Title: Hospital-based Healthcare Worker Perceptions of Personal Risk related to COVID-19

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ABSTRACT

Background

Health care workers treating COVID-19 patients face significant stressors such as caring for critically ill and dying patients, physically demanding care requiring new degrees of personal protective equipment use, risk of contracting the disease, and putting loved ones at risk. This study investigates the stress impact from COVID-19 exposure and how nurses and medical providers (physicians, nurse practitioners, physician assistants) experience these challenges differently.

Methods

An electronic, self-administered questionnaire was sent to all hospital staff over 6 weeks surveying exposure to COVID-19 patients and degree of stress caused by this exposure. Responses from medical providers and nurses were analyzed for significant contributors to stress levels, as well as comparing responses from medical providers versus nurses.

Results

Stress levels from increased risk of disease contraction while on the job, fear of transmitting it to family or friends, and the resulting social stigma were highest in medical staff during the COVID-19 pandemic. Compared to medical providers, nurses had nearly 4 times the odds of considering job resignation due to COVID-19. However, the majority of healthcare workers

(77.39% of medical providers and 52.90% of nurses) strongly agreed or agreed with the statements indicating high levels of altruism in their desire to treat COVID-19 patients.

Conclusion

The significant stress burden placed on nurses likely contributes to increased thoughts of job resignation. However, health care providers displayed high levels of altruism during this time of extreme crisis, despite their personal risks of caring for COVID-19 patients.

INTRODUCTION

With many Americans at home, healthcare workers remain on the front lines during the Coronavirus Disease 2019 (COVID-19) pandemic. As these healthcare workers confront various challenges accompanied by COVID-19, the potential impact on their stress levels and mental health are worrisome. A recent cross-sectional study in China showed that around 71% of health care workers were in distress and 50% were experiencing clinical symptoms of depression during the COVID-19 pandemic.[1] Earlier studies from the Severe Acute Respiratory Syndrome (SARS-CoV1) pandemic found healthcare workers perceptions of the risks that they were taking by working in healthcare during the pandemic were significantly positively associated with post-traumatic stress.[2,3] Considering each disease outbreak poses its own unique set of perceived risks, it is crucial to identify those specifically precipitated by COVID-19.[4]

Previous studies from the SARS-CoV1 epidemic found that healthcare workers were stigmatized by their communities and did not receive support from their families and friends for working during the pandemic.[3] Early work from China at the beginning of the COVID-19 pandemic identified similar patterns.[5]

At the same time, healthcare workers generally have been found to have higher levels of altruism than the general population.[6] During the SARS-CoV1 pandemic, many nurses actually volunteered to care on SARS units.[7] Altruism had been found to be protective against post-

traumatic stress during the SARS pandemic[3], and may therefore be an important quality to monitor and encourage.

The objectives of this study were firstly to explore healthcare workers' perceptions of the risks that they are taking by working during the pandemic, and secondly, to investigate how different groups of healthcare workers perceive the risks of caring for patients during COVID-19.

METHODS

Setting

From March 26th to May 9th, 2020, hospital staff (clinical as well as non-clinical) were invited to participate in a self-administered survey at the George Washington University Hospital (GWUH), a 431-bed, urban, quaternary care, academic teaching hospital. From March to May 2020, the GWUH cared for approximately 1000 COVID-19 patients. This study received an exemption from the George Washington Institutional Review Board (NCR202386).

Survey Tool

The survey was set up as a larger longitudinal study to track the perceptions of risk of all hospital staff as the pandemic progressed. The invitation was sent out electronically, and survey responses were recorded directly into REDCap (Vanderbilt University, Nashville, TN), a secure, HIPAA compliant, web-based database application.

The questionnaire (Appendix 1) consisted of three parts: basic demographic data including role and specialty in the hospital, nature of COVID-19 exposure, 9 perceived risk questions, and one measure of altruistic acceptance of risk. The 9COVID-19 risk questions and 1 altruism question were adapted from two previous studies that assessed perceived risk of developing and transmitting hospital employees in Taiwan and China.[2] The perception of risk and stress were assessed on a five-point Likert scale (strongly disagree; disagree; neutral; agree; strongly agree). The electronic survey tool was pilot tested with 2 attending physicians, 2 resident physicians, and 2 nurses to ensure local context applicability and feasibility. Questions were modified based on their feedback. This survey had an acceptable internal consistency, with a Cronbach's alpha of 0.72.

