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Engaged, overextended, or burned out: What is the state of the disaster response workforce?

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ABSTRACT

The prolonged coronavirus-2019 (COVID-19) pandemic and co-occurring disasters during 2020 took a toll on everyone, taxing public health and disaster management personnel particularly. This initial study evaluated levels of exhaustion, cynicism, and professional efficacy among a broad array of the disaster workforce responding to these events through an online survey. Responses were compared to normative standards from an international dataset using a one-sample t-test and described using k-means cluster analysis. Results from 111 emergency management and disaster services, public health, healthcare, first responders, and other professionals and volunteers indicated high levels of emotional exhaustion and cynicism, along with high levels of personal efficacy compared to normative samples. Perceptions of the heightened risk of contracting COVID-19 were significantly associated with increased emotional exhaustion and cynicism. Cluster analysis results indicated three different patterns of burnout: half of the respondents were overextended (high levels of emotional exhaustion, cynicism, and efficacy) or burned out (high emotional exhaustion and cynicism, low efficacy), while 50 percent were engaged (low emotional exhaustion, low cynicism, and high personal efficacy). This suggests that despite the COVID-19 pandemic, a substantial proportion of the disaster response workforce is still thriving. However, a large proportion is burned out or at high risk (overextended). Limitations of this study include a lack of diversity in the sample, which, although similar to the demographic characteristics of the emergency manager population, may limit the generalizability of the study results. System-level planners can use this information to develop comprehensive workforce approaches, policies, and procedures to prevent burnout for these essential personnel working behind the scenes.

Key words: Burnout, disaster response, COVID-19, cluster analysis, exhaustion

INTRODUCTION

During 2020, people across the world were directly and indirectly impacted by the coronavirus-2019 (COVID-19) pandemic. The pandemic, however, was not the only disaster that occurred during the year. Co-occurring with the pandemic, the United States experienced a record-setting year for billion-dollar disasters with a record-breaking 230 presidentially declared emergencies and major disasters.[1,2] To respond to these co-occurring threats, the disaster response workforce in the United States has had to deploy to acute disaster events, such as

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hurricanes making landfall along the Gulf Coast and the Caribbean, the West Coast wildfire season, or the Iowa derecho, while managing the chronic risks associated with the pandemic. These prolonged threats have the potential to overwhelm workers' resources and result in professional burnout.[3,4] This study analyzes levels of emotional exhaustion, cynicism, and professional efficacy within the US disaster response workforce tasked with operational response to compounding threats compared to population-level norms. This study is limited, in part, by a comparatively small and homogenous sample; generalizations of this study to diverse populations should be done with care.

LITERATURE REVIEW

Burnout during the COVID-19 pandemic has received extensive attention, especially as it applies to medical professionals and frontline healthcare workers.[5-15] Less studied, however, is the psychological health of the individuals coordinating the response to the pandemic and other co-occurring disasters. These individuals have had to respond to changing work roles throughout the pandemic response that have placed them at risk for burnout. Burnout, recognized by the World Health Organization (WHO) as a syndrome resulting from unmanaged and chronic workplace stress,[16] is traditionally characterized by high levels of emotional exhaustion and cynicism and low levels of personal efficacy.[4]

Research on post-disaster burnout among disaster response personnel has primarily examined burnout following an acute event, such as an earthquake, a wildfire, or a hurricane incident.[17-21] Less studied, however, is the influence of ongoing disasters on workers' health. This disconnect is especially surprising considering that burnout is thought to be influenced, primarily, by exposure to chronic stressors.[3,16] Moreover, the COVID-19 pandemic has occurred, in many cases, simultaneously alongside acute disaster incidents. This combination of co-occurring and ongoing activations has the potential to create prolonged job demands that may lead to burnout.[3] As the COVID-19 pandemic continues, many disaster response personnel are facing months of continued elevated work demands as they respond to the pandemic, prepare for seasonal natural hazards, eg, floods, hurricanes, wildfires, tornadoes, and manage vaccination distributions. Due to the prolonged demands, we posit that the disaster response workforce will report higher levels of burnout than the general population.

