Perceptions of the Availability of Personal Protective Equipment and Its Association With Burnout Among US Healthcare Personnel During the SARS-CoV-2 Pandemic, 2020–2021

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Objective: The aim of the study is to explore associations among personal protective equipment (PPE) availability, workplace environment, and burnout among US healthcare personnel during the COVID-19 pandemic. **Methods:** The study used an online healthcare provider (HCP) survey (December 2020–February 2021) regarding PPE confidence, availability, burnout, and workplace environment. **Results:** Lack of appropriate PPE was reported by 27% of 799 US HCP surveyed. Burnout, reported by 77% of HCP, was more likely among females, those with fewer years of professional experience, and those with a higher desire to quit, and less likely for those who perceived PPE was adequate or their employer took all steps to minimize workplace risks. **Conclusions:** This study suggests that lack of adequate PPE can lead to HCP burnout, which may result in employees quitting. A pandemic preparedness plan that includes adequate PPE is essential for HCP well-being, patient health, and employer fiscal health.

Keywords: COVID-19, burnout, PPE, healthcare personnel, pandemic preparedness, social determinant of health

LEARNING OUTCOMES

After completing this enduring educational activity, the learner will be better able to:

- Define burnout and describe the elements and validation of the two-question Maslach Burnout Inventory score
- Summarize previous research on burnout and lack of personal protective equipment among healthcare personnel
- Describe the six variables that were consistently significant predictors of burnout in this population of healthcare personnel and the implications for future pandemic preparedness

The novel coronavirus (SARS-CoV-2) was first recognized in December 2019 and COVID-19 was declared a global pandemic by the World Health Organization in March 2020.[1,2] Healthcare providers (HCPs) have been on the "front lines" of defense against the COVID-19 since the beginning of the pandemic. While most individuals had their daily routines upended by restrictions and stay-at-home orders, HCP were considered essential workers and continued to perform their regular duties in hospitals and clinics. Many were reassigned to meet the needs of the increased volume of COVID-19 patients leading to significant changes in their regular routines and clinical practice.[3] During the early days of the pandemic, personal protective equipment (PPE) was often scarce and there was no vaccine to help protect against the virus leaving many HCP vulnerable. This increased exposure, accompanied by working with uncertainty, led to increased emotional stress. Many HCP experienced significant and prolonged exposure to the SARS-CoV-2 virus, with many developing COVID-19.[4,5] One study at a major US medical center found that the SARS-CoV-2 antibody positivity rate among HCP providing COVID-19 care was significantly lower among those who properly used PPE in all situations.[6] Research has shown that direct contact with very infectious patients (including Ebola, SARS, H1N1, H7N9, and COVID-19 patients) is linked to increased burnout and stress among HCP.[3,7] It has also been demonstrated that a perception of inadequate availability of PPE, not feeling supported at work, and working in a facility viewed as placing low importance on safety, can lead to burnout among employees.[8–10] Previous studies have indicated that lack of availability of PPE has been shown to be a key indicator of stress for HCP in large-scale outbreaks or pandemics, including Middle East respiratory syndrome and COVID-19.[11–14]

Burnout, as first defined by Maslach in 1981, is a psychological syndrome that emerges as a prolonged response to chronic interpersonal stressors on the job. Burnout is characterized by three key dimensions including overwhelming exhaustion, feelings of cynicism and detachment from the job, and a sense of ineffectiveness and lack of accomplishment. The significance of the three-dimensional model is that it places the individual's stress experience within a social context and involves the person's conception of both self and others.[15–17] The World Health Organization (WHO) added burnout to the 11th Revision of the International Classification of Diseases as an occupational phenomenon, rather than as a medical condition, in 2022.[18]

Burnout is a well-documented contributor to decreased work capabilities and is well-documented within the HCP community.[8,10,19,20] Acute burnout, if not addressed, may lead to long-term mental health problems.[21] HCP can suffer burnout and stress that are linked with their fears of contracting a disease while at work. [4,7] How a worker fares in the workplace can depend on the organization's