Data Analysis

For this study, we selected responses from medical staff, including physicians, registered nurses, nurse practitioners and physician assistants. We divided subjects into two discrete groups based on exposure to patients: registered nurses, who theoretically have more bedside exposure to patients,[8] and medical providers, which include physicians (attending and trainee) and advanced practice providers (nurse practitioners and physician assistants). In our institution, advanced practice providers operate in the same way as residents. The survey results were dichotomized to compare responses of strongly disagree, disagree and neutral, to agree and strongly agree. We used chi square test to compare the responses of medical providers and nurses on all of the survey questions. We also used a multivariable logistic regression model to compare the

differences in odds of having thoughts about resigning between nurses and medical providers while controlling for demographic and COVID-related variables. Analyses were conducted in STATA 14 (StataCorp, College Station, TX). We considered p-values less than 0.05 to be significant.

RESULTS

We received 445 medical staff and nurse responses to our survey. 43 of the surveys were excluded due to missing responses. There were no significant differences in demographic or perceived risk variables for the included and excluded groups. Missing data analysis is provided in supplemental appendix.

In Table 1, we describe the demographic characteristics, occupational characteristics, and COVID-19 exposure of respondents to the survey. The demographic characteristics of the nurses significantly differed from that of the medical providers. Nurses were more likely to be female. A greater percentage of them identified as black, and a greater percentage of them also reported being over 50 years of age. There were no significant differences between the nurses and medical providers in the percentages of those who cared for COVID-19 patients, had family members or friends with COVID-19, or was in quarantine for COVID-19 diagnosis or exposure.

[Insert Table 1]

In Table 2, we show various factors that contribute to stress in healthcare workers during COVID-19 pandemic. Within these categories, more medical providers were more likely to agree or strongly agree with that their job is putting them at risk (75% vs. 66.97%, p<0.05) and that they are concerned about passing COVID to others (89.13% vs. 81.65%, p=0.04). Categories that nurses were more likely to agree or strongly agree with were that they may not survive if they get COVID (13.30% vs. 3.26%, p<0.001), are having thoughts of resigning (21.56% vs. 5.98%, p<0.001), and people are avoiding their family because of their jobs (40.37% vs. 25%, p=0.001).

[Insert Table 2]

In Table 3, we present the results of the multivariable logistic regression model exploring the difference in thoughts about resigning due to COVID-19. After controlling for other demographic and COVID-related characteristics, nurses had 3.87 times the odds of considering resignation due to COVID-19 than medical providers. Additionally, healthcare workers who had a friend or close relative who contracted COVID-19 had 55% lower odds than those who did not. Healthcare workers who had been in quarantine for potential COVID-19 exposure had 68% lower odds of considering resignation than those who had not.

[Insert Table 3]

Figure 1 displays the levels of altruism of healthcare workers during the COVID-19 pandemic based on their occupation. 77.39% of medical providers (80.49% of attending physicians, 74.11% of resident physicians, 82.61% of advanced practitioners), and 54.96% of nurses strongly agreed or agreed with the statement, "because I want to help the COVID-19 patients, I am willing to accept the risks." These trends were consistent after controlling for covariates in logistic regression presented as predicted probabilities (see Supplemental Table 1).

[Insert Figure 1]

DISCUSSION

Our cross-sectional survey revealed that transmission risk, extra stress at work, and risk to self were great sources of distress to medical staff during the pandemic. Our study also found a higher percentage of nurses considering resignation due to COVID-19 when compared to medical providers, but the altruism scores were high in both groups overall.

As healthcare workers face a unique set of stressors posed by COVID-19, concerns about its impact on the stress levels and mental health of these workers are arising. Several recently published studies address this topic; however, they were all conducted on healthcare workers in China. Various factors including politics, culture, and infrastructure of the healthcare system of a region may influence their working environment, and therefore their experiences and reactions to this

crisis. This demonstrates the need to implement similar studies in the current epicenter of the pandemic (United States) to better prepare healthcare workers in response to a disaster.