> H1: Individuals in the disaster response workforce will report higher levels of burnout than expected compared to the general population.

In addition to the normal occupational demands that are facing the disaster response workforce, we also postulate that individuals are facing stressors uniquely related to the COVID-19 pandemic. Specifically, individuals may have varying perceptions of their likelihood of contracting COVID-19 and the potential severity of the virus on their health or their family's health. These perceptions may be an additional stressor that can contribute to burnout. Previous research has connected fear of physical harm to burnout among healthcare workers, finding that fear of contracting HIV, fear of physical assault, and fear of workplace violence are related to increased emotional exhaustion.[22-24] Similarly, a study of frontline nurses during the COVID-19 pandemic found positive correlations between fear and burnout dimensions of emotional exhaustion, depersonalization, and personal accomplishment.[25] Extending this study, we suggest that perceptions of contracting COVID-19 and the potential severity of contraction will contribute to job burnout among disaster response workers.

> H2: Perceptions of (a) the likelihood of contracting COVID-19 and (b) the potential severity of COVID-19 for the individual's health will be related to increased burnout.

Thus far, our discussion of job burnout has deemphasized the dimensions of burnout. However, the scope of emotional exhaustion, cynicism, and personal efficacy contributes uniquely to the experience

and development of burnout for the individual.[4,26] Emotional exhaustion is often viewed as a necessary component of burnout. Cynicism, or feelings of distance or disconnect from one's job, consistently has a strong, positive relationship with burnout. Reduced personal efficacy, on the other hand, is less reliably related to emotional exhaustion.[27] Sequential models of the development of burnout suggest that this is because reduced personal efficacy develops after prolonged exhaustion and cynicism.[28] Thus, high levels of exhaustion and cynicism may be considered as a "warning" for reduced personal efficacy. Based on this dimensionalized view of burnout, we also conducted exploratory analyses to discover the patterns of how burnout presents among the disaster response workforce.

> RQ1: What clusters best describe the disaster response workforce along the dimensions of burnout, eg, emotional exhaustion, cynicism, and personal efficacy.

METHODS

Procedure

A survey was conducted among disaster response personnel from October to December 2020. The survey included items measuring burnout and demographic information, including zip code, county of residence, and job role. The research project was reviewed and determined exempt by the University of South Florida Institutional Review Board. To be eligible to participate, individuals had to be 18 years of age or older and work or volunteer in response to a disaster event. Participants were recruited using a snowball sampling approach through disaster management and emergency response listservs, professional associations and working groups, eg, CONVERGE Working Group calls,[29] and through social media groups, eg, Facebook, Reddit, Twitter, and LinkedIn.

Participants

A total of 121 surveys were completed. Five surveys were excluded because participants were from outside the United States, eg, Mexico and Canada, and six were excluded for missing responses. The final sample was 111 surveys. The sample consisted of majority male respondents (56.8 percent, n = 63), mostly White (89.2 percent, n = 99), and non-Hispanic/Latino (91.9 percent, n = 102).

Measures

Burnout: The Maslach Burnout Inventory-General Survey (MBI-GS) was used to measure burnout.[30] The MBI-GS contains 16 items assessing the three facets of burnout: emotional exhaustion, eg, "I feel emotionally drained from my work," α = .94; cynicism, eg, "I have become more cynical about whether my work contributes anything," α = .88; and professional efficacy, eg, "I can effectively solve the problems that arise in my work," α = .74. Response options were Likert-type responses, eg, from 0 = Never to 6 = Every day.

Perceptions of COVID-19: A single question assessed perceptions of contracting COVID-19 ("How likely do you think it is that you will get COVID-19?") and potential severity of COVID-19 ("How severely do you think COVID-19 would affect your health?"). Response options were Likert-type responses, eg, from 1 = Not at all likely to 5 = Extremely likely and from 1 = Not at all to 5 = Very much.

