

# Palestinian Health Care Workers' Stress and Stressors During COVID-19 Pandemic: A Cross-Sectional Study

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## Abstract

**Background:** COVID-19 is thought to be the most significant public health threat the modern world has encountered. Health care workers (HCWs) face enormous pressure due to work overload, negative emotions, exhaustion, lack of contact with their families, and risk of catching the infection and death. **Aim:** This study aims to assess the level of stress perceived by HCWs and possible associated factors during the COVID-19 outbreak in Palestine. **Methods:** A cross-sectional sample of 430 frontlines HCWs was conducted using an online self-reported questionnaire. HCWs' stress from the COVID-19 outbreak, factors that increase stress, and the activities that reduced stress were assessed. Chi-square test was used to compare between a categorical variable and the study outcome; associations are presented as odds ratios (OR) and confidence intervals (95% CI) with 0.05 significance level. Al-Najah National University institutional review board granted ethics approval. **Results:** Most respondents (74.0%) reported high-stress levels during the outbreak. Fear of transmitting the virus to family was the most stressful factor (91.6%). HCWs who did not have training on the outbreak response were more likely to have high-stress levels (OR=2.7 [95% CI= 1.7-4.4],  $P < .001$ ). Those with high stress reported being disappointed (OR=2.4 [95% CI= 1.5-3.6],  $P < .001$ ), and strongly considered taking sick leave (OR=3.9 [95% CI= 1.9-7.9],  $P < .001$ ). **Conclusion:** HCWs are under tremendous stress, given the ongoing COVID-19 pandemic. Understanding the psychological impact of the outbreak on HCWs and the activities that mitigate the stress is crucial to guide policies and interventions that can maintain psychological well-being.

## Keywords

health care workers, stress, Palestine, stressors, COVID-19

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## Introduction

The novel coronavirus outbreak of pneumonia emerged in Wuhan, China days before the 2020 New Year, and has subsequently garnered worldwide attention. By the end of April 2020, Coronavirus disease 2019 (COVID-19) had invaded most countries with almost 20 million confirmed cases as of the time of manuscript submission, and a reported crude case fatality rate of 4% based on the current case description of the World Health Organization (WHO).<sup>1</sup> Compared to previous Coronavirus outbreaks, COVID-19 appears to be more contagious, with a more extended incubation period, and on the 16th of March the WHO declared it a pandemic infectious disease.<sup>2</sup>

COVID-19 is currently thought to be the most significant public health threat the modern world has encountered. The severity of the disease, the unavailability of a vaccine, little evidence on the effectiveness of potential therapeutic

agents, and no presumably pre-existing immunity in the population make everyone potentially susceptible and fearful about catching the infection.<sup>3</sup>

Health care is a highly stressful profession and considered among the top stressful professions during normal circumstances.<sup>4</sup> Facing this large scale, infectious public health event puts medical staff under both physical and

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psychological pressure.<sup>5,6</sup> Since the early emergence of the disease, it has been recognized that personnel working in health care facilities and caring for patients with COVID-19 are under tremendous stress.<sup>7</sup> Previous experience from coronavirus outbreaks such as Severe Acute Respiratory Syndrome- Coronavirus-1 (SARS CoV-1) and the Middle East Respiratory Syndrome Coronavirus (MERS-CoV) demonstrated varying levels of anxiety and nervousness among frontline health care workers (HCWs).<sup>8,9</sup>

Data regarding HCWs occupational hazard of exposure in the current emergency is suboptimal.<sup>10</sup> Available data in China showed that 3000 HCWs were infected, and at least 22 died.<sup>11</sup> A significant proportion of HCWs experienced anxiety, depression, and insomnia.<sup>12</sup>

The psychological burden of the outbreak is due to several factors. Besides the fear of death and the high risk of infection, HCWs face enormous pressure due to work overload, negative emotions, lack of contact with their families, and exhaustion.<sup>13</sup> The extreme preventive practices and the use of whole-body personal protective equipment (PPE) have been linked to many psychological effects.<sup>14</sup> Stress may be compounded when HCWs are shunned because others, including family, fear that they may transmit infection.