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commitment to safety and its ability to fulfill this commitment, which can have a significant effect on the health and well-being of employees including a proclivity to burnout. The organization of work and the quality of population-based interventions can impact worker health rendering work an important social determinant of health.[22] "Intention to leave the post" can result from burnout in HCP. This can lead to increased costs associated with replacing workers, but more importantly, would likely decrease the overall capabilities of a healthcare facility to care for patients, particularly if the facility experiences a surge of patients.[4,23]

This research study was designed to explore the association between PPE availability, burnout, and perceptions regarding workplace safety among US HCP during the third wave of the COVID-19 crisis in late 2020-early 2021. Understanding the impact of PPE on HCP burnout may be important in the development of future PPE policies and practices, both during the current COVID-19 pandemic and for future pandemic preparedness.

METHODS

Study Design & Population

A cross-sectional online survey was distributed between December 2020 and February 2021 to US-based HCP who had worked in a clinical setting at any time during the COVID-19 pandemic. The study population consisted of a convenience sample of occupational medicine clinic staff at two healthcare systems, one in Arizona and another in Pennsylvania, hospital-based employees of one health care system in Pennsylvania, and online communities of HCP. Direct emailing was sent to the employees of the two health care systems. For the online community, the survey invitation was posted on social media through HCP groups on Facebook, personal pages on Facebook, multiple healthcare-related subreddits on Reddit, and on the University of Pennsylvania's Occupational and Environmental Residency program page on LinkedIn. Participants were asked to respond only if they had worked in a healthcare setting at some point during the pandemic. Participants self-selected by responding to a social media posting or to an email request to complete the survey. Exclusion criteria included not working in a hospital or clinic setting during the COVID-19 pandemic and/or working outside the U.S.

Participants were able to complete the survey at any time during the open period, and their participation was not monitored. Participation in the survey was strictly voluntary; no compensation was offered for participation. Participants were able to discontinue their survey at any time during the process. No identifying information (ie, name, email address, or contact information) was collected to allow full anonymity.

This study was approved by the University of Pennsylvania Institutional Review Board.

Survey Tool

The survey consisted of questions regarding demographics, PPE confidence, knowledge, and availability, perceptions of the workplace, and HCP burnout. A portion of the survey questions was taken from a prior validated survey regarding knowledge and confidence in PPE during the H1N1 pandemic, and the validated two-question Maslach Burnout Inventory (henceforth referred to as the 2QMBI) was included as well.[24,25] The survey was pilot tested before implementation. After a written explanation of the purpose, benefits, and risks of the survey, participants consented to participation through an electronic acknowledgement. An acknowledgement of confidentiality and contact information were provided to the participants before the start of the survey.

Assessment of Burnout

Burnout was assessed using the 2QMBI score that was previously shown to correlate with the more extensive 22-question Maslach Burnout Inventory score.[15–17] The correlation between the shorter and longer survey was demonstrated in various studies among emergency medicine residents, medical students, participating physicians, and non–emergency medicine residents.[25–28] In brief, the individual response to two survey questions ("I feel burned out from my work" and "I have become more callous toward people since I took this job") was scored on a seven-point Likert scale (0–6). A score of 4 corresponded to a response of ≥1 time per week on either question, while a score of 2 corresponded to a response of once a month on either question. A total score of 4 or higher, combined across the two questions, was defined as burned out.