Several previous studies demonstrated a correlation between perceived safety and risk and the physical and psychological wellbeing of healthcare workers. For example, higher levels of trust in hospital equipment and infection control measures predicted lower levels of emotional exhaustion and state anger in nurses.[9] Perception of personal risk from a disease outbreak was associated with post-traumatic stress symptoms.[4] On the other hand, altruistic acceptance of job-related risk showed protective effects on psychological wellbeing.[4] Improving our understanding of these perceived risks and threats can help design interventions to reduce the amount of risk felt by the employees, promote environments conducive to altruism, and thus lead to a positive impact on the wellbeing of healthcare workers.

Categories with the highest percentage of medical providers who "agreed" or "strongly agreed" included fear of passing disease onto others (Transmission), feeling of extra stress at work (Stress), and perception of great risk at one's job (Risk). Categories with the highest number of nurses who "agreed" or "strongly agreed" were Transmission, Stress, Risk, and Family (having family and friends worrying they might get infected through the healthcare worker). Considering the highly contagious nature of COVID-19, it is not surprising that both medical providers and nurses considered the risk of transmission to be one of the most significant sources of distress. Additionally, the limited supply of personal protective equipment (PPE) for healthcare personnel

may be one explanation to why the majority of medical staff agreed or strongly agreed that their job is putting them at great risk. As a caveat, our hospital did have more PPE than most but a one-mask per day policy was utilized in the early stages of the pandemic to conserve in case of a surge or supply chain issues. As the magnitude and spread of COVID-19 are becoming ever more apparent with unprecedented equipment shortages and overwhelmed intensive care systems, healthcare workers confront ethical dilemmas regarding the allocation of these limited and frequently life-saving resources to equally needy patients.[10-12] Additionally, non-emergency department and non-intensive care unit physicians and nurses were asked to step into roles in the emergency department or intensive care unit. Thus, these healthcare workers encounter a predicament about providing care outside of one's scope of practice.[10] All of these elements may be responsible for the high percentage of medical staff who agreed or strongly agreed that they feel extra stress at work.

Our results complement the findings from a recent study from China during the COVID-19 pandemic, which found the medical staff's primary concerns to be the lack of PPE, lack of sleep, contagion risks to their family members, inability to handle patients unwilling to quarantine or cooperate, and feelings of inadequacy treating critically ill patients.[13] Studies during the SARS-CoV1 outbreak of 2003 showed similar findings, with major contributors to distress in healthcare workers being fear of contracting the disease; fear of spreading the infection to loved ones; treating colleagues with SARS; and interpersonal isolation.[14-18]

A significantly higher percentage of medical providers than nurses agreed or strongly agreed with statements in the Risk and Transmission categories. This is a surprising finding considering nurses have closer and more frequent contact with patients, which initially led us to predict that nurses would have greater perceived risk of contracting and spreading COVID-19 than medical providers. On the other hand, a significantly higher percentage of nurses than medical providers agreed or strongly agreed with statements in the Survival ("I am unlikely to survive if I were to get COVID-19") and Social ("People avoid my family because of my work") categories. This may reflect the differences in demographic patterns of nurses in our institution. Nurses were more likely to be African American and over 50 years of age. Both of these groups have been found to have high rates of severe COVID-19 illness, which may influence the risks that they perceive that they are under and subsequently lead to increased post-traumatic stress.[19,20] These findings are in accordance with a cross-sectional, survey-based study on healthcare workers in Wuhan, China that reported significantly higher levels of distress and mental health symptoms in nurses compared to other healthcare workers.[1]

Nurses have reported experiencing more severe symptoms of depression, anxiety, insomnia, and distress than doctors in China during the height of the COVID-19 pandemic.[1] A possible explanation for this finding may be that nurses have close and frequent contact with patients, exposing them to the highest risk of infection.[8] More alarming are the results of a study conducted following during the SARS-CoV1 outbreak in Toronto, which showed that nurses and other hospital staff that cared for SARs patients had a significant decline in their time at the bedside,

decreased face-to-face contact with patients and decreased total work hours even after the outbreak's resolution.[3]

It is concerning that nurses have significantly greater odds of considering resignation because of COVID-19 than medical providers. Heightened anxiety about falling ill with COVID-19 and experiences of social isolation may be correlated to their stronger considerations to resignation. Turnover in the nursing profession is already very high. Annual nursing turnover rates are estimated to be at 27%.[21] These results are alarming as high rates of nursing turnover will likely be highly disruptive to hospitals during a pandemic as hospitals may also be dealing with frequent absenteeism due to COVID-19 exposures. Research is urgently needed to identify strategies to minimize nursing turnover during the pandemic.