Higher levels of stress and emotional exhaustion were shown to be associated with higher absenteeism, intention to exit the profession, and low quality personal and family life.<sup>15</sup> Assessing the level of stress, and its source should be a priority for health service managers and other stakeholders.<sup>4</sup> To date, epidemiological data on the mental health problems and psychiatric morbidity of those suspected or diagnosed with the 2019-nCoV and their treating health professionals is minimal; therefore how to respond to these challenges during the outbreak is unknown.<sup>16</sup>

Palestine reported the first 7 confirmed cases of COVID-19 on March 5, 2020. Since then, HCWs have faced a rapidly increasing workload of possible COVID-19 patients and been on the receiving end of harassment and discrimination because of public COVID-19 fears. This study aims to assess the level of stress perceived by HCWs and possible associated factors during the COVID-19 outbreak in Palestine.

## Methods

While a cross-sectional research design was adopted, the sampling method generally followed convenience sampling. The study population included frontline HCWs (physicians, nurses, and other allied health professionals; lab and radiology technicians) working in hospitals and primary healthcare centers who were likely to deal with suspected or confirmed COVID-19 patients. Online software was used to design an electronic web-based questionnaire. It was sent, with 2 invitations to participate, to HCWs through closed institutional groups using different social media tools (WhatsApp and Messenger). This method was

used to reach as many frontline HCWs as possible in COVID-19 related quarantine circumstances and to comply with social distancing guidelines and taking advantage of the high rate of internet use among Palestinians.<sup>17</sup>

The time frame was planned to capture the uncertainty and the lack of experience with the COVID-19 outbreak by sampling over 2 weeks (March 29-April 15) in which the peak of cases and deaths in Palestine occurred.

The sample size calculation was based on the formula:  $[n = Z^2 * P * (1 - P) / d^2]$ ,<sup>18</sup> where  $Z (=1.96)$  is the statistic for a level of confidence,  $P$  is the expected proportion of subjects presented mental disorders, and  $d$  is the precision. The minimum required sample size ( $n$ ) to meet the study objectives was estimated at 385 healthcare professionals by assuming 50% expected proportion, which is the maximum variability, a 95% confidence interval (CI), and a 5% absolute precision either side of the proportion.

The questionnaire had 36 questions in 3 sections: section 1 explored HCWs' demographic information, and section 2 assessed stress and stressful factors from the COVID-19 outbreak using a Likert scale from 0 to 5, where "0" means no stress and "5" indicates very severe stress. Section 3 assessed knowledge regarding COVID-19 through 6 multiple-choice questions. A correct answer was assigned 1 point, and an incorrect answer was assigned 0 points. The total knowledge score ranged from 0 to 6, with a higher score denoting a better knowledge of COVID-19. Factors contributing to the reduction of stress were explored in multiple response questions where the participant could check all that applied.

The questionnaire was built based on an extensive literature review.<sup>8,19,20</sup> It was reviewed by 3 experts in the field and pre-tested for its validity and reliability. A pilot study was framed on Google Forms (the online questionnaire form). Twenty HCWs were selected purposively, included male and female doctors, nurses, and allied health professionals from different age groups and health care settings. The questionnaire was tested for its content and feasibility, delivery, and ease of filling it out.

This study was approved and implemented in collaboration with the Palestinian Ministry of Health. Ethical approval was obtained from Al-Najah National University Institutional Review Board (Reference No: F. MED 3/20/10). Detailed information about the study's aim and what participation would involve was provided on the first page of the online questionnaire. Participants could withdraw at any time, without providing a reason, and that all information and opinions given would be confidential and anonymous.