Statistical Analysis

Summary statistics are presented as frequencies and percentages for demographic variables (gender, type of HCP, work setting years of work experience, etc), PPE availability, and perceptions of the employer taking all steps to minimize workplace risks. To assess difference in burnout by these variables, χ^2 or Fisher exact tests were performed. Multiple logistic regression models using backward elimination were developed to examine the relationship between burnout and demographic characteristics, PPE availability, and perceptions of their employer minimizing risk. Variables that were significant at the $P < 0.10$ in bivariate analyses were included in the initial model. Final model parameters were presented as odds ratios (ORs) with 95% confidence intervals (95% CIs). All analyses were performed using SAS statistical software (version 9.4, SAS Institute, Cary, NC). Figures were created using GraphPad Prism (version 9.3.1 GraphPad Software, San Diego, CA).

RESULTS

Demographics

Of 1028 surveys received, 858 (83%) met the inclusion criteria of working in a US healthcare setting with patient contact, and 799 respondents answered both questions in the survey related to burnout. Respondents came from 49 states. More than 89% of the data were obtained from those who responded via social media. The mean age of participants was 38.2 years (SD, 11.0; range, 19–68 years), 82% were female; 29% were physicians, 32% were advanced practice providers (nurse practitioner, physician's assistant, and emergency medical technician), 20% were therapists/dieticians, and 19% were nurses (Table 1). The work setting was diverse with 26% working in an inpatient unit, 18% in the emergency department, 26% in an outpatient clinic, and 19% in a primary care clinic. Years of professional experience were relatively balanced with 58% of respondents having ≤10 years and 42% with ≥11 years of professional experience.

More than 94% of respondents considered themselves to be moderately or very knowledgeable about COVID-19. Exposure to known/suspected COVID-19 patients was reported by 86% of the respondents, with 35% reporting that at least half of the patients they interacted with had COVID-19.

Confidence in and Access to PPE

Confidence that PPE could protect HCPs was high with 79% reporting their level of confidence as either very confident or moderately confident (Table 2). However, lack of appropriate PPE was reported by 27% of HCPs, and 12% reported working directly with known/suspected COVID-19 patients without PPE because none was available.

Lack of PPE made 18% of participants want to quit their job. The possibility that an HCP would quit their job if PPE was not

TABLE 1. Demographic Characteristics of US Healthcare Personnel Comparing Those Who Reported Burnout Versus Those Who Did Not (Based on 2QMBI Score)

		Total (N = 799)		No Burnout (2QMBI ≤3)		Burnout (2QMBI ≥4)		
Variable	**Category**	***n***	**%**	***n***	**%**	***n***	**%**	***P***
Gender	Female	648	81.5	132	73.7	516	83.8	0.0022
	Male	137	17.2	46	25.7	91	14.8	
	Nonbinary	10	1.3	1	0.6	9	1.5	
Age, yr	<30	158	22.9	23	14.7	135	25.3	<0.0001
	30–35	192	27.9	30	19.2	162	30.4	
	36–45	171	24.8	41	26.3	130	24.4	
	>45	168	24.4	62	39.7	106	19.9	
Live with children <18 yr old		346	44	85	47.8	261	42.9	0.2649
Work environment	In-patient unit	204	25.6	35	19.6	169	27.3	0.073
	Emergency department	143	17.9	30	16.8	113	18.3	
	Primary care clinic	153	19.2	34	19.0	119	19.3	
	Outpatient clinic (nonprimary care)	203	25.5	59	33.0	144	23.3	
	Other	94	11.8	21	11.7	73	11.8	
Years of professional experience	0–5 yr	272	34.3	45	25.4	227	36.9	<0.0001
	6–10 yr	186	23.5	34	19.2	152	24.7	
	11–15 yr	104	13.1	19	10.7	85	13.8	
	16–20 yr	92	11.6	26	14.7	66	10.7	
	>20 yr	139	17.5	53	29.9	86	14.0	
Region of the US	Midwest	155	19.5	24	13.3	131	21.3	0.0198
	West	128	16.1	24	13.3	104	16.9	
	Southeast	138	17.3	28	15.6	110	17.9	
	Northeast	270	33.9	74	41.1	196	31.8	
	Southwest	105	13.2	30	16.7	75	12.2	
HCP type	NP/PA/EMT	245	31.9	54	32.3	191	31.8	0.2212
	Nursing	146	19	30	18.0	116	19.3	
	Physician	222	28.9	57	34.1	165	27.5	
	RT/PT/OT/SLP/dietician	155	20.2	26	15.6	129	21.5	

*Totals may not add to 799 because of missing values.