We selected resigning as the outcome measure of interest for the regression model as it bears a significant impact on our healthcare system. While we recognize that thoughts of resigning may vary from day to day, we believe that it provides a general approximation of the accumulated stresses and risks borne by healthcare workers. Interestingly, factors associated with less thoughts of resignation due to COVID-19 include having a close friend/relative who contracted COVID-19 and having been in quarantine for potential COVID-19 exposure. A study during the Middle East Respiratory Syndrome (MERS) outbreak revealed that treating one's own colleagues sick from MERS was one of the top factors causing stress in healthcare workers.[22] However, no past study to our knowledge has associated this with thoughts of resignation. One can only speculate the

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reasons for our findings. Perhaps, witnessing a loved one suffer from COVID-19 reinforced healthcare workers' sense of duty and altruism. With physical exhaustion and sleep deprivation established as some of the greatest sources of distress during disease outbreaks,[14,22] enforced quarantine may have provided the much-needed break and rest for the overworked healthcare workers.

When comparing responses from the altruism category, significantly greater percentage of medical staff members than nurses agreed or strongly agreed to "because I want to help the COVID-19 patients, I am willing to accept the risks involved." Several explanations could account for this unexpected finding. First, as mentioned previously, nurses are at higher risk of acquiring COVID-19 due to their frequent contact with patients. Higher risks are naturally more difficult to accept. Second, nurses experience more severe mental health symptoms during disease outbreaks as described in several studies.[1,23] Is it possible that these mental health symptoms leave less mental capacity for altruism? This topic warrants additional investigation. Although the difference between medical providers and nurses was statistically significant, it is reassuring to observe that the majority of all healthcare workers, regardless of position, showed high levels of altruism.

This study has several limitations. It is limited in scope as it is a single-center study. As it is a cross sectional survey study, no causal relationships can be concluded between perceived risk factors and the levels of altruism or thoughts of resignation. We did not receive sufficient survey response to examine each of the positions included in the study separately, but we identify that each of these

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positions have unique challenges and experiences. For instance, our COVID-19 intensive care unit was only staffed by advanced practice providers. Residents and fellows worked on the other intensive care units during the height of the pandemic.

At the time that we designed this survey, there was no survey tool available to understand the perceived risks of COVID-19 to healthcare workers. COVID-19 specific validated tools have subsequently been developed.[24] Hence, we modified survey questions utilized by Chong and Wu in their study of the impact of the SARS epidemic on healthcare workers.[2,4]

The data being used to conduct this analysis is part of a larger project where we are aiming to track the impact of COVID-19 on healthcare workers longitudinally. Due to this design, it is possible for respondents to be represented more than once, which makes the true response rate difficult to fathom, as has the potential to bias the findings. We also did not include a question about how much time the provider spent with COVID-19 patients. Certainly, the perceived risks of a nurse working every day in the COVID-19 ICU would be very different from a nurse working in labor and delivery who would only occasionally care for a laboring woman with COVID-19. Lastly, response bias may exist because non-respondents could have been either too stressed to respond or not at all stressed and therefore not interested in taking the survey.

In the future, we intend to complete the longitudinal study to chart changes in perceived risk levels among healthcare providers in response to both local and national changes, and to use these findings to identify interventions which positively affect the mental wellbeing of our staff.

CONCLUSION

In this survey study of healthcare workers in a hospital with COVID-19 positive patients in Washington D.C., transmission risk, extra stress at work, and risk to self were the great sources of distress to medical staff during the pandemic. A higher percentage of nurses considered resignation due to COVID-19 when compared to medical providers, but the levels of altruism were high in both groups overall. It is essential to develop and implement interventions to preserve the well-being of healthcare workers during this pandemic, with special attention to the nurses.

