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ORIGINAL RESEARCH

Psychological Resilience, Anxiety, and Well-Being of Health Care Providers During the COVID-19 Pandemic

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Background: On the frontlines of the pandemic, healthcare providers (HCPs) are overworked, anxious, and fearful. Yet, despite all the fear and anxiety, the facilitation of protective resilience and psychological well-being has become crucial to ensure that minimal intangible psychological losses are incurred due to the pandemic.

Aim: The present study aimed to examine the psychological resiliency, state anxiety, trait anxiety, and psychological well-being of frontline HCPs during the COVID-19 and to determine the association among resiliency, state-trait anxiety, and psychological well-being and their links with demographic and workplace factors.

Design and Settings: A cross-sectional study concerning frontline HCPs was conducted at two of the largest hospitals in the eastern province of Saudi Arabia.

Results: A significant inverse correlation was determined between resilience and state anxiety ($r=-0.417$, $p<0.05$) and between resilience and trait anxiety ($r=-0.536$, $p<0.05$). Likewise, a positive intermediate correlation between resilience and the age of the individual ($r=0.263$, $p<0.05$) and a weak positive correlation with years of experience ($r=0.211$, $p<0.05$) were established. Also, the resilience score of volunteer workers (50.9) was lower than that of regular staff (66.8) ($p=0.028$).

Conclusion: Resilience is a crucial factor affecting the training of individuals, which will further promote their work output and mental health capacity, thus improving their overall concept of survival in adversity.

Keywords: psychological distress, anxiety, resilience, well-being, COVID-19 pandemic, health care providers

Introduction

The novel coronavirus disease (COVID-19) pandemic has changed the way mankind works and lives in the 21st century. Meanwhile, on the frontlines of the pandemic, healthcare providers (HCPs) face heavy workloads, shortages, and hazardous working environments. HCPs are overworked, anxious, and fearful, and the facilitation of protective resilience and psychological well-being has become crucial to ensure that minimal intangible psychological losses are incurred due to the pandemic.[1–3]

Reliance refers to the ability to cope with adverse circumstances. It is a protective factor for individual well-being. HCPs with a high level of reliance were found to have lower anxiety symptoms.[4]

Indeed, an unprecedented time has beset the world, posing risk to the psychological well-being of frontline HCPs who are experiencing difficulties in coping with threats. The fear of contaminating themselves, their families, and their patients haunts them.[5]

Present stressors may negatively impact psychological and mental health.[5–7] Preserving the mental health of frontline HCPs and caring about their well-being will strengthen the health care system's response to this pandemic.[8]

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During pandemics, depression, anxiety, and stress are perceived as emotional reactions. In China, the frontline HCPs looking after the COVID-19 patients experience insomnia, stress, and anxiety and suffer from more severe mental health problems than those with fewer responsibilities.[9–11]

In this study, our objectives are to measure frontline HCPs' resilience, state anxiety, trait anxiety, and level of psychological well-being during COVID-19 to determine the correlation among these determiners and the demographics associated with HCPs' healthcare environment.

Methods

Study Settings, Target Population, Sample Size, and Sampling Technique

Altogether, 348 online questionnaires were sent to all frontline HCPs, namely physicians, nurses, and respiratory therapists working at Qatif Central Hospital and King Fahd Hospital of the University. The current study included as participants 146 COVID-19 frontline HCPs from King Fahd Hospital of the University (KFHU) (70%) and Qatif Central Hospital (30%), representing the Eastern Province of Saudi Arabia. The majority were full-time staff (91%), while 9% were volunteers. Their characteristics are listed in Table 1. All the COVID-19 frontlines at the hospitals under investigation during the study. We approached them through the human resources department. We sent an email with a link to an electronic survey.

Table 1 Demographic and Work Characteristics of Frontline HCPs During COVID-19 in the Eastern Province of the Kingdom of Saudi Arabia (KSA) (2020)

		No. (n=146)	**%**
Age (yrs.)	Min-max Mean ±SD	16–61 33±7	
Gender	Male Female	40 106	27.4 72.6
Specialty	Medicine/surgery Nursing Respiratory therapy	47 93 5	32.4 64.1 3.4
Years of experience	Min-max Median	1–32	
Working hours/week	Min-max Median	10–480 48	
The average number of COVID-19 patients seen/day	Min-max Median	0–60 2	
Marital status	Single Married Separated Widowed	46 92 7 1	31.5 63.0 4.8 0.7
Have children		76	52.1
Number of children	Min-max Median	1–5 2	
Elders at home		54	37.0
Separate room		107	73.3
Chronic medical illness		15	10.3

Study Design

A cross-sectional study was conducted using a web-based self-administered questionnaire.