2QMBI, two-question Maslach Burnout Inventory; HCP, healthcare provider; PPE, personal protective equipment; RT/PT/OT/SLP, Respiratory Therapist/Physical Therapist/Occupational Therapist/Speech Language Pathologist.

TABLE 2. Perceptions of US Healthcare Personnel Regarding PPE and Their Work Environment Comparing Those Who Reported Burnout Versus Those Who Did Not (Based on 2QMBI Score)

		Total (N = 799)		No Burnout (2QMBI ≤3)		Burnout MBI (2QMBI ≥4)		
Variable	**Category**	***n***	**%**	***n***	**%**	***n***	**%**	***P***
Confidence in PPE	Not confident at all	41	5.1	4	2.2	37	6.0	<0.0001
	Slightly confident	130	16.3	21	11.7	109	17.6	
	Moderately confident	399	50.0	74	41.1	325	52.6	
	Very confident	228	28.6	81	45.0	147	23.8	
Appropriate PPE available when you need it at work		585	73.2	162	90.0	423	68.4	<0.0001
Reuse PPE at work		693	86.8	150	83.3	543	87.9	0.1321
Worry about infecting others	Great deal	259	32.5	45	25.1	214	34.6	<0.0001
	A lot-moderate	370	46.4	71	39.7	299	48.4	
	None/a little	168	21.1	63	35.2	105	17.0	
Employer minimizes risk	Strongly disagree	63	7.9	6	3.3	57	9.2	<0.0001
	Disagree	189	23.7	16	8.9	173	28.0	
	Neutral	148	18.5	29	16.1	119	19.3	
	Agree	281	35.2	79	43.9	202	32.7	
	Strongly agree	117	14.7	50	27.8	67	10.8	
Quit due to lack of PPE	Yes	142	17.9	7	3.9	135	22.0	<0.0001
	Maybe	203	25.6	33	18.4	170	27.7	
	No	447	56.4	139	77.7	308	50.2	
Likelihood of quitting if facility does not provide PPE in future	Extremely unlikely to quit	66	8.4	26	14.7	40	6.6	<0.0001
	Unlikely to quit	151	19.2	49	27.7	102	16.7	
	Unsure about quitting	267	34	59	33.3	208	34.2	
	Likely to quit	157	20	25	14.1	132	21.7	
	Extremely likely to quit	145	18.4	18	10.2	127	20.9	

*Totals may not add to 799 due to missing values.

2QMBI, two-question Maslach Burnout Inventory; MBI, Maslach Burnout Inventory; PPE, personal protective equipment.

supplied in the future varied with 38% likely or extremely likely to quit and 34% unsure about quitting.

Employee Perception of Their Work and Family Exposure

The feelings of HCPs about their work during the COVID-19 pandemic were quite variable; 29% reported feeling purposeful and proud of their contributions, 33% were scared, 10% were unbothered, and 29% were unsure about how they felt about working during the pandemic. Of the employees, 79% worried that they would bring COVID-19 home and infect loved ones; 33% worried a great deal.

Burnout

Responses to the two questions ("I feel burned out from my work" and "I have become more callous toward people since I took this job") used in the 2QMBI were generally consistent. Feeling burned out from work daily was reported by 20% of HCPs. Feeling more callous toward people since taking their current job was reported as an everyday occurrence by 12% of respondents. Using the 2QMBI based on the composite responses to these two questions, the overall rate of burnout was 77%.