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Table 1. Demographic characteristics, occupational characteristics, and COVID-19 exposure of responders: *Although both clinical and non-clinical staff were surveyed, only responses from medical providers (attending physicians, residents, nurse practitioners and physician assistants) and registered nurses were included in analysis.*

	Total (n = 402) Frequency (%)	Medical Providers (n = 184) Frequency (%)	Registered Nurses (n = 218) Frequency (%)	P-value
Sex				
Female	308 (76.62%)	110 (59.78%)	198 (90.83%)	<0.001
Male	94 (23.38%)	74 (40.22%)	20 (9.17%)	
Age				
<30	115 (28.61%)	59 (32.07%)	56 (25.69%)	<0.001
30-39	173 (43.03%)	89 (48.37%)	84 (38.53%)	
40-49	54 (13.43%)	24 (13.04%)	30 (13.76%)	
50-59	34 (8.46%)	9 (4.89%)	25 (11.47%)	
>59	26 (6.47%)	3 (1.63%)	23 (10.55%)	
Ethnicity				
White, non-Hispanic	236 (58.71%)	116 (63.04%)	120 (50.05%)	<0.001
Black, non-Hispanic	53 (13.18%)	8 (4.35%)	45 (20.64%)	
Hispanic	14 (3.48%)	6 (3.26%)	8 (3.67%)	
Asian	63 (15.67%)	38 (20.65%)	25 (11.47%)	
Other	36 (8.96%)	16 (8.70%)	20 (9.17%)	
Specialty				
Emergency Department	44 (10.95%)	12 (6.52%)	32 (14.68%)	<0.001
Intensive Care Unit	61 (15.17%)	29 (15.76%)	32 (14.68%)	
Perioperative	32 (7.96%)	8 (4.35%)	24 (11.01%)	
Surgery	52 (12.94%)	28 (15.22%)	24 (11.01%)	
Medicine	70 (17.41%)	45 (24.46%)	25 (11.47%)	
Psychiatry	11 (2.74%)	7 (3.80%)	4 (1.83%)	
Women's Services	50 (12.44%)	13 (7.07%)	37 (16.97%)	
Other	82 (20.40%)	42 (22.83%)	40 (18.35%)	
Parent or primary caregiver for a school	106 (26.37%)	44 (23.91%)	62 (28.44%)	0.31

age child or younger			
Primary caregiver or live with someone > 80 years old	6 (1.49%)	0 (0.00%)	6 (2.75%)	0.02
Cared for a patient with diagnosed or suspected COVID-19	265 (65.92%)	127 (69.02%)	138 (63.30%)	0.23
Has a friend/ close relative who contracted COVID-19	149 (37.06%)	68 (36.96%)	81 (37.16%)	0.97
Has been in quarantine for potential COVID-19 exposure	51 (12.69%)	22 (11.96%)	29 (13.30%)	0.69

Table 2. Stress factors of medical providers compared to registered nurses: *Survey responses were dichotomized to include "agreed" or "strongly agreed" as positive responses. This table shows the frequency of positive responses for each category while also comparing the differences in responses between medical providers and nurses.*

| Category	All responses (n= 402) Frequency (%)	Medical providers (n=184) Frequency (%)	Registered Nurses (n=218) Frequency (%)	P value
My job is putting me at great risk.	284 (70.65%)	138 (75.00%)	146 (66.97%)	0.08
I feel extra stress at work.	318 (79.10%)	142 (77.17%)	176 (80.73%)	0.38
I am afraid of falling ill with COVID-19.	290 (72.14%)	132 (71.74%)	158 (72.48%)	0.87
I have little control over whether I get infected or not.	227 (56.47%)	109 (59.24%)	118 (54.24%)	0.30
I am unlikely to survive if I were to get COVID-19.	35 (8.71%)	6 (3.26%)	29 (13.30%)	<0.001
I think about resigning because of COVID-19.	58 (14.43%)	11 (5.98%)	47 (21.56%)	<0.001
I am afraid I will pass COVID-19 on to others.	342 (95.07%)	164 (89.13%)	178 (81.65%)	0.04
My family and friends are worried they might get infected through me.	264 (65.67%)	117 (63.59%)	147 (67.43%)	0.51
People avoid my family because of my work	134 (33.33%)	46 (25.00%)	88 (40.37%)	0.001
Altruism: Because I want to help the COVID-19 patients, I am willing to accept the risks involved.	267 (63.42%)	147 (79.89%)	120 (55.05%)	<0.001

Table 3. Multivariable linear regression model regressing for thoughts about resigning due to COVID-19 based on occupation: *After controlling for demographic and COVID-related characteristics, analysis showed that nursing staff had greater odds of considering resignation. Those who had a friend or close relative who contracted COVID-19, and those who had been in quarantine had lower odds of considering resignation. Pseudo R2=0.1809*