Data Collection Process

The first positive case of COVID-19 in Saudi Arabia was in 2 March 2020. Data were collected from the 1st of July 2020 to the 31st of July 2020. A web-based version of the questionnaire comprising 34 items was administered to all the frontline HCPs at Qatif Central Hospital and King Fahd Hospital of the University working in July 2020. The participants were asked to submit the completed questionnaires electronically. The items had been previously validated,[12–14] and were divided into four parts. The first segment covered demographic and workplace characteristics, the second contained the elements of the "WHO-5 Well-Being Index", the third contained the "10-item Connor-Davidson Resilience Scale" (CD-RISC-10), and the fourth contained the items from the "State-Trait Anxiety Inventory" (STAI).

Measurements

The State-Trait Anxiety Inventory (Short-Form)

The STAI for adults (STAI-AD) is an instrument commonly used worldwide to measure anxiety. Anxiety states are characterized by subjective feelings of tension, apprehension, nervousness, and worry, and by the activation or arousal of the autonomic nervous system. The STAI has 20 questions, split into two subscales: "state anxiety", which is a reactive and temporary condition, and "trait anxiety", which is a more general and long-standing quality. Each subscale is formed of ten 4-likert scale items. The weights were reversed for items that indicated positive feelings. The higher the score, the greater the anxiety.[12,14]

The WHO – 5 Well-Being Index

This index, first published in 1998, is among the most widely used questionnaires for assessing psychological well-being and has been translated into more than 30 languages.

To obtain a percentage score ranging from 0 to 100, the raw score ranging from 0 to 25 was multiplied by 4. A percentage score of 0 represents the worst possible scenario, whereas a score of 100 represents the best possible quality of life. A score below 13 indicates poor well-being and indicates the need to undergo tests for depression.[13]

Connor-Davidson Resilience Scale 10

The CD-RISC-10 consists of 10 statements that describe different aspects of resilience. The scale serves mainly as a measure of hardiness, with items corresponding to flexibility, sense of self, ability to regulate emotion, optimism, and cognitive focus/maintaining attention under stress. Each item is scored on a five-point scale ranging from 0 to 4, with 0 indicating that the resilience statement is not true at all, and a score of 4 implies that the statement is true nearly all the time. The total score was calculated by adding all 10 items. Therefore, the total score can range from 0 to 40 points. Higher scores suggest greater resilience, and lower scores denote less resilience or more difficulty in bouncing back from adversity. A score below 33 may suggest problems in coping with stress or bouncing back from adversity.[12]

Data Management

Score percent was calculated as the percent of the highest possible score, namely,

score percent of anxiety = sum of scores of the 10 items *100/ 10*4. Also, the

score percent of each resilience aspect = sum of scores of the items forming this aspect *100/number of items forming this aspect*4.

Statistical Analysis

Statistical analysis was performed using IBM SPSS version 21. Statistical significance was set at $p<0.05$. Descriptive statistics were presented using frequency and percentage for categorical data and minimum, maximum, mean, and standard deviation for numerical data, and median were provided when the data were skewed.

The difference in resilience score between categories of the different factors was tested using Student's *t*-test, Mann–Whitney tests, and one-way ANOVA/Kruskal Wallis, and the correlation was presented using Spearman correlation coefficient.

Multiple linear regression was performed with the resilience score as the dependent variable and age, experience, state anxiety, and trait anxiety as independent variables using the enter method. All assumptions of linearity (by scatter plots) and normality (normal Q-Q plot, coeff of skewness=−0.381, coefficient of kurtosis=−0.376) were satisfied. Breusch-Pagan test for heteroskedasticity p=0.976.Durbin Watson=2.007.

Results

The score percent of resilience and its different aspects ranged from 0 to 100 with a median [95% CI around median] of 67.5 [62.5,72.5]. Further, the ability to regulate emotions had the highest median score (75 [50, 75]), while cognitive focus/maintaining attention under stress had the lowest median score (50 [50, 75]) (Figure 1). State anxiety and trait anxiety had median [95% CI around median] scores of 55 [52.5, 57.5] and 47.5 [47.5, 52.5], respectively.