The Statistical Package for the Social Sciences software (SPSS version 20.0) was used for data analysis. Frequencies and percentages of occurrence summarized categorical socio-demographic data. The age and experience variables were categorized into 2 groups: <35 years of age or  $\geq 35$ , and <10 years of experience in health care or  $\geq 10$ , respectively. The perceived level of stress was categorized into

**Table 1.** Demographic Characteristics of Participant Health Care Workers (n=430).

Characteristic	Total sample	Health care workers/profession	
	Frequency (%)	Doctor (n=211) Frequency (%)	Other HCWs†(n=219) Frequency (%)
Sex			
Male	194 (45.2)	134 (69.1)	60 (30.9)
Female	235 (54.8)	77 (32.8)	158 (67.2)
Age			
<35 years	206 (48.7)	114 (55.3)	92 (44.7)
≥35 years	217 (51.3)	97 (44.7)	120 (55.3)
Health care setting			
Primary health care	234 (54.3)	96 (41.0)	138 (59.0)
Hospitals	196 (45.4)	115 (58.7)	81 (41.3)
Experience			
<10	187 (44.0)	120 (64.2)	67 (35.8)
≥10 years	243 (56.0)	91 (37.4)	152 (62.6)
Marital status			
Married	332 (77.2)	151 (45.5)	181 (54.5)
Unmarried	98 (22.7)	60 (61.2)	38 (38.8)
Have children			
Yes	318 (74.1)	137 (43.1)	181 (56.9)
No	111 (25.9)	73 (65.8)	38 (34.2)
Living with family			
Yes	384 (89.7)	190 (49.5)	194 (50.5)
No	44 (10.3)	20 (45.5)	24 (45.5)
Reported having contact with a suspected or confirmed case			
Yes	157 (36.5)	84 (53.5)	73 (46.5)
No	273 (63.5)	127 (46.5)	146 (53.5)

†Nurses and allied health care professionals; lab and radiology technicians.

high-stress levels for those who ranked their stress level  $\geq 3$  and low stress for those who ranked  $< 3$ . HCWs' knowledge was categorized into 2 groups; adequate knowledge for those who answered correctly  $\geq 4$  questions and inadequate knowledge for those who answered correctly  $< 4$  questions. Cronbach's alpha was computed to assess the internal consistency of the stress and emotions related statements. It was 0.90, which indicates an excellent level of self-consistency.

Chi-square test was used to compare categorical variables with the study outcome; associations are presented as odds ratios (OR) and confidence intervals (95%CI). A *P*-value of  $< .05$  was used to determine statistical significance.

## Results

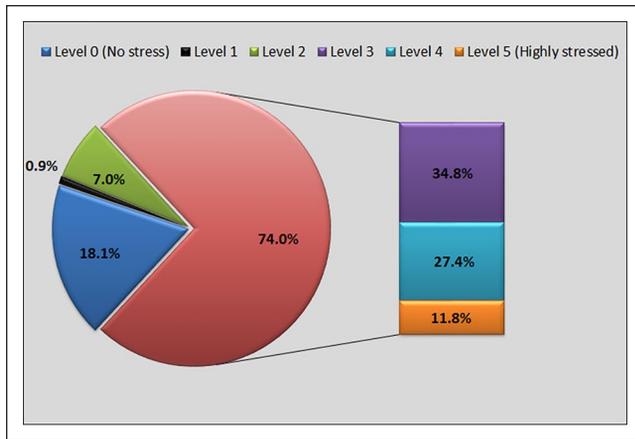
Four hundred thirty HCWs (211 doctors and 219 nurses or allied health professionals) from the West Bank of Palestine agreed to participate. The average age of the participants was 36 ( $\pm 8.9$ ) years the majority married (77.2%), have children (74.1%), and living with their families during the outbreak (89.7%). About 54% of the participants worked in primary healthcare settings, and 243 (56.0%) have  $\geq 10$  years of work experience. Of HCWs, 157 (36.5%)

reported having contact with suspected or confirmed COVID-19 cases (Table 1). HCWs' knowledge of COVID-19 was assessed with 6 questions, and two thirds (66.0%) showed adequate knowledge.