Categories (reference group)	Odds Ratio (Standard Error)	95% CI	P value
Occupation (Reference: Medical providers)			
Nurse	3.87 (1.63)	1.69, 8.84	0.001
Age (< 30)			
30-39	1.12 (0.48)	0.48, 2.59	0.80
40-49	0.34 (0.22)	0.09, 1.21	0.10
50-59	0.88 (0.57)	0.25, 3.13	0.85
>60	2.30 (1.41)	0.69, 7.68	0.18
Gender (Reference: Male)			
Female	1.47 (0.77)	0.53, 4.09	0.46
Race (Reference: White, non-Hispanic)			
Black, non-Hispanic	0.76 (0.40)	0.27, 2.13	0.60
Hispanic	4.86 (3.58)	1.15, 20.62	0.032
Asian	1.49 (0.71)	0.58, 3.81	0.41
Other	1.77 (0.89)	0.66, 4.72	0.26
Specialty (Reference: Emergency department)			
Intensive care	2.14 (1.38)	0.61, 7.58	0.24
Perioperative	2.78 (2.10)	0.63, 12.24	0.18
Surgery	0.78 (0.64)	0.15, 3.93	0.76
Medicine	1.88 (1.31)	0.48, 7.34	0.36
Psychiatry	0.83 (1.11)	0.06, 11.33	0.89
Women's services	2.31 (1.59)	0.60, 8.89	0.22
Other	1.78 (1.16)	0.50, 6.36	0.37
Parent or primary caregiver for a school age child or younger	0.55 (0.21)	0.26, 1.15	0.11

Primary caregiver or live with someone > 80 years old	0.34 (0.35)	0.05, 2.49	0.29
Cared for a patient with diagnosed or suspected COVID-19	1.35 (0.52)	0.63, 2.88	0.44
Has a friend/ close relative who contracted COVID-19	0.45 (0.15)	0.23, 0.85	0.015
Has been in quarantine for potential COVID-19 exposure	0.32 (0.13)	0.14, 0.73	0.006
Constant	1.37 (2.44)	0.04, 45.48	0.86

Figure 1. Levels of altruism of healthcare workers during COVID-19 pandemic based on occupation: *Responses to the altruism statement "Because I want to help the COVID-19 patients, I am willing to accept the risks" was further broken down by specific occupation of healthcare workers.*

"Because I want to help the COVID-19 patients,
I am willing to accept the risks"
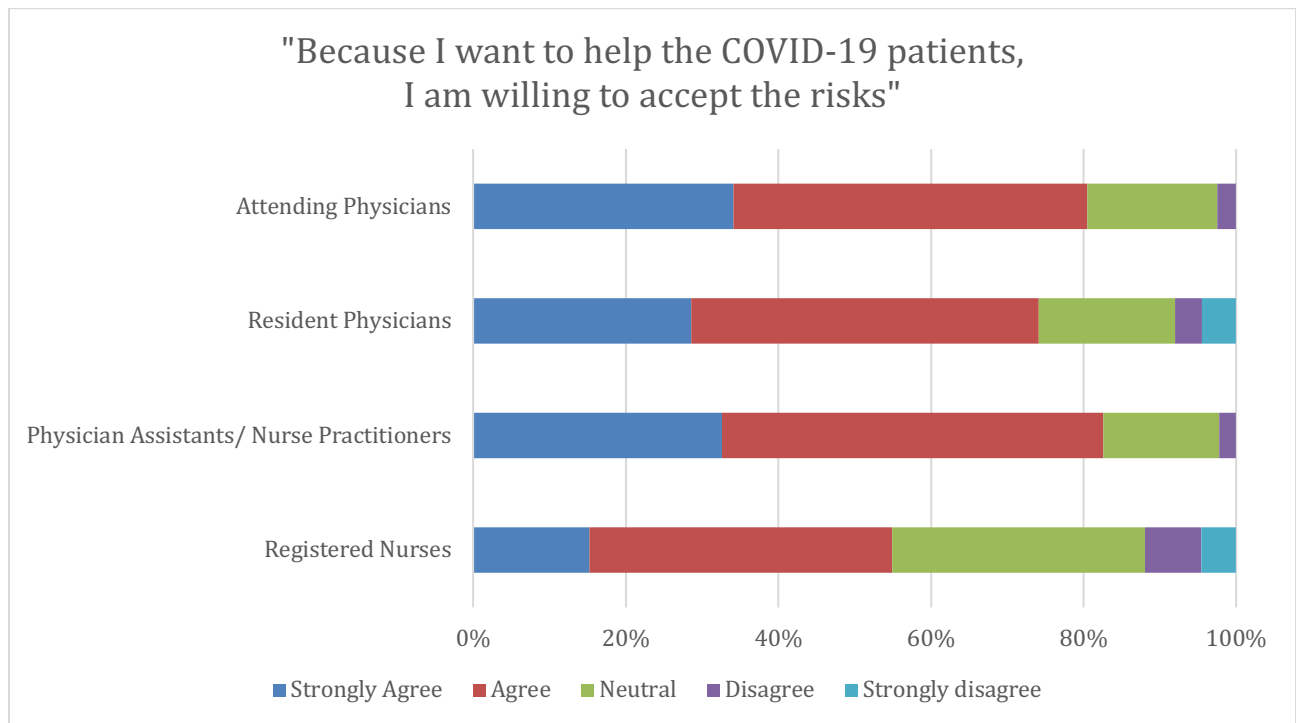
APPENDIX