There was no statistically significant difference in the resilience score and all its aspects concerning the HCPs' specialty, gender, marital status, having children or elderly at home, having separate rooms at home, or having a chronic medical illness (Table 2). Moreover, the average number of hours spent at work and the average number of COVID-19 patients seen per day was not a significant factor affecting resilience. The median resilience score of volunteer workers (50.9 [22.5, 77.5]) was lower than that of regular staff (67.5 [62.5, 75]) (p=0.028).

There was an intermediate inverse significant correlation between resilience and anxiety scores (ie, resilience and all its aspects had lower scores, and state and trait anxiety had higher scores), while the correlation between resilience and well-being was not statistically significant. The values are illustrated in Table 3 and Figure 2.

Resilience in relation to flexibility, self-efficacy, and ability to regulate emotions was higher with older age (ie, intermediate correlation) and with more years of experience (ie, weak correlation).

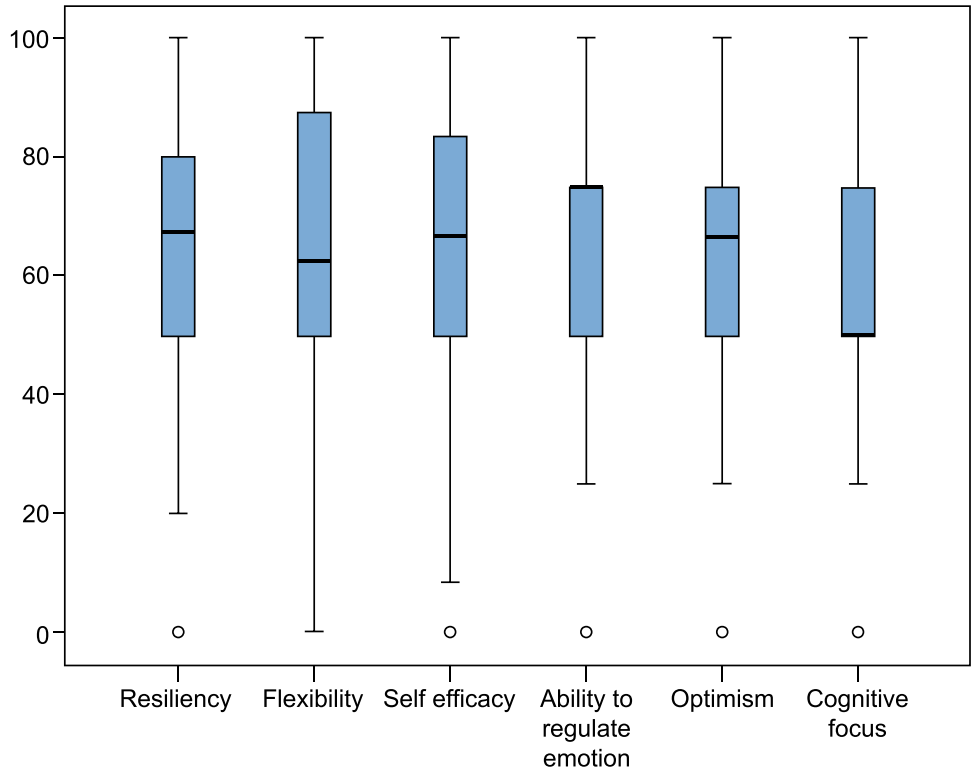

Figure 1 Score percent and aspects of resilience of COVID-19 frontline HCPs in the Eastern Province of KSA (2020).

Table 2 Relation Between Resilience and Demographic and Work Characteristics of Frontline HCPs During COVID-19 in the Eastern Province of the Kingdom of Saudi Arabia (KSA) (2020)