HCWs were asked to rate their level of stress during the outbreak over a scale of 6. Of them, 318 [74.0% (95% CI=69.8%-78.3%)] reported high levels of stress; levels 3, 4, and 5 (Figure 1).

Of the factors that increased stress, the fear of transmitting the virus to family was the highest (91.6%), followed by the fact that the disease has no treatment (87.7%), and the fear of acquiring the infection personally (85.8%). Table 2 summarizes the most common stressors perceived by HCWs.

The univariable analysis explored the relation between HCWs' perceived high-stress levels and their characteristics. HCWs' gender, age, job title, experience, marital status, having children, reported dealing with suspected or confirmed cases, knowledge, and type of health care setting showed no significant relation with high-stress levels. On the other hand, not having training on outbreak response and being disappointed while working on this outbreak was associated with high-stress levels. HCWs who did not get training on the outbreak response were 2.7 times more



**Figure 1.** Distribution of perceived stress level among health care workers.

likely to have high-stress levels ( $P < .001$ ,  $OR = 2.7$  [95%  $CI = 1.7-4.4$ ]). HCWs with high-stress levels are 2.4 times more likely to report being disappointed while working on this outbreak ( $P < .001$ ,  $OR = 2.4$  [95%  $CI = 1.5-3.6$ ]). Additionally, HCWs with high-stress levels are 4 times more likely to strongly think about taking sick leave ( $P < .001$ ,  $OR = 3.9$  [95%  $CI = 1.9-7.9$ ]) (Table 3).

Regarding factors that helped reduce stress, HCWs ranked being involved in activities like prayers, sports, and exercise as the most common (80.5%). This was followed by having clear guidelines for infection prevention (64.7%), the availability of PPE (57.3%), and the support of colleagues (Table 4).

## Discussion

Palestinian HCWs reported high levels of stress during the first weeks of the current COVID-19 pandemic. In Palestine, this stress is on top of the uncertainty and challenge of living under occupation.<sup>21</sup> These realities make it especially important that HCWs are prepared and supported in dealing with the challenges they may face.

Our sample included equivalent numbers of doctors and nurses or allied health care workers. There was little change in perceived stress between, genders, age, practice setting (primary health care vs hospital), job title (physician vs nurse), amount of health care experience, knowledge about COVID-19 (adequate vs inadequate), and whether or not the individual dealt with a suspected or confirmed case. This is in line with other studies that showed no relation between age, experience, job title, and stress.<sup>22,23</sup> However, female gender reported significant association with stress among Indian HCWs,<sup>22</sup> and women reported significantly higher posttraumatic stress symptoms in Hubei Province—the heart of COVID-19 pandemic.<sup>23,24</sup> On the other hand, studies showed that nurses' were more likely to have acute stress due to their different roles in COVID-19 patient care.<sup>22</sup> Our findings may

be attributed to the fact that during our study, Palestinian females HCWs were less likely to care for COVID-19 patients due to childcare responsibilities, and most COVID-19 patients were not severe enough to need hospitalization.

Furthermore, the level of uncertainty during this pandemic may equalize the stress response, so that even those with more experience in the healthcare setting, differing roles (doctor vs nurse), and acuity differences of the patients (hospital vs primary care) did not alter the stress HCWs experienced. HCWs reported significantly less stress if they received training on the outbreak response. The importance of preparation for managing the pandemic with clearly outlined guidelines and protocols, even if they are continually being adjusted, is critical and has been supported in other research.<sup>25</sup> HCWs recounted more stress if they felt disappointed while working on the outbreak. The Arabic word used translates as let down or disappointed. While cross-sectional studies cannot show cause and effect, disappointment was reported as feeling unsafe and out of control. Perhaps this is due to failures in the healthcare system's response, such as inadequate PPE, lack of guidelines, lack of training, and long work hours. Participants who felt the most stress were 4 times more likely to consider taking sick leave, which removes them from the environment, but further burdens their colleagues, and has implications for patient care.