Appendix 1. Survey questions: *Survey questions for COVID-19 exposure and stress factors*

Please respond to the following set of questions by responding yes or no

	Yes	No
Are you a parent or primary caregiver for school-aged child or younger		
Are you a primary caregiver for or lives with a person over age of 80		
Have you cared for a patient with diagnosed or suspected COVID-19?		
Do you have any friends/close relative that have contracted COVID-19?		
Have you been in quarantine for a potential exposure to COVID-19?		

Please select how much you agree or disagree with the following statements

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
My job is putting me at great risk.					
I feel extra stress at work.					
I am afraid of falling ill with COVID-19.					
I have little control over whether I get infected or not.					
I am unlikely to survive if I were to get COVID-19.					
I think about resigning because of COVID-19.					
I am afraid I will pass COVID-19 on to others.					
My family and friends are worried they might get infected through me.					
People avoid my family because of my work					
Because I want to help the COVID-19 patients, I am willing to accept the risks involved.					

Supplemental Table 1. Results of chi-square tests assessing difference between non-missing missing data points

	Total (n = 445)	Non-Missing Data (n = 402)	Missing Data (n = 43)	P-value
Sex				
Female	344 (77.30%)	308 (76.62%)	36 (83.72%)	0.29
Male	101 (22.70%)	94 (23.38%)	7 (16.28%)	
Age				
<30	121 (27.25%)	115 (28.61%)	6 (14.29%)	0.31
30-39	192 (43.24%)	173 (43.03%)	19 (45.24%)	
40-49	62 (13.96%)	54 (13.43%)	8 (19.05%)	
50-59	39 (8.78%)	34 (8.46%)	5 (11.90%)	
>59	30 (6.76%)	26 (6.47%)	4 (9.52%)	
Ethnicity				
White, non-Hispanic	257 (58.54%)	236 (58.71%)	21 (51.76%)	0.99
Black, non-Hispanic	58 (13.21%)	53 (13.18%)	5 (13.51%)	
Hispanic	15 (3.42%)	14 (3.48%)	1 (2.70%)	
Asian	70 (15.95%)	63 (15.67%)	7 (18.92%)	
Other	39 (8.88%)	36 (8.96%)	3 (8.11%)	
Specialty				
Emergency Department	47 (10.56%)	44 (10.95%)	3 (6.98%)	0.09
Intensive Care Unit	63 (14.16%)	61 (15.17%)	2 (4.65%)	
Perioperative	35 (7.87%)	32 (7.96%)	3 (6.98%)	
Surgery	56 (12.58%)	52 (12.94%)	4 (9.30%)	
Medicine	75 (16.85%)	70 (17.41%)	5 (11.63%)	
Psychiatry	12 (2.70%)	11 (2.74%)	1 (2.33%)	
Women's Services	58 (13.03%)	50 (12.44%)	8 (18.60%)	
Other	99 (22.25%)	82 (20.40%)	17 (39.53%)	
Parent or primary caregiver for a school age child or younger	117 (26.47%)	106 (26.37%)	11 (27.50%)	0.88
Primary caregiver or live with someone > 80 years old	7 (1.59%)	6 (1.49%)	1 (2.70%)	0.58
Cared for a patient with	289 (65.38%)	265 (65.92%)	24 (60.00%)	0.45