		Resilience Score Percent					p-value
		Min	Max	Mean	SD	Median	
Gender	Male	20.00	90.00	64.62	18.31	67.50	
	Female	25.00	100.00	66.20	18.27	67.50	0.703
Specialty	Medicine/surgery	22.50	90.00	61.96	16.86	60.00	
	Nursing	20.00	100.00	67.80	19.03	70.00	
	Respiratory therapy	45.00	67.50	60.50	8.91	62.50	0.170
Hospital	KFHU	20.00	100.00	67.13	18.48	70.00	
	Qatif Central Hospital	25.00	90.00	62.62	17.43	62.50	0.176
Marital status	Single	20.00	100.00	62.83	19.91	65.00	
	Married	25.00	100.00	66.51	17.67	67.50	
	Separated	57.50	85.00	76.67	9.96	80.00	
	Widow	65.00	65.00	65.00		65.00	0.328
Have children	No	22.50	100.00	64.82	19.52	65.00	
	Yes	20.00	100.00	66.63	17.05	67.50	0.553
Have elders at home	No	20.00	100.00	66.76	19.68	72.50	
	Yes	25.00	100.00	64.04	15.38	62.50	0.361
Have separate room	No	27.50	100.00	65.41	17.37	65.00	
	Yes	20.00	100.00	65.90	18.60	68.75	0.888
Chronic medical illness	No	20.00	100.00	65.64	18.36	67.50	
	Yes	27.50	87.50	66.96	17.60	70.00	0.744
Participating in frontlines of COVID pandemic	Staff	20.00	100.00	66.50	17.96	67.50	
	Volunteer	22.50	80.00	57.05	20.09	60.00	0.028

Table 3 Correlation Among Resilience and Its Aspects with Well-Being and Anxiety

	WHO-5 Well-Being		State Anxiety	Trait Anxiety	Age (Years)	Years of Experience
Resilience	r_s	0.149	−0.417	−0.536	0.263	0.211
	p	0.073	0.000	0.000	0.001	0.011
Flexibility	r_s	0.081	−0.330	−0.421	0.249	0.184
	p	0.329	0.000	0.000	0.002	0.026
Self-efficacy	r_s	0.127	−0.420	−0.544	0.263	0.221
	p	0.127	0.000	0.000	0.001	0.007
Ability to regulate emotions	r_s	0.133	−0.405	−0.489	0.266	0.198
	p	0.108	0.000	0.000	0.001	0.017
Optimism	r_s	0.102	−0.294	−0.419	0.160	0.120
	p	0.220	0.000	0.000	0.054	0.150
Cognitive focus/maintaining attention under stress	r_s	0.077	−0.285	−0.381	0.109	0.114
	p	0.355	0.000	0.000	0.190	0.171

After entering age, experience, state anxiety, and trait anxiety in the multiple linear regression model as potential predictors of resilience ($F_{(4141)}$=13.97, p<0.001), adjusted R^2=0.268, the only significant associated factor detected was trait anxiety (b= −0.653, t=−4.05 p<0.001) (Table 4).

