

The Relationship Between Stress and Resilience of Nurses in Intensive Care Units During the COVID-19 Pandemic

INQUIRY: The Journal of Health Care
Organization, Provision, and Financing
Volume 60: 1–8
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DOI: 10.1177/00469580231179876
journals.sagepub.com/home/inq



Ibrahim Aqtam, PhD¹, Ahmad Ayed, PhD², Dalia Toqan, PhD²,
Basma Salameh, PhD², Eman Sameh Abd Elhay, PhD³, Kefah Zaben, PhD⁴,
and Mustafa Mohammad Shouli, PhD¹

Abstract

The coronavirus infection COVID-19 has been a risk to world health, particularly for individuals who are vulnerable to it. Critical care nurses have described experiencing extremely high levels of stress under these struggling conditions. This study aimed to assess the relationship between stress and resilience of intensive care unit nurses during the COVID-19 pandemic. A cross-sectional study was conducted on 227 nurses who are working in the intensive care units in the West Bank hospitals, Palestine. Data collection utilized the Nursing Stress Scale (NSS) and the Brief Resilient Coping Scale (BRCS). Two hundred twenty-seven intensive care nurses completed the questionnaire; (61.2%) were males, and (81.5%) had documented COVID-19 infection among their friends, family, or coworkers. Most intensive care nurses reported high levels of stress (105.9 ± 11.9), but low levels of resilience (11.0 ± 4.3). There was a moderate negative correlation between nurses' stress and their resilience ($P < .05$) and a small to moderate negative correlation between nurses' stress sub-scales and resilience ($P < .05$). Also, the results revealed a statistically significant difference between the stress score mean and the nurses who had documented COVID-19 infection among their friends, family, or coworkers ($P < .05$), and between the resilience mean score and the nurses' gender ($P < .05$). During the COVID-19 outbreak, intensive care nurses' stress levels were high, and their resilience was low. Thus, controlling nurses' stress levels and identifying possible stress sources related to the COVID-19 pandemic are important to maintain patients' safety and improve the quality of care.

Keywords

resilience, stress, intensive care unit and nurses, COVID-19, Palestine

What do we already know about this topic?

Intensive critical care nurses have suffered great physical and mental exhaustion during the pandemic.

How does your research contribute to the field?

There was a moderately negative correlation between nurses' stress and their resilience. Also, there is a small to moderate negative correlation between nurses' stress sub-scales and resilience.

What are your research's implications toward theory, practice, or policy?

Effective intervention programs for nurses to improve their physical and psychological well-being while caring for critically ill patients are required.

Introduction

The coronavirus infection (COVID-19) has quickly spread through the world, affecting thousands of people and killing many of them; as a result, the World Health Organization¹ has declared COVID-19 a pandemic infection. Precautions against the infection are the proper method to protect vulnerable individuals. Because of its rapid transmission, the coronavirus poses

a significant risk of mortality.^{2,3} This event has caused widespread fear throughout the world.

The psychological pressure placed on health-care personnel as a result of the urgent medical emergency and high transmission rates has resulted in substantial mental health problems.^{4,5} Also, dealing with traumatic patient encounters and the sudden deaths of family members, friends, and colleagues has led to high rates of psychiatric morbidity



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and a wide range of mental health disorders among these professionals.⁵⁻⁸

At the same time, nurses would be exposed to physical and mental stress, as well as emotions of isolation and helplessness in light of health risks and the demands of high-intensity tasks brought on by such health emergencies.⁹ Stress is a wide term that is commonly used to describe both internal and external stressful situations.¹⁰ Stress can have a significant impact on a nurse's ability to complete tasks; in particular, poor decision-making, low motivation, apathy, lack of concentration, and anxiety can impair work performance and lead to unanticipated errors.¹¹

However, not everyone who suffers stress develops psychological or mental illnesses.¹² Staff coping use various strategies such as social and personal resources, as well as social support, optimism, and resilience, operate as protective factors.^{13,14} Resilience is described as an individual's ability to manage great hardship and recover rapidly, and it has been associated with a lower risk of mental illness.^{15,16} It is described also, as the ability to recover or survive effectively in the face of adversity, and it has been defined as a "dynamic process of positive adaptation to stress," which includes dynamic interactions between personal and environmental variables and resources.¹⁷ Throughout COVID-19, there was a need to manage ongoing stresses while minimizing psychological distress. This pandemic is unlike any other, and it has been distressing for health professionals, especially ICU nurses, resulting in psychological problems.^{18,19} Aside from the negative consequences, some people can use protective factors such as resilience to deal with psychological trauma and lessen mental health problems.²⁰