When comparing those who reported feeling burned out versus those who did not based on the 2QMBI, several demographic variables were significant ($P < 0.10$) (Table 1). Healthcare providers, who were burned out had fewer years of professional experience, were female, more likely to be nurses or MP, PA, or EMT, and lived in the Midwest, West, and Southeast.

With respect to PPE, HCP who were classified as burned out based on the 2QMBI scale had less confidence in their PPE (24% vs 45% very confident, $P < 0.0001$) and did not think they had appropriate PPE available (68% vs 90%, $P < 0.0001$) (Table 2). Those who reported that they were burned out also reported that they worried they would infect others (83% vs 65%, $P < 0.0001$) and that their employers did not take all reasonable steps to minimize exposure (37% vs 12%, $P < 0.0001$). A desire to quit because of lack of PPE and to quit if PPE was not provided in the future was reported more frequently among those who were burned out (22% vs 4%, $P < 0.001$ and 43% vs 24%, $P < 0.0001$).

Multiple logistic regression based on the 2QMBI composite score of burnout showed that six variables were consistently significant predictors of burnout (Fig. 1). The odds of burnout increased if the HCP was female (OR = 1.9, 95% CI: 1.2–2.9) or had 0 to 5 years of work experience (OR = 2.4, 95% CI: 1.4–4.0). The odds of burnout were highest for those with 0 to 5 years of professional experience and declined with increasing years of experience. In addition, HCP who reported they did not have appropriate PPE when they needed it at work (OR = 2.2, 95% CI: 1.2–3.9) and those who indicated that their employer did not take all reasonable steps to minimize their exposure to COVID-19 (OR = 2.5, 95% CI: 1.5–4.2) had a greater odds of

