
Yes	175	86.2	30	100.0		

χ^2 Chi square test of significant, *p<0.05: significant and MD: Doctor of Medicine.

Table (6): The relation between negative emotion affect and characteristics of studied healthcare providers (n=233)

Variables	Negative emotion				χ^2	p
	high negative emotion n.74		low negative emotion n.159			
	No.	%	No.	%		
Age						
20-30	50	67.6	80	50.3	10.7	0.005*
30-40	22	29.7	53	33.3		
>40	2	2.7	26	16.4		
Sex						
Female	48	64.9	82	51.6	3.6	0.057
Male	26	35.1	77	48.4		
Marital status						
Single	36	48.6	68	42.8	0.71	0.4
Married	38	51.4	91	57.2		
Occupation						
Doctors	26	35.1	87	54.7	9.7	0.008*
Nurses	42	56.8	68	42.8		
Technical	6	8.1	4	2.5		
Qualification						
Bachelors	38	51.4	60	37.7		
Master	12	16.2	44	27.7	13.3	0.004*
Diploma	12	16.2	10	6.3		
MD	12	16.2	45	28.3		
Working hours weeks						
<30 hours	16	21.6	18	11.3		
30-40	44	59.5	95	59.7	11.6	0.02*
40-50	12	16.2	22	13.8		
50-60	0	.0	14	8.8		
60-70	2	2.7	10	6.3		
Sleep pattern						
Little	36	48.6	97	61.0	3.1	0.076
Enough hours	38	51.4	62	39.0		
Experience per years						
<3 years	22	29.7	32	20.1		
3-5	20	27.0	32	20.1	6.04	0.11
5-10	24	32.4	65	40.9		
>10	8	10.8	30	18.9		
Fear to be infected						
No	2	2.7	10	6.3		
Sometimes	14	18.9	82	51.6	26.6	0.0001*
Yes	58	78.4	67	42.1		
Worry transmit virus to others						
No	0	.0	6	3.8	5.2	0.074
Sometimes	4	5.4	18	11.3		
Yes	70	94.6	135	84.9		

χ^2 Chi square test of significant, *p<0.05: significant and MD: Doctor of Medicine.

Table (7): Compassion satisfaction, compassion fatigue, anxiety, the positive and negative affect that describe feelings and emotions of studied healthcare providers (n=233)

Parameters of caregivers	No=223	%	Mean ±SD(range)
Compassion satisfaction			
High satisfaction	173	77.6	37.1±4.6(24-48)
Moderate satisfaction	50	22.4	
Compassion fatigue			
Moderate fatigue	89	39.9	37.8±5.7(19-53)
High fatigue	134	60.1	
Anxiety			
Low anxiety	30	13.5	
Moderate anxiety	139	62.3	12.7±4.9(2-24)
High anxiety	54	24.2	
Positive affect			
High positive emotion	193	86.5	16.5±4.2(5-25)
Low positive emotion	30	13.5	
Negative affect			
High negative emotion	68	30.5	11.1±4.3(5-25)
Low negative emotion	155	69.5	

Table (8): Correlation matrix of compassion satisfaction, compassion fatigue, anxiety, the positive and negative affect that describe feelings and emotions of studied healthcare providers (n=233)

Parameters	Compassion satisfaction		Compassion fatigue		anxiety		Positive affect	
	(r)	P	(r)	P	(r)	p	(r)	p
Compassion fatigue	0.067	0.306						
Anxiety	- 0.124	0.059	0.542	0.0001				
Positive affect	0.41	0.0001	0.234	0.0001	0.056	0.398	.	
Negative affect	-0.39	0.0001	0.295	0.0001	0.476	0.0001	-0.128	0.051

(r) Correlation coefficient significant (p<0.05)

Table (9): Multiple linear regression model for predicting compassion satisfaction among studied health care providers (n.233):

Predictors	Unstandardized Coefficients		t	Sig.	r	R^2
	B	SE				
(Constant)	27.24		6.908	.0001	0.59	0.35
Positive affect	.448	.065	4.982	.0001		
Negative affect	-.303	.061	3.232	.001		
Sleeping hours per day	1.048	.324	3.348	.001		
Experience	.610	.253	6.908	.0001		