Frontline HCWs are under massive pressure as the result of their professional obligation. Most participants reported the risk of contagion, fear of transmitting to family, and the uncertainty related to COVID-19 because there was no treatment, and their colleagues' fear contributed to feeling stress. These are valid fears with COVID-19 as asymptomatic individuals have transmitted the disease to multiple family members,<sup>26</sup> and HCWs have died.<sup>11</sup>

These high levels of stress are in addition to worldwide reports of burnout for physicians even before the pandemic.<sup>27</sup> This underlines the importance of healthcare systems and managers doing all they can to support front line HCWs. To ensure minimal risk of infection when treating patients with COVID-19, the CDC recommends the use of PPE including a gown, gloves, and either an N95 respirator plus a face shield/goggles or a powered, air-purifying respirator (PAPR).<sup>28</sup> There is limited availability of N95 masks, respiratory isolation rooms, and PAPR, in many places around the world including Palestine.<sup>21</sup> Creating supportive environments at work and giving HCWs time off to pursue activities that help them manage the stress is also important,<sup>11</sup> and supported by our findings.

Educating the public about preventive measures and imposing community sanctions also helps to limit the workload for HCWs. Interestingly, less than a fifth of our sample reported feeling ostracized because of their exposure to COVID-19. Perhaps this is due to the strong community commitment to HCWs as heroes because in Palestine they have been victims of the political unrest.<sup>29</sup>

**Table 2.** Factors Reported by Health Care Works to Increase Their Stress.

Factors	Frequency	Percentage
The fear of transmitting COVID-19 to family	394	91.6
The fact that there is no treatment for COVID-19	377	87.7
The possibility of catching the infection	370	85.8
Being a health care worker and know about COVID-19	359	83.5
Knowing that the disease is uncontrolled	346	80.5
The lack of experience in such outbreaks	336	78.1
Feeling unsafe and things are not under the control	311	72.3
My colleagues' fear	297	69.1
Fear from being isolated or quarantined	295	68.6
Feeling ostracized from people because I dealt with suspected cases	75	17.1

**Table 3.** Factors Associated With Perceived High-Stress Level Among HCWs During COVID-19 Outbreak.

Characteristic	Perceived stress level		P value*	OR (95% CI)
	High (n=318)	Low or none (n=112)		
Sex				
Male	138 (71.1%)	56 (28.9%)	.237	0.76 (0.5-1.2)
Female	179 (76.2%)	56 (23.8%)		
Age				
<35 years	157 (76.3%)	49 (23.7%)	.364	0.81 (0.5-1.3)
≥35 years	157 (72.4%)	60 (27.6%)		
Health care setting				
Primary health care	172 (73.5%)	62 (26.5%)	.817	1.1 (0.70-1.6)
Hospitals	146 (74.6%)	50 (25.4%)		
Job title				
Physicians	153 (72.5%)	58 (27.5%)	.504	1.2 (0.8-1.9)
Other health care workers†	165 (75.3%)	54 (24.7%)		
Experience				
<10 years	145 (77.5%)	42 (22.5%)	.137	0.72 (0.5-1.1)
≥10 years	173 (71.3%)	70 (28.2%)		
Marital status				
Married	245 (73.8%)	87 (26.2%)	.891	1.1 (0.6-1.7)
Unmarried	73 (74.5%)	25 (25.5%)		
Have children				
Yes	236 (74.2%)	82 (25.8%)	.798	0.91 (0.6-1.5)
No	81 (73.0%)	30 (27.0%)		
Living with family				
Yes	284 (74.0%)	100 (26.0%)	.860	0.93 (0.5-1.9)
No	32 (72.7%)	12 (27.3%)		
Reported having contact with a suspected or confirmed case				
Yes	117 (74.5%)	40 (25.5%)	.839	0.95 (0.6-1.5)
No	201 (73.6%)	72 (26.4%)		
Knowledge				
Adequate‡	210 (73.9%)	74 (26.1%)	.995	0.99 (0.6-1.6)
Inadequate	108 (74.0%)	38 (26.0%)		
Got training on outbreak response				
Yes	56 (57.7%)	41 (42.3%)	<.001	2.7 (1.7-4.4)
No	262 (78.7%)	71 (21.3%)		