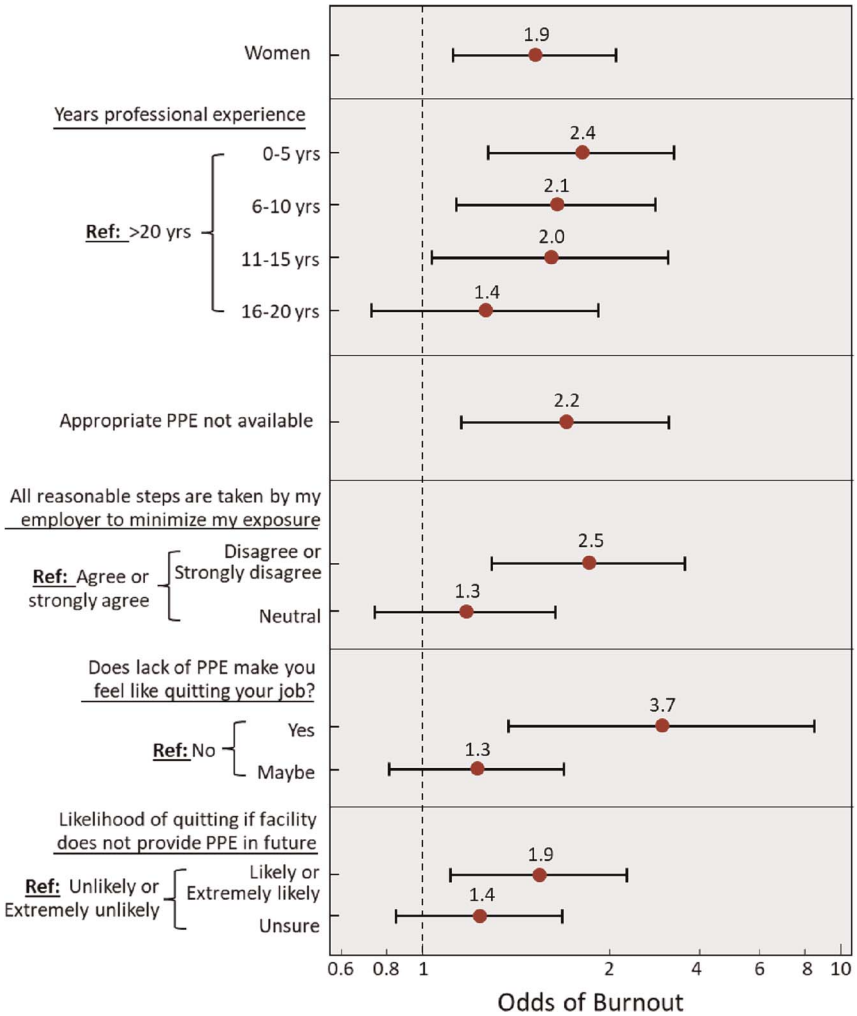

FIGURE 1. Odds of burnout among US healthcare professionals—multiple regression analysis (based on the 2QMBI score).

burnout. The strongest predictor of burnout was reported by those HCP who indicated that lack of PPE made them feel like quitting their job (OR = 3.7, 95% CI: 1.6–8.7) and the odds of burnout remained significant among those who said they were likely to quit if the facility did not provide PPE in the future (OR = 1.9, 95% CI: 1.2–3.1).

DISCUSSION

This study explored the association between HCP confidence in PPE, availability of PPE, protection from COVID-19, burnout, and HCP perceptions of employer's actions to minimize exposure to COVID-19 in the workplace during the third wave of the pandemic (late 2020–early 2021) when disease was at a higher rate than in the first two waves of the pandemic.[29] Review of the literature did not reveal any other studies that specifically addressed this association. Nine to eleven months after the pandemic started in March 2020, PPE was still scarce in the United States and HCPs in our survey reported challenges with access to the necessary PPE to adequately perform their jobs. While more than three quarters of HCP placed a moderate-high level of confidence in PPE, appropriate PPE was not always available for more than one quarter of those surveyed. The level of confidence in PPE in our survey was similar to an earlier study among emergency department and inpatient medical staff at a US medical center in which 85% reported being either somewhat or extremely confident in PPE use.[30] A US national survey of critical care nurses conducted at approximately the same time as this survey reported that 71% experienced shortages of PPE, considerably higher than our results from a much broader HCP population.[31] Approximately one third of all employees in our survey reported that they were scared while working during the pandemic and more than half worried they would bring COVID-19 home and infect their loved ones.

Burnout, based on the 2QMBI, was reported by 77% of the HCP in this survey. A systematic review and meta-analysis of 27 studies published from the beginning of the pandemic until January 2021 reported an overall rate of burnout of 52% with the highest rates among physicians and nurses (66%).[32] Burnout among physicians in our survey was 74%, similar to this meta-analysis, but considerably higher than the rate of 41% reported in another meta-analysis of burnout among 6299 physicians during the pandemic (using either the Maslach Burnout Inventory or other burnout definitions).[33]

With only one time point, we do not know whether the rate of burnout increased or decreased in our survey population as the pandemic progressed. Some studies have reported that burnout remained constant in the first year of the pandemic, while others reported a steady increase each month.[34,35]

Lack of appropriate PPE and working in an environment where the employer did not take reasonable steps to minimize employer's exposure were strong predictors of burnout among the survey respondents. This was not unexpected in this population as more than 50% of the HCP reported that more than half of their patients had COVID-19, COVID-19 deaths in the US were at an all-time high, and healthcare systems were overwhelmed.[29] Those who reported burnout were more likely to consider quitting. Similar findings were reported from a study conducted in December 2020 among HCP in the Southwest region of the United States with a moderate correlation between burnout and turnover intention ($P < 0.001$).[36] Respondents to the AMA Coping with COVID survey conducted among US HCP between April and December 2020 (earlier than our survey) reported a 50% burnout rate with the highest rate among nurses (56%); 29% indicated an intention to leave their positions in the next 2 years, again with the highest rate among nurses (41%).[37] Preventing burnout among HCP is critical to the retention of experienced staff and in improving the emotional state and attitudes of HCP to ensure optimal outcomes in patient care, the most important goal for any HCP and quality healthcare system.[38] Our results confirm findings from previous studies that lack of adequate PPE, feeling unsupported at work, and working in a facility that is perceived to place a low importance on the safety of their staff can lead to further burnout among employees.[11–13] During the 2003 SARS outbreak in Taiwan, negative effects on HCP mental health resulted in more people resigning from their jobs and poor performances at work.[39] These are all sentiments that were echoed in this study.