β = regression coefficients, SE: standard error, R square = 35% of predictors, f test=24.3
*significant P=0.0001

References

1. World Health Organization (WHO). (Coronavirus disease (COVID-19) situation reports. situation report-51. Coronavirus Disease (COVID-2019) Situation Reports. (2020). Situation Report,.https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports/
2. Alharbi, J., Jackson, D., and Usher, K. The potential for COVID-19 to contribute to compassion fatigue in critical care nurses. *Journal of Clinical Nursing*. 2020; *29*(15-16): 2762-2764. https://doi.org/10.1111/jocn.15314
3. Sullivan, A.B., Kane, A., Roth, A.J., Davis, B.E., Drerup, M.L., and Heinberg, L.J. The COVID-19 Crisis: A Mental Health Perspective and Response Using Telemedicine. *Journal of Patient Experience.* 2020; 7(3): 237437352092274. https://doi.org/10.1177/2374373520922747.
4. Lai, J., Ma, S., Wang, Y., Cai, Z., Hu, J., Wei, N., Wu, J., Du, H., Chen, T., Li, R., Tan, H., Kang, L., Yao, L., Huang, M., Wang, H., Wang, G., Liu, Z., and Hu, S. Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. *JAMA Network Open*. 2020; 3(3): e203976. https://doi.org/10.1001/jamanetworkopen.2020.3976
5. Liu, Q., Luo, D., Haase, J.E., Guo, Q., Wang, X. Q., Liu, S., Xia, L., Liu, Z., Yang, J., and Yang, B.X. The experiences of health-care providers during the COVID-19 crisis in China: a qualitative study. *The Lancet Global Health*. 2020; 8(6): e790–e798. https://doi.org/10.1016/S2214-109X(20)30204-7
6. Kang, L., Ma, S., Chen, M., Yang, J., Wang, Y., Li, R., Yao, L., Bai, H., Cai, Z., Xiang Yang, B., Hu, S., Zhang, K., Wang, G., Ma, C., and Liu, Z. Impact on mental health and perceptions of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: A cross-sectional study. *Brain, Behavior, and Immunity*. 2020; 87: 11-17. https://doi.org/10.1016/j.bbi.2020.03.028
7. Yi, J., Kim, M.A., Choi, K., Droubay, B.A., and Kim, S. Compassion satisfaction and compassion fatigue among medical social workers in Korea: the role of empathy. *Social Work in Health Care*. 2019; 58(10): 970-987. https://doi.org/10.1080/00981389.2019.1686678
8. Smart, D., English, A., James, J., Wilson, M., Daratha, K.B., Childers, B., and Magera, C. Compassion fatigue and satisfaction: A cross-sectional survey among US healthcare workers. *Nursing and Health Sciences*. 2014; 16(1): 3-10. https://doi.org/10.1111/nhs.12068
9. Zhang, Y.Y., Zhang, C., Han, X.R., Li, W., and Wang, Y.L. Determinants of compassion satisfaction, compassion fatigue and burn out in nursing. *Medicine (United States)*. 2018; 97(26): 1-7. https://doi.org/10.1097/MD.0000000000011086.
10. Radwan, G.N. Epidemiology of SARS-CoV-2 in Egypt. *East Mediterr Health J*. 2020; 26(7):768-773. https://doi.org/10.26719/emhj.20.084
11. Stamm, D.B.H. Professional Quality of Life. 2015. Available at: https://proqol.org/
12. Beck, A.T., Epstein, N., Brown, G., and Steer, R.A. An Inventory for Measuring Clinical Anxiety: Psychometric Properties. *Journal of Consulting and Clinical Psychology*. 1988; 56(6): 893-897. https://doi.org/10.1037/0022-006X.56.6.893
13. Magyar-Moe, J.L. Positive Psychological Tests and

Measures. In Practical Resources for the Mental Health Professional, Therapist's Guide to Positive Psychological Interventions. *Elsevier*, *Academic Press*. 2009; 43-72. https://doi.org/10.1016/b978-0-12-374517-0.00003-6

14. Imo, U.O. Burnout and psychiatric morbidity among doctors in the UK: A systematic literature review of prevalence and associated factors. *BJPsych Bulletin*. 2017; 41(4): 197-204. https://doi.org/10.1192/pb.bp.116.054247