Qualitative questions and coding: Open-response questions were collected to capture descriptive information about participants, such as the name of the organization or agency they work for and their emergency response role. Responses were qualitatively coded into their disaster response jurisdiction, eg, city, county, state, federal, private industry, or voluntary organizations active in disaster; organization type, eg, disaster services, emergency management, healthcare, public health, or other; and work role, eg, first responder, management, staff, or volunteer. The responses were initially coded by two of the coauthors with subject matter expertise. They exhibited strong levels of agreement for each of the codes with Cohen's kappa above .6 (jurisdiction k = .857, organization k = .669, and role k = .825).[31] A third author independently reviewed all responses with disagreement to reach full agreement.

Comparison burnout databases: The combined database provided mean and standard deviation

normative data for each burnout measure (exhaustion, cynicism, and professional efficacy).[30] The sample population is 47,800 for exhaustion, 47,752 for cynicism, and 47,843 for professional efficacy. The sample consists of 51.9 percent (n = 24,732) men and 48.1 percent (n = 22,904) women. Participants were from 17 countries and 41 occupations. The database is composed of data that were collected from 1996 to 2015 from multiple international studies.

RESULTS

Demographic information of participants

Of the 111 participants who completed the survey, 57 percent (n = 64) were primarily married and 85 percent (n = 94) were employed full time. Participants were also educated, with a majority of them having earned a bachelor's or master's degree (81 percent, n = 90). Qualitative coding of participants' organization/agency and work role indicates that respondents are responsible for a variety of jurisdictions. Specifically, responses indicating jurisdictions ranged across government levels such as city/county (n = 36), state (n = 11), and federal (n = 15) as well as industry/business organizations (n = 11) and voluntary organizations active in disaster (VOADs; n = 17). Respondents worked in organizations that focused on emergency management (n = 58), disaster services (n = 20), public health (n = 5), healthcare/medical (n = 3), and other organizations spanning community, education, and government services (n = 10). Finally, respondents were primarily staff (n = 53) or management (n = 31), although respondents also included volunteers (n = 12) and first responders (n = 7). Demographic information on respondents is presented in Table 1.

Prevalence of burnout

To address the prevalence of burnout within the disaster response workforce, a series of one-sample *t*-tests and a cluster analysis were conducted. Descriptive information for burnout dimensions is

Table 1. Respondent characteristics

Sex	N	Race	n	Ethnicity	n
Male	63	White	99	Not Hispanic or Latino	102
Female	47	Black or African American	5	Hispanic or Latino	8
Not reported	1	Asian	4	Not reported	1
		Other	3		
Education	**N**	**Marital status**	**n**	**Employment**	**n**
Less than a high school diploma	1	Single	28	Student	1
High school degree or equivalent	11	Living with a partner	3	Employed part time	2
Bachelor's degree	48	Married	64	Employed full time	94
Master's degree	37	Divorced	14	Disability	3
Doctorate	5	Widowed	2	Retired	7
Other, eg, associate's degree, certifications	9			Unemployed	1
				Not reported	2
Jurisdiction	**N**	**Organization type**	**n**	**Work role**	**n**
City/county	36	Emergency management	58	Staff	53
State	11	Disaster services	20	Management	31
Federal	15	Other (community,	10	Volunteer	12
Industry/business	11	education, or government)		First responder	7
VOAD	17	Public health	5	Not reported	8
Not reported	21	Healthcare/medical	3		
		Not reported	15		

presented in Table 2. A series of one-sample *t*-test was used to compare the sample means of each burnout subscale measure (exhaustion, cynicism, and professional efficacy) to a normative dataset. [30] The one-sample *t*-tests indicate that burnout levels in the disaster response sample are significantly different from the comparative burnout levels from the normed dataset. Specifically, disaster response personnel reported higher levels of emotional exhaustion, $t(110) = 4.52$, $p < 0.01$, and cynicism, $t(110) = 3.25$, $p < 0.01$. Interestingly, disaster response personnel also reported higher levels of personal efficacy than the normative dataset, $t(110) = 9.40$, $p < 0.01$. An exploration of the effect sizes indicates a moderate-to-large effect of the disaster response personnel sample compared to the normative dataset. Specifically, moderately small to large effects were found for emotional exhaustion (Cohen's $d = 0.43$), cynicism (Cohen's $d = 0.31$), and personal efficacy (Cohen's $d = 0.89$).[33]