The high proportion of female participants reporting burnout has been seen in multiple other studies.[40–42] This may be the result of women often having more responsibilities at home including child care, elder care, and household tasks.[15,43] In the Coping with COVID survey, women had approximately 50% greater odds or reporting burnout than men (OR = 1.49) and workers with childcare stress had an 80% greater odds of burnout (OR = 1.80).[44] Burnout among women physicians also has been associated with gender discrimination and biases, deferred personal life decisions, and barriers to professional advancement.[43]

Our survey showed that HCP with more years of professional experience reported less burnout. A survey of critical care nurses conducted in the same period as our survey found that younger nurses with less experience had higher levels of burnout, a finding consistent with our results.[31] The resilience of older HCP during the pandemic may be a function of age and having experienced other stressful events in their career in the past, including working during other outbreaks and epidemics (such as H1N1 and/or HIV). It is also possible that those who are less likely to tolerate working in the healthcare environment leave the workplace sooner while those who remain have longer years of employment in this setting.

We did not find any difference in burnout based on work environment (ED, inpatient, outpatient, or primary care clinic). This finding was not unexpected given that at this time point in the US pandemic, no matter where an HCP was employed, they had a high probability of being exposed to COVID-19 with approximately 135 to 518 cases/100,000 population on a weekly basis.[29] The importance of addressing burnout, stress, depression, substance abuse, and suicidal behaviors of HCP during the pandemic was recognized by the National Institute for Occupational Safety and Health when it launched a national Mental Health Initiative for Health Workers in 2021.[45]

The majority of this study was conducted during the third wave of COVID-19 infections in the United States in late 2020 to early 2021, surpassing the peaks of the two previous waves of the COVID-19 pandemic's domestic toll.[29] Although 86% of respondents reported known/suspected exposure to COVID-19, given the fact that this was during the pandemic, all patients were potentially infected. Based on the experiences and lessons learned from the two prior waves, it was thought that PPE shortages would be less problematic this time around. However, shortages of critical items, such as N95 respirators, face shields, and goggles continued and a large number of participants in our survey contemplated quitting because of PPE shortages. The associations seen between PPE availability, burnout, and perceptions of workplace safety might have been even higher early in the pandemic as PPE shortages were more problematic at the onset. However, HCP's COVID-19 fatigue may have played some role in survey responses as the study was about a year into the pandemic, yet also in the middle of a surge of COVID-19 cases during the third wave.

This study was conducted at the time when COVID-19 vaccines first became available in the United States but had not been widely distributed.[46–48] While vaccination had the potential to provide another important level of protection for HCP, it did not play a role at the time of this research and did not mitigate the need for PPE. Vaccine uptake was slow, both among HCPs and the general population, it took several weeks to receive two doses of an mRNA vaccine and develop appropriate protection, and COVID-19 cases and deaths continued to rise.[29,49]

Much progress has been made in increasing PPE availability in the United States since this study was conducted. In addition, vaccines are now readily available, and most adults have either been vaccinated

with one or more doses and/or had COVID-19.[50] However, the stressors from COVID-19 may not fully be behind us for various reasons. New SARS-CoV-2 variants, waning vaccine immunity, vaccine hesitancy, and slowness among Americans to receive their COVID-19 booster doses suggest that the pandemic is not over.[51–54] From October 2022 to January 2023, the number of COVID-19 deaths per week in the United States ranged from 2500 to 4400 and many HCPs were still needed to care for these COVID-19 patients on a daily basis.[55] As such, PPE will continue to be an important element in their personal protection against the virus.