Nurses on the frontlines of COVID-19 are more vulnerable to the poor health impacts of stress because they are exposed to higher degrees of stress.^{21,22} Individuals who experience high levels of professional stress are more likely to develop heart disease, cancer, depression, anxiety disorders, and sleep difficulties.²³⁻²⁵ Furthermore, nurses with high levels of stress and low resilience provide inadequate quality care, exhibit less caring behaviors, and have greater rates of burnout and attrition.²⁶

Significance of the Study

Nurses are anticipated to play an even more critical role in preparing for and controlling COVID-19. Nurses caring for confirmed or suspected patients are more likely to be

exposed to a high risk of infection, a higher level of burden of care, and negative psychological stress than the general population. If recovery does not involve termination of the acute adaptive response, deleterious effects on psychological and physiological function may occur. Health care workers, especially nurses, who come into close contact with confirmed or suspected patients when providing care are often left with inadequate protections from contamination, high risks of infection, working burnout, fear, anxiety, and depression.²⁷

The adverse psychological outcomes following the COVID-19 epidemic found significant emotional distress was present in 18% to 57% of healthcare workers.²⁸ According to a cross-sectional study conducted in 17 countries aimed at assessing health workers' stress from COVID-19 and reported coping levels, physicians experienced higher stress but had a lower fear of COVID-19, while nurses reported moderate to high resilient coping levels.²⁹ Another study revealed the overall prevalence of anxiety among front-line healthcare workers in Iran was 25.8%.³⁰ Therefore, this study aimed to assess the relationship between stress and resilience of intensive care unit nurses during the COVID-19 pandemic.

Method

A cross-sectional study was conducted on nurses working in intensive care units in West Bank hospitals. The study was conducted from February to September 2021.

Sample and Sampling Method

The total number of nurses who work in targeted ICUs is approximately 400. The RaoSoft program was used to calculate the sample size, which had a 95% confidence level, a 5% margin of error, and a 50% response rate. A convenience sample of 197 participants was needed to conduct this study. To compensate for attrition, 40 additional nurses were recruited, bringing the total sample size to 237 nurses. In total, 227 nurses took part in the study.

Inclusion and Exclusion Criteria

All full-time nurses working in the targeted ICUs were included, and exclusion those who were away from work or on vacation during the collection of data.

¹Nablus University for Vocational & Technical Education, Nablus, Palestine

²Arab American University, Jenin, Palestine

³Mansoura University, Mansoura, Egypt

⁴Al-Quds University, Jerusalem, Palestine

Received 9 February 2023; revised 11 May 2023; revised manuscript accepted 12 May 2023

Corresponding Author:

Ahmad Ayed, Faculty of Nursing, Arab American University, Jenin 0097, Palestine.

Email: ahmad.juma@aaup.edu

The Data Collection Process

After obtaining approval from the Arab American University and Ministry of Health, the researchers contacted each nursing administrator in the targeted hospitals to present the purpose of the study and obtain the list of nurses in the intensive care units. The questionnaires were distributed face-to-face at each hospital in Arabic version. The instrument was translated into Arabic following the translation protocol of the World Health Organization. Also, the validity of the instrument was tested by sending it to 5 experts in nursing education. The experts had no comments.

Instruments

A questionnaire composed of the following parts:

- Part 1: Socio-demographic characteristics developed by the researcher after reviewing the related literature. It includes age, gender, and education level, the number of household members, experience, and information about a previous COVID-19 infection.
- Part 2: The Nursing Stress Scale (NSS), developed by Gray-Toft and Anderson, is a 34-item self-report questionnaire that measures the frequency and sources of stress experienced by nurses. The scale consists of 7 subscales: death and dying; conflicts with physicians; inadequate preparation; a lack of support; conflicts with other nurses; workload; and uncertainty concerning treatment.³¹ Each item's response ranges from never (score 0) to very frequently (score 4), with values ranging from 0 to 136 and higher scores indicating more stress. The scale is the best known and most widely used in nursing.³² The Cronbach's alpha is .92 for the total scale.³³
- Part 3: The Brief Resilient Coping Scale (BRCS) developed by Sinclair and Wallston.³⁴ The format is a Likert response with 6 anchor points ranging from 0 (does not describe me at all) to 5 (very well describes me). The maximum score is 20 points; the higher the score, the greater the resilience. According to the authors of the original scale, low-resistance subjects are those who obtain scores lower than 13, while those who score above 17 are considered highly adaptable.³⁴ This is a self-administered scale that aims to assess the ability to handle stress in an adaptive manner. The original scale has 4 items and an internal consistency of 0.76.

In the current study, Cronbach's alpha for the Nursing Stress Scale and Brief Resilience Coping Scale were .933 and .912, respectively, which were considered high for both tools.

Pilot Study

A random sample of 20 participants who matched the inclusion criteria were chosen for the pilot study. The participants

reported having no difficulty interpreting or clarifying the data from the instruments. According to the pilot study, the average time to complete the questionnaire was 10 to 20 min.

Ethical Considerations

Ethical approval was obtained from the Arab American University and Ministry of Health. A written informed consent was obtained from the participants before completing the questionnaire. Voluntary participation was explained. It was explained that all data will be kept confidential and will be used for study purposes only. A clear explanation was given to each participant about the study objectives and tool, and enough time was given for questions.

Data Analysis

Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) version 23. Descriptive statistics for all parameters included in this analysis were performed. These analyses included distributions of means and standard deviations. Moreover, an independent *t* test, ANOVA, and correlation were used.

Results

Sample Description

Two hundred twenty-seven participants out of 237 nurses completed the study, with a response rate of 95.8%. The analysis revealed that the majority of the participants, 146 (64.3%), were between the ages of 25 and 45, with 139 (61.2%) being males. More than half of them 131(57.7%) were married. Most of them—171 (75.3%)—have a bachelor's degree, and 90 (39.5%) have 1 to 5 years' experience. In 101 (44.5%) of the households studied, the number of household residents ranged between 4 and 6. Regarding COVID-19 infection, 185 (81.5%) of the studied sample had documented COVID-19 infection among their friends, family, or coworkers, as seen in Table 1.

The analysis revealed that the total stress mean was 105.9 ± 11.9 (ranging from 47 to 133), which is high. Also, the analysis showed that the inadequate preparation subscale of stress had the highest mean score of 5.2 ± 0.8 , and both death and dying and a lack of support had the lowest mean scores of 3.0 ± 0.5 . According to the resilience mean scores, it was 11.0 ± 4.3 (ranging from 2 to 16), which is low, as seen in Table 2.

The analysis showed that there was a moderate negative correlation between nurses' stress and their resilience ($P < .05$). Also, nurse stress sub-scales (death and dying, conflicts with other nurses, workload, and uncertainty concerning treatment) showed similar results. At the same time, nurse stress sub-scales (conflicts with physicians, inadequate preparation, and lack of support) showed a small negative correlation and resilience ($P < .05$), as seen in Table 3.

Table 1. Demographic Characteristics of the Participants (N = 227).

Characteristics	N (%)
Age	
<25	7 (3.1)
25-45	146 (64.3)
>45	74 (32.6)
Gender	
Male	139 (61.2)
Female	88 (38.8)
Marital status	
Single	91 (40.1)
Married	131 (57.7)
Other	5 (2.2)
Educational level	
Diploma	39 (17.2)
Bachelor	171 (75.3)
Postgraduate studies	17 (7.5)
Household residents	
From 1 to 3	86 (37.9)
From 4 to 6	101 (44.5)
From 7 to 9	29 (12.8)
10 or more	11 (4.8)
Experience	
Less than 1 year	35 (15.4)
1-5 years	90 (39.6)
6-10 years	63 (27.8)
More than 10 years	39 (17.2)
COVID-19 infection of friends' family and/or coworkers	
Yes	185 (81.5)
No	42 (18.5)

Table 2. Stress and Resilience Mean Scores (N = 227).