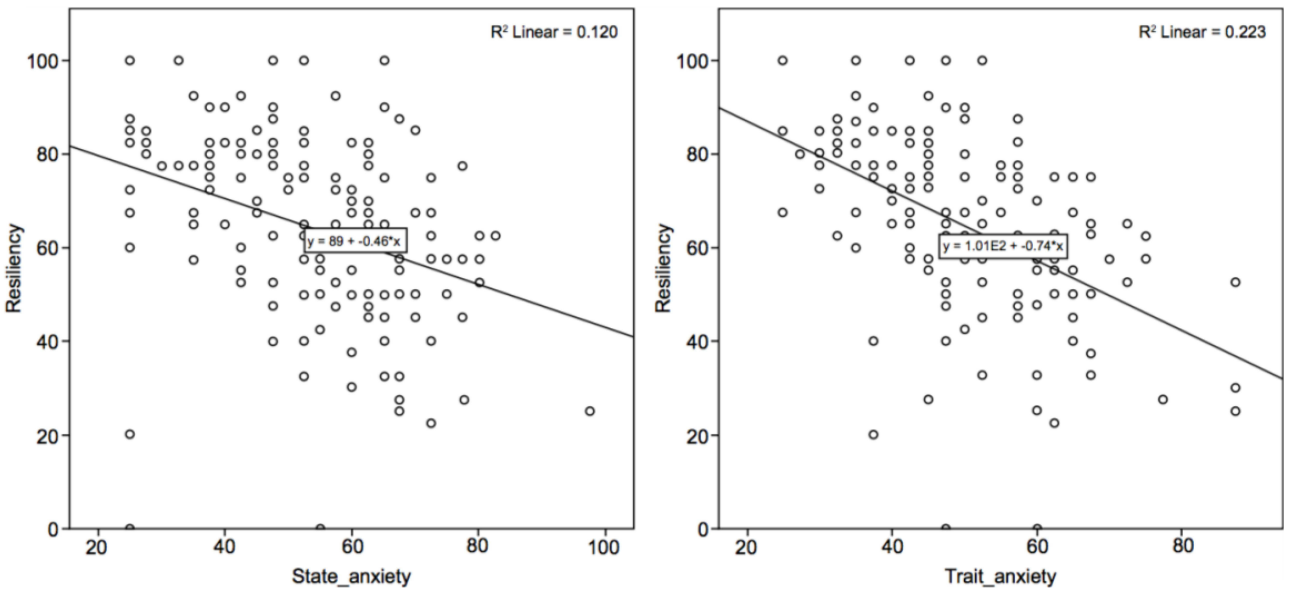

Figure 2 Correlation between resilience and state and trait anxiety.

Discussion

Work during COVID-19 can be highly challenging for HCPs, especially frontline workers who must deal with such cases on a day-to-day basis. Globally, various studies have assessed the physical and psychological functioning of the people directly associated with this pandemic in terms of being exposed to the care and treatment of COVID-19 patients. Although HCPs are trained to deal with worst-case scenarios, they also feel concerned about the well-being of their loved ones at home, especially if there are elderly and children at home. In such cases, there can be an appearance of psychological symptoms of stress, anxiety, mood, and sleep issues, thus affecting the overall well-being and life satisfaction of the concerned people and affecting their ability to deal with various important decisions, both at work and home. A study was conducted in Saudi Arabia in early 2020 regarding the anxiety associated with COVID-19 as compared to the previously experienced MERS outbreak in the country, and it was observed that the anxiety level among the HCPs was 41.1% more related to COVID-19.[15]

In consideration of all these aspects, the current research was designed to explore the relationship among resilience, well-being, state, and trait anxiety in HCPs, including both the regular hospital staff and the volunteer workers.

As depicted in Figure 1, it is apparent that the only feature that shows the least median score (50) is that for cognitive focus (ie, ability to maintain attention during stress), whereas the highest median score (75) is that for the ability to regulate emotions. Psychologically, both cognitive focus and emotional regulation can be part of an individual's coping

Table 4 Regression Analysis for Factors Related to Resilience of Frontline HCPs During COVID-19 in the Eastern Province of the Kingdom of Saudi Arabia (KSA) (2020)

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	89.672	10.938		8.198	0.000
State anxiety	−0.047	0.140	−0.039	−0.333	0.740
Trait anxiety	−0.653	0.161	−0.470	−4.051	0.000
Age (years)	0.385	0.327	0.152	1.176	0.241
Years of experience	−0.163	0.355	−0.059	−0.459	0.647

Notes: F=13.97, p=0.0001, adjusted R^2=0.268.

style. Since COVID-19 renders people helpless at times, especially regarding how to prevent its spread, the cognitive focus could be lowered as it depends on whether people act rationally and professionally at work. Alternatively, practitioners realize that keeping emotions under regulation can help them cope with a bad or uncertain scenario. Emotional regulation does not mean controlling your emotions all the time and not feeling them; conversely, it means experiencing your emotions (ie, feeling sad, angry, or fearful) but overcoming the associated negativity afterward for personal benefit.[16]

None of the six resilience variables signified any direct effect regarding the demographic features of the sample, except that the volunteer workers had a slightly lower resilience score (50.9) than the regular hospital staff (66.8, $p<0.05$). This difference could be the direct effect of the difference in the level of training between the volunteers and regular staff workers. A study conducted in China proved that physicians had a higher level of resilience (73.48), followed by support staff and technicians.[4] Similarly, Awano et al[17] state that HCPs with lower resilience scores have a higher chance of developing psychological problems, such as depression.

As outlined in Table 3, resilience as a whole did not show any significant correlation with well-being.The American Psychological Association's[18] definition of well-being links it with experiencing a state of happiness, low levels of stress, better physical and mental health, and good quality of life. Yet, the current scenario of COVID-19 negatively affected all these aspects. A recent meta-analysis of COVID-19 has also validated that several HCPs demonstrated mood and sleep disturbances, which eventually affected their mental health.[19]