Improved public and private sector policies to assure needed quantities of PPE availability have been vital lessons learned that will hopefully improve preparedness and the overall safety climate for any future pandemics. However, the supply of PPE still remains a significant concern 3 years after the onset of the COVID-19 pandemic. On October 25, 2022, the White House COVID-19 Response Coordinator reported that the United States "would not have the stockpiles that we wanted to have going into the winter for both PPE and testing."[56] The Medical and Health Stockpile Accountability Act, introduced in Congress on January 28, 2022, would require the federal government to create a national tracking system for PPE. This measure could be important in alleviating future supply chain disruptions like the shortages of PPE, COVID-19 tests, ventilators, and other medical gear seen during the onset of the pandemic.[57]

Future studies should explore PPE availability variations between different regions (rural vs urban) and health care settings (hospitals vs outpatient clinics) as well as during different points in time throughout the pandemic. It remains important to continue monitoring burnout rates of HCP as we surpass the 3-year anniversary of the start of the pandemic, and it may be of particular importance to continue monitoring for a period after the pandemic has ended. Further research is also warranted to better understand protective factors against burnout in the setting of this prolonged, global pandemic, especially among women, as these may be different than those seen during past outbreaks of shorter duration. Additional study to more clearly recognize factors impacting HCP confidence in PPE can also help identify areas of improvement to bolster PPE confidence and use.

This research helps highlight that not only is PPE important for basic infection control, but that PPE plays a significant role in feelings of safety and burnout among HCP. The organization of work, as a social determinant of health, is an important factor that can affect worker health and well-being. Continued strategies to contain the pandemic and policies to assure PPE availability for workers are in order will be vital to sustaining the mental and physical health of HCP now and in the future. The information learned in this outbreak can hopefully help HCP and the public health community to be better prepared for likely infectious outbreaks of lesser, similar, or greater magnitude in the future. Healthcare organizations and other key stakeholders need to be aware of the concerns of HCP presented in this and other studies so changes can occur that can help conserve the quality of the HCP workforce while continuing to fight the current COVID-19 pandemic and any future pandemics/outbreaks.

Limitations and Strengths

This study had several limitations. Results were obtained using an online survey with the majority of responses obtained through social media, which could miss responses from people who do not participate within social media communities. A convenience sample was used, which may not be representative of the US HCP population. Because of the nature of social media, it is not possible to determine how many people read the study invitation and chose not to participate; thus, a response rate could not be calculated. In addition, this survey reflects HCP perceptions during a specific time, nearly a year into the COVID-19 pandemic, and prolonged exposure to the stressors associated with the pandemic could have had an impact on perceptions of burnout. Furthermore, given the timing of this study within the pandemic, the results may not reflect the later stages of the pandemic when PPE was more readily available. As such, it may not accurately describe HCP perceptions of PPE availability at different time points during the pandemic but rather presents a snapshot as to how HCP were feeling during this phase of the pandemic when the burden of COVID-19 was very high.

The strengths of the study are severalfold. The survey instrument used included portions of previously validated questionnaires that were adapted from past viral outbreaks as well as the validated 2QMBI.[15–17] In addition, the questionnaire was pilot tested before administration. The survey population included participants from 49 US states and featured a large variety of different types of HCP. By including participants from both large health systems as well as online social media communities, the study was able to feature participants from numerous different healthcare settings.

Conclusions

This study showed that 9 to 11 months after the start of the COVID-19 pandemic, appropriate PPE was not always available, and many HCPs indicated an intention to quit. Healthcare provider burnout was significantly associated with lack of PPE and feeling unsafe. To be prepared for the possibility of future waves of COVID-19 (resulting from waning protection and/or new variants) or future pandemics, further efforts are needed to stabilize the US supply of PPE that are critical to ensure the safety of our HCPs and their patients.

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