Variable	M (SD)
STRESS (34 items)	105.9 (11.9)
Death and dying (7 items)	3.0 (0.5)
Conflicts with physicians (5 items)	3.1 (0.5)
Inadequate preparation (3 items)	5.2 (0.8)
Lack of support (3 items)	3.0 (0.5)
Conflicts with other nurses (5 items)	3.2 (0.4)
Workload (6 items)	3.2 (0.6)
Uncertainty concerning treatment (5 items)	3.1 (0.4)
Resilience	11.0 (4.3)

M = mean; SD = standard deviation.

To determine whether there is a difference in nursing stress means scores and socio-demographic characteristics, the results in Table 4 showed that there were statistically significant differences between the stress score mean and both gender and the nurses who had documented COVID-19 infection among their friends, family, or coworkers ($P < .05$). At the same time, there was only a statistically significant

difference between the resilience score mean and the nurses' gender ($P < .05$).

Discussion

The increasing literature on the psychological effect of the COVID-19 epidemic on health care professionals has revealed a high frequency of psychiatric problems among hospital staff.^{19,35}

The current study found that nurses' perceived stress was high and their resilience was low during the COVID-19 pandemic. The pandemic of COVID-19 has increased the working hours, workload, and stress levels of healthcare personnel, particularly nurses as well as insufficient coping skills.³⁶ These findings are reinforced by the Croghan et al³⁷ study, which found increased stress and lower resilience among nurses. They used the perceived Stress Scale (PSS), Brief Resilience Coping Scale (BRCS), and Brief Resilience Scale (BRS) to collect data. Another Egyptian study discovered that nursing stress was greater than the mean score.³⁸ They collected data by Nursing Stress Scale (NSS). Also, these results supported by studies conducted during the COVID-19 pandemic, the results stated that nurses had high work stress and anxiety.^{39,40} However, in a study revealed that only 5.2% of the 906 healthcare professionals working during the COVID-19 pandemic experienced stress.⁴¹ This may be due to the different scales used to assess stress levels among nurses.

Also, the current study found that nurses' increased reported stress was associated with inadequate preparation. This might be explained due to the abrupt outbreak of COVID-19, and nurses don't have adequate skills on how to respond to or deal with the emotional needs of patients and their families. The current study's findings were validated by Hendy et al³⁸ and Afulani et al⁴² who found that poor perceived preparation to respond to COVID-19 increases stress. Afulani et al⁴² study used 10-item Cohen perceived stress scale to assess stress. Another study in Spain found that staff not only had to deal with patients who had a contagious and potentially fatal illness, but they also had to deal with a number of stressful factors that could increase anxiety in the face of an overwhelming situation, and in most cases, with limited resources.⁴³ A study by Ardic et al⁴⁴ found that health services had the most uncertainty during the COVID-19 pandemic.

Nurses have been considered the health system's and outbreak response's backbone.⁸ Although stressors are higher in frontline (direct patient care) nurses than in others, it is understandable that nurses experience more stress due to the nature of their work responsibilities, which include spending more time delivering direct patient care and providing direct social and emotional support to patients whose families are prohibited from visiting.²² It is critical to have a better knowledge of the specific elements that contribute to nursing stress so that stress reduction strategies may be applied effectively for this population.

Table 3. Correlation of Nursing Stress and Resilience (N=227).

Variable	Resilience Pearson's correlation (r)	P-value
STRESS	-.433**	.001
Death and dying	-.314**	.001
Conflicts with physicians	-.189**	.004
Inadequate preparation	-.202**	.002
Lack of support	-.284**	.001
Conflicts with other nurses	-.418**	.001
Workload	-.353**	.001
Uncertainty concerning treatment	-.502**	.001

**Correlation is significant at the .01 level (two-tailed).

*Correlation is significant at the .05 level (two-tailed).

Table 4. Differences Between Nurse's Socio-Demographic Characteristics and Both Stress and Resilience (N=227).