diagnosed or suspected COVID-19				
Has a friend/ close relative who contracted COVID-19	162 (36.65%)	149 (37.06%)	13 (32.50%)	0.57
Has been in quarantine for potential COVID-19 exposure	56 (12.67%)	51 (12.69%)	5 (12.50%)	0.97
My job is putting me at great risk.	313 (70.50%)	284 (70.65%)	29 (69.05%)	0.83
I feel extra stress at work.	353 (79.68%)	318 (79.10%)	35 (85.37%)	0.343
I am afraid of falling ill with COVID-19.	320 (72.23%)	290 (72.14%)	30 (73.17%)	0.89
I have little control over whether I get infected or not.	250 (56.69%)	227 (56.47%)	23 (58.97%)	0.76
I am unlikely to survive if I were to get COVID-19.	338 (8.58%)	35 (8.71%)	3 (7.32%)	0.76
I think about resigning because of COVID-19.	63 (14.16%)	58 (14.43%)	5 (11.63%)	0.62
I am afraid I will pass COVID-19 on to others.	373 (84.01%)	342 (85.07%)	31 (73.81%)	0.06
My family and friends are worried they might get infected through me.	288 (65.16%)	264 (65.67%)	24 (60.00%)	0.47
People avoid my family because of my work	149 (33.49%)	134 (33.33%)	15 (34.88%)	0.84
Altruism: Because I want to help the COVID-19 patients, I am willing to accept the risks involved.	287 (65.08%)	267 (66.42%)	20 (51.28%)	0.06

Supplemental Table 2. Multivariable linear regression model regressing for altruism: *After controlling for demographic and COVID-related characteristics, analysis showed that nursing staff had greater odds of feeling altruistic ("Because I want to help the COVID-19 patients, I am willing to accept the risks involved.") Pseudo R2=0.1073*

Categories (reference group)	Odds Ratio (Standard Error)	95% CI	P value
Occupation (Reference: Medical providers)			
Resident/Fellow	0.84 (0.45)	0.29, 2.42	0.74
Advanced Practitioner	1.23 (0.77)	0.36, 4.22	0.75
Nurse	0.33 (0.16)	0.13, 0.83	0.02
Age (Reference: < 30)			
30-39	0.82 (0.25)	0.46, 1.48	0.52
40-49	0.74 (0.33)	0.31, 1.77	0.50
50-59	0.60 (0.28)	0.24, 1.50	0.28
>60	1.26 (0.67)	0.44, 3.59	0.67
Gender (Reference: Male)			
Female	0.63 (0.20)	0.33, 1.19	0.15
Race (Reference: White, non-Hispanic)			
Black, non-Hispanic	0.68 (0.24)	0.34, 1.36	0.28
Hispanic	1.78 (1.29)	0.43, 7.36	0.42
Asian	0.85 (0.29)	0.43, 1.67	0.64
Other	0.52 (0.21)	0.23, 1.15	0.11
Specialty (Reference: Emergency department)			
Intensive care	1.42 (0.67)	0.56, 3.58	0.46
Perioperative	0.75 (0.42)	0.25, 2.24	0.60
Surgery	1.11 (0.57)	0.41, 3.04	0.83
Medicine	0.73 (0.34)	0.30, 1.81	0.50
Psychiatry	0.78 (0.63)	0.16, 3.81	0.76
Women's services	1.40 (0.70)	0.53, 3.72	0.50
Other	0.64 (0.28)	0.27, 1.52	0.31
Parent or primary caregiver for a school age child or younger	1.12 (0.33)	0.63, 1.99	0.70

Primary caregiver or live with someone > 80 years old	6.31 (7.39)	0.63, 62.75	0.12
Cared for a patient with diagnosed or suspected COVID-19	1.00 (0.28)	0.58, 1.72	0.99
Has a friend/ close relative who contracted COVID-19	1.10 (0.26)	0.68, 1.76	0.70
Has been in quarantine for potential COVID-19 exposure	1.72 (0.58)	0.89, 3.33	0.11
Constant	0.61 (1.00)	0.02, 15.04	0.76

Position	Margin (Standard Error)	95% CI	P value
Attending Physician	0.79 (0.07)	0.65, 0.93	0.00
Resident Physician/ Fellow	0.76 (0.05)	0.66, 0.86	0.00
Advanced Practitioner	0.82 (0.06)	0.70, 0.94	0.00
Nurse	0.57 (0.04)	0.50, 0.64	0.00