(continued)

**Table 3. (continued)**

Characteristic	Perceived stress level		P value*	OR (95% CI)
	High (n=318)	Low or none (n=112)		
Felt disappointed while working on this outbreak <sup>‡</sup>				
Yes	203 (81.0%)	48 (19.0%)	<.001	2.4 (1.5-3.6)
No	115 (64.2%)	64 (35.8%)		
Strongly thought about sick leave				
Yes	80 (89.9%)	9 (10.1%)	<.001	3.9 (1.9-7.9)
No	238 (69.8%)	103 (30.2%)		

Abbreviations: CI: confidence interval; OR: odds ratio.

\*Chi-square test.

<sup>‡</sup>Nurses, and allied health care professionals; lab and radiology technicians.

<sup>‡</sup>Having a score of  $\geq 4/6$  on knowledge questions.

<sup>‡</sup>This referred to the environment in which they were working.

**Table 4. Factors Reported by Health Care Workers to Reduce Their Stress.**

Strategy	Total	Perceived stress level		P value*
		High (n=318)	Low or none (n=112)	
Did relaxation activities, for example, involved in prayers, sports, exercise, etc.	347 (80.5%)	254 (79.9%)	92 (82.1%)	.63
Having clear guidelines for infection prevention	279 (64.7%)	209 (65.7%)	69 (61.6%)	.433
Availability of personal protective equipment	247 (57.3%)	177 (55.7%)	70 (62.5%)	.208
Colleagues' support	244 (56.6%)	181 (56.9%)	62 (55.4%)	.774
Sharing jokes or humor among colleagues	179 (41.5%)	132 (41.5%)	46 (41.1%)	.935

\*Chi-square test.

This study has limitations. First, this study's cross-sectional nature makes it challenging to identify the cause-effect relationship between independent and dependent variables. Second, obtaining the data through self-report questionnaires makes it liable for reporting bias; those interested in the topic of feeling stress chose to respond. We were unable to compare the differences between responders and non-responders. Finally, the study did not assess other variables that may impact study outcomes, such as the respondents' socioeconomic status. Our findings may not be generalizable to Gaza, which has additional challenges, but HCWs worldwide are under tremendous stress, given the ongoing COVID-19 pandemic.<sup>11</sup>

## Conclusion

In conclusion, our study showed that high levels of stress are present among Palestinian HCWs. As the pandemic continues, essential clinical and policy strategies are needed to support HCWs. Training on outbreak responses should be considered for all HCWs. Understanding the psychological impact of this outbreak and the activities that mitigate the stress is crucial to guide policies and interventions that can maintain the psychological well-being of HCWs. Updating them with clear evidence-based guidelines for

infection prevention and updating them as the evidence changes, and making PPE routinely available should be considered by health authorities. Psychological support could include counseling services and the development of support systems among colleagues. These steps are imperative to ensure high-quality care for patients.

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## Author Contributions

BM: literature search, conceptualization and study design, development of the questionnaire, data collection, analysis, data interpretation, manuscript writing. ZN: conceptualization and study design, development of the questionnaire, analysis, data interpretation, manuscript writing. TZ: development of the questionnaire, data interpretation, manuscript writing. All authors have seen and approved the final version of the manuscript for submission.

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