Socio-demographic characteristic	N	Stress			Resilience		
		M (SD)	Test	P-value	M (SD)	Test	P-value
Age							
<25	7	109.7 (7.0)	$F=0.382$	0.683	12.9 (2.8)	$F=2.335$	0.099
25-45	146	105.7 (13.5)			10.5 (4.5)		
>45	74	106.0 (8.6)			11.7 (4.1)		
Gender							
Male	139	105.5 (13.0)	$t=2.05$	0.042	11.5 (4.1)	$t=2.206$	0.028
Female	88	109.3 (11.2)			10.2 (4.5)		
Marital status							
Single	91	105.8 (12.2)	$F=0.331$	0.719	10.6 (4.5)	$F=0.664$	0.516
Married	131	105.8 (11.9)			11.2 (4.2)		
Other	5	110.2 (6.1)			11.6 (3.4)		
Educational level							
Diploma	39	107.1 (9.7)	$F=0.257$	0.773	11.3 (4.3)	$F=0.099$	0.906
Bachelor	171	105.7 (12.6)			10.9 (4.3)		
Postgraduate	17	104.9 (9.0)			10.8 (4.4)		
Household residents							
From 1 to 3	86	105.3 (11.8)	$F=0.370$	0.774	11.4 (4.3)	$F=0.710$	0.547
From 4 to 6	101	105.6 (12.9)			10.6 (4.4)		
From 7 to 9	29	107.5 (9.1)			11.3 (4.3)		
10 or more	11	108.2 (9.9)			10.0 (4.4)		
Experience							
Less than 1 year	35	107.9 (11.1)	$F=1.082$	0.358	9.5 (4.6)	$F=1.593$	0.192
1-5 years	90	104.6 (13.4)			11.2 (4.4)		
6-10 years	63	107.3 (12.3)			11.2 (4.0)		
More than 10 years	39	104.9 (7.2)			11.5 (4.4)		
COVID-19 infection of friends/family and/or coworkers							
Yes	185	105.1 (11.8)	$t=-2.05$	0.041	10.9 (4.4)	$t=-0.305$	0.760
No	42	109.3 (12.1)			11.2 (4.1)		

In this study, females experienced higher stress than males. Earlier studies have shown that females working in health care are more likely to experience stress, with female respondents having a greater risk of psychological distress

than men.⁴⁵⁻⁴⁸ Furthermore, this finding is congruent with a study conducted among medical students in Nigeria during the Coronavirus epidemic, which found that females had higher psychological discomfort than male students.⁴⁹ This

conclusion is similar to a previous study by Rakhmanov and Dane,⁵⁰ which was done among African university students and found that females are more likely than males to experience psychological discomfort.

Additionally, the current study found that males were more resilient than females. This might be explained by disparities in coping methods between men and women in the Arab cultural setting.⁵¹ A study done in Lebanon found gender to be one of the most important characteristics connected with resilience.⁵² During the epidemic, female nurses were likely overwhelmed with family and work duties, resulting in decreased resilience. As a result, organizations should create gender-sensitive, empowering initiatives to assist men and women in successfully coping with adversity.⁵³ A future study should investigate more into the gender dynamics, causes, and manifestations among Palestinian nurses.

Furthermore, the current study found that nurses who had friends, relatives, or coworkers infected with COVID-19 had much greater stress than those who did not. This finding was reinforced by research done in 6 Arab countries, which found that having a family with COVID-19 was a strong predictor of stress.⁵⁴ Also, the findings were similar to those of a Turkish study that reported a substantial difference in anxiety levels between nurses and family members with COVID-19.⁵⁵

Despite the study's significant findings, a few limitations should be considered. The study is cross-sectional, therefore it does not account for the direct impact of stress on resilience. In addition, the data were gathered using a self-reported questionnaire based on the nurses' perceptions and opinions.

Implications for Clinical Practice

It is critical to keep the nurses' stress levels under control. Thus, controlling nurses' stress levels and identifying possible stress sources related to the COVID-19 pandemic are important to maintain patients' safety and improve the quality of care. Therefore, effective intervention programs for nurses to improve their coping resilience are required. More research is needed to understand the factors affecting critical care nurses' resilience.

Conclusion

This study confirmed that intensive care nurses' stress was high and their resilience was lower during the COVID-19 outbreak. Also, the study confirmed that inadequate preparation was the major factor of stress among nurses. Furthermore, it indicated a moderately negative correlation between nurses' stress and resilience.

Acknowledgments

The authors would like to express their thanks to the nurses who participated in the study.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iDs

Ibrahim Aqtam  <https://orcid.org/0000-0001-6339-9176>

Ahmad Ayed  <https://orcid.org/0000-0003-2164-8183>

Basma Salame  <https://orcid.org/0000-0003-1372-7199>

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