15. Du, J., Dong, L., Wang, T., Yuan, C., Fu, R., Zhang, L., Liu, B., Zhang, M., Yin, Y., Qin, J., Bouey, J., Zhao, M., and Li, X. Psychological symptoms among frontline healthcare workers during COVID-19 outbreak in Wuhan. General Hospital Psychiatry. 2020; 67: 144-145. https://doi.org/10.1016/j.genhosppsych.2020.03.011

16. Chu, J., Cui, S., Jiang, Y., Shi, Q., Zhang, L., Kong, D., and Qian, M. Impact of COVID-19 on psychology of nurses working in the emergency and fever outpatient: A cross-sectional survey. *Research Square*. 2020; 1-23. https://doi.org/10.21203/rs.3.rs-20777/v1

17. Ramaci, T., Barattucci, M., Ledda, C., and Rapisarda, V. Social stigma during COVID-19 and its impact on HCWs outcomes. *Sustainability (Switzerland)*. 2020; 12(9): 1-14. https://doi.org/10.3390/su12093834

18. Wu, Y., Wang, J., Luo, C., Hu, S., Lin, X., Anderson, A.E., Bruera, E., Yang, X., Wei, S., and Qian, Y. A Comparison of Burnout Frequency Among Oncology Physicians and Nurses Working on the Frontline and Usual Wards During the COVID-19 Epidemic in Wuhan, China. *Journal of Pain and Symptom Management*. 2020; 60(1): e60–e65. https://doi.org/10.1016/j.jpainsymman.2020.04.008

19. Pappa, S., Ntella, V., Giannakas, T., Giannakoulis, V.G., Papoutsi, E., and Katsaounou, P. Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. *Brain, Behavior, and Immunity*. 2020; 88: 901-907. https://doi.org/10.1016/j.bbi.2020.05.026

20. Aoyagi, Y., Beck, C.R., Dingwall, R., and Nguyen-Van-Tam, J.S. Healthcare workers' willingness to work during an influenza pandemic: A systematic review and meta-analysis. *Influenza and other Respiratory Viruses*. 2015; 9(3): 120-130. https://doi.org/10.1111/irv.12310

21. Kang, H.S., Son, Y.D., Chae, S.M., and Corte, C. Working experiences of nurses during the Middle East respiratory syndrome outbreak. *International Journal of Nursing Practice*. 2018; 24(5): e12664. https://doi.org/10.1111/ijn.12664

22. Brooks, S.K., Webster, R.K., Smith, L.E., Woodland, L., Wessely, S., Greenberg, N., and Rubin, G.J. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *The Lancet*. 2020; 395(10227): 912-920. https://doi.org/10.1016/S0140-6736(20)30460-8

23. Ho, C.S., Chee, C.Y., and Ho, R.C. Mental Health Strategies to Combat the Psychological Impact of COVID-19 Beyond Paranoia and Panic. *Annals of the Academy of Medicine, Singapore*. 2020; 49(1): 155-160.

24. Wu, Z., and McGoogan, J.M. Characteristics of and Important Lessons from the Coronavirus Disease 2019 (COVID-19) Outbreak in China: Summary of a Report of 72314 Cases from the Chinese Center for Disease Control and Prevention. *In JAMA - Journal of the American Medical*

Association. 2020; 323(13): 1239-1242. https://doi.org/10.1001/jama.2020.

25. Sun, N., Wei, L., Shi, S., Jiao, D., Song, R., Ma, L., Wang, H., Wang, C., Wang, Z., You, Y., Liu, S., and Wang, H. A qualitative study on the psychological experience of caregivers of COVID-19 patients. *American Journal of Infection Control*. 2020; 48(6): 592-598. https://doi.org/10.1016/j.ajic.2020.03.018

26. Burtson, P.L., and Stichler, J.F. Nursing work environment and nurse caring: Relationship among motivational factors. *Journal of Advanced Nursing*. 2010; 66(8): 1819-1831. https://doi.org/10.1111/j.1365-2648.2010.05336.x

27. Usher, K., Durkin, J., and Bhullar, N. The COVID-19 pandemic and mental health impacts. *International Journal of Mental Health Nursing*. 2020; 29(3): 315-318. https://doi.org/10.1111/inm.12726