There appears to be a significant inverse correlation between resilience and state anxiety and between resilience and trait anxiety. State anxiety is an anxious response related to the current state or situation whereas trait anxiety is linked with an individual's personality characteristics which are responsible to create an anxiety response during an adverse state;[20] hence, both these types of anxieties tend to lower resilient responses at the time of negativity. Similarly, a study on the health workers of Wuhan revealed a negative correlation between resilience and anxiety.[21] Another study verified that high resilience reduced the negative effects of fear of coronavirus, depression, anxiety, and stress among the health professionals directly dealing with the COVID-19 patients.[22]

Similarly, the subscales of CD-RISC-10 show a significant negative correlation with the state and trait anxiety scale, which includes subscales of flexibility, self-efficacy, ability to regulate emotions, optimism, and cognitive focus. While summarizing the given results of the five elements, it proves that people's sense of adequacy is affected by the belief that one has sufficient knowledge and skills to deal with the worst-case scenario. During the pandemic, the prevalence of uncertainty creates pessimism and a lack of focused attention heightens negative emotions and facilitates rigidness. A study conducted in China to explore the affected mental health outcomes among health-related workers observed that many of them were suffering from depression, anxiety, insomnia, and distress.[9]

Multiple linear regression signified that the only significantly associated factor was trait anxiety. Moreover, a study on paramedics was performed in Iran to find the connection between resilience and personality traits. The study depicted that the personality trait of neuroticism, which is based on anxiety symptoms, was significantly correlated with resilience.[23]

Table 3 further refers to a positive intermediate correlation between resilience and age of the individual, as well as a weak positive correlation with years of experience. This positive correlation is further linked with three of the CD-RISC-10 subscales, which comprise flexibility, self-efficacy, and ability to regulate emotions. With advanced age and experience, people developed a sense of self-efficacy, which helped them in guiding others and avoiding rigidity to better handle their emotions. A study conducted in Turkey demonstrated that the psychological resilience of health care workers was higher in later years.[24] This higher age phenomenon is often linked with more years of experience, as those in the higher age category would also be higher in the experience category. Another cross-sectional study in the UK exhibited a weak but positive correlation between resilience and age, where older employees in the health profession showed a higher level of resilience.[25]

Overall resilience is one factor that has been identified as a positive indicator of coping and survival, with a low rate of adverse psychological symptoms. Nonetheless, many frontline HCPs are not aware of the benefits of self-resilience, and in many countries, hospitals and government agencies are unable to provide adequate work support. In turn, cases of failed coping strategies, depression, stress, anxiety, post-traumatic stress disorder (PTSD), and burnout among health workers rise dramatically.[26]

Many medical facilities have realized the importance of providing organizational support and training for their healthcare professionals to help them successfully survive during pandemics and have observed the positive outcomes of such measures. One such study conducted in the Philippines on frontline nurses revealed that resilient nurses and those who perceived organizational and social support to be higher reported lower anxiety in relation to COVID-19.[27]

Strengths and Limitations

This study has a few limitations. Only two areas of the Eastern Province of KSA were appraised; otherwise, an increased sample size would have made a difference in the generalization of this study's outcomes. Psychological symptoms related to depression, PTSD, and burnout, which can also be highly prevalent during times such as COVID-19, were not explored.

Recommendations

1. In future, this study can also be conducted in other parts of the KSA to increase its scope and relevance.
2. The prevalence of other psychological symptoms, particularly depression, PTSD, and burnout, can also be explored in the future.
3. Based on these results, hospitals can start psychosocial resilience training for frontline workers to prevent the re-emergence of psychological symptoms of depression or PTSD.
4. A well-planned system for staff support can be structured to assist in self-care procedures, which can consequently boost workers' sense of well-being and resilience.

Conclusion

In conclusion, resilience is an important survival characteristic in times of stress and adversity. A link can be established between resilience and various personality and situational variables. Further, it presented a significant inverse correlation with both state and trait anxiety and a direct positive correlation with the age and experience of the HCPs. Also, resilience is a mindset that can be taught, which will further promote professional and mental health capacity, thus improving the holistic concept of survival in adversity.

Data Sharing Statement

The data supporting the findings of this study are available within the article in the result section.

Ethical Considerations and Institutional Review Board Approval

Approval for the study was obtained from IAU and QCH's ethics committee and institutional review board (IRB-2020-01-166) Participation was voluntary. We considered consent to be implicit when the participants filled out and submitted the completed questionnaire. Informed written consent was stated on the first page of the electronic questionnaire. The research is in accordance with the Declaration of Helsinki.

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Disclosure

The authors have no conflicts of interest to declare.

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