Burnout and COVID-19 perceptions

A series of multivariate regressions were conducted to determine if perceptions of COVID-19 likelihood and severity predicted respondents' levels of emotional exhaustion, cynicism, and personal efficacy (Table 3). Multivariate analyses were conducted to account for expected intercorrelations between the burnout dimensions. Multivariate analysis indicates a significant effect of perceptions of the likelihood of contracting COVID-19 on the burnout dimensions of emotional exhaustion, cynicism, and personal efficacy, $F(3, 106) = 3.61$, $p = .02$, and Pillai's trace = .093. Post hoc univariate

Table 2. Means, standard deviations, and correlations

Variable	M	SD	1	2		
1. Emotional exhaustion (0–6)	2.99	1.71				
2. Cynicism (0–6)	2.26	1.69	.70**			
3. Personal efficacy (0–6)	5.06	0.81	–.29**	–.41**		
4. COVID-19 likelihood (1–5)	3.07	1.10	.21*	.27**	.01	
5. COVID-19 severity (1–5)	3.27	1.11	.12	.10	.02	.27*

Notes: M and SD are used to represent the mean and standard deviation, respectively.
*p < .05; **p < .01.
|r| < .3 indicates a small effect size; |r| > .3 and |r| < .5 indicate a moderate effect size; and |r| > .5 indicates a large effect size.[32]

Table 3. Linear regressions of COVID-19 perceptions on emotional exhaustion, cynicism, and personal efficacy

	DV: Emotional exhaustion		DV: Cynicism		DV: Personal efficacy	
	Coef.	SE	Coef.	SE	Coef.	SE
Intercept	2.98**	.16	2.24**	.15	5.06	.08
COVID-19 likelihood (1–5)	.33*	.15	.41**	.14	.004	.07
R^2	.045		.074		0.00	
	Coef.	SE	Coef.	SE	Coef.	SE
Intercept	2.98**	.16	2.24**	.16	.506**	.08
COVID-19 severity (1–5)	.18	.15	.15	.15	.01	.07
R^2	.013		.010		.0002	

Notes: *p < .05; **p < .01.
R^2 = .04 indicates a small effect size; R^2 = .25 indicates a moderate effect size; and R^2 = .64 indicates a strong effect size.[34]

analyses indicate a significant effect of perceptions of COVID-19 likelihood on emotional exhaustion (b = .33, SE = .15, p = .03) and cynicism (b = .41, SE = .14, p = .004). A significant effect was not found for personal efficacy (b = .004, SE = .07, p = .95); personal efficacy was not related to perceptions of the likelihood of contracting COVID-19.

A separate multivariate analysis was conducted to examine perceptions of COVID-19 severity on dimensions of burnout. A significant effect was not found, $F(3, 106) = .66$, p = .58, and Pillai's trace = .018, indicating that perceptions of COVID-19 severity did not influence self-reports of emotional exhaustion, cynicism, or personal efficacy.

Cluster analysis

An exploratory k-means cluster analysis was conducted to investigate how observations are organized into different groups with common characteristics along the facets of burnout. The optimal number of clusters was determined using the NbClust package in R and the gap statistic. The NbClust package provides an overview of 30 indices to determine the optimal number of clusters for the observed data.[35] The gap statistic compares the change in within-cluster dispersion to determine the optimal number of clusters.[36] The NbClust package and the gap statistic indicated that three clusters provided the optimal number of clusters for the current data, (see Figure 1).

The three-cluster solution indicates that respondents can be characterized by three different patterns of burnout (Table 4). The first group describes disaster response personnel that are overextended; they are high on emotional exhaustion (M = .82), cynicism (M = .48), and personal efficacy (M = .49). These respondents are exhausted and cynical, but they still feel efficacious in their work. The second cluster describes disaster response personnel that are burned out; they are high on emotional exhaustion (M = .82) and cynicism (M = .99) and low on personal efficacy (M = −1.51). These respondents fit the classic burnout profile where they are exhausted, cynical, and feel ineffective in their work. The third and final cluster describes respondents who feel engaged; they are low on emotional exhaustion (M = −.83) and cynicism (M = −.71) and high on personal efficacy (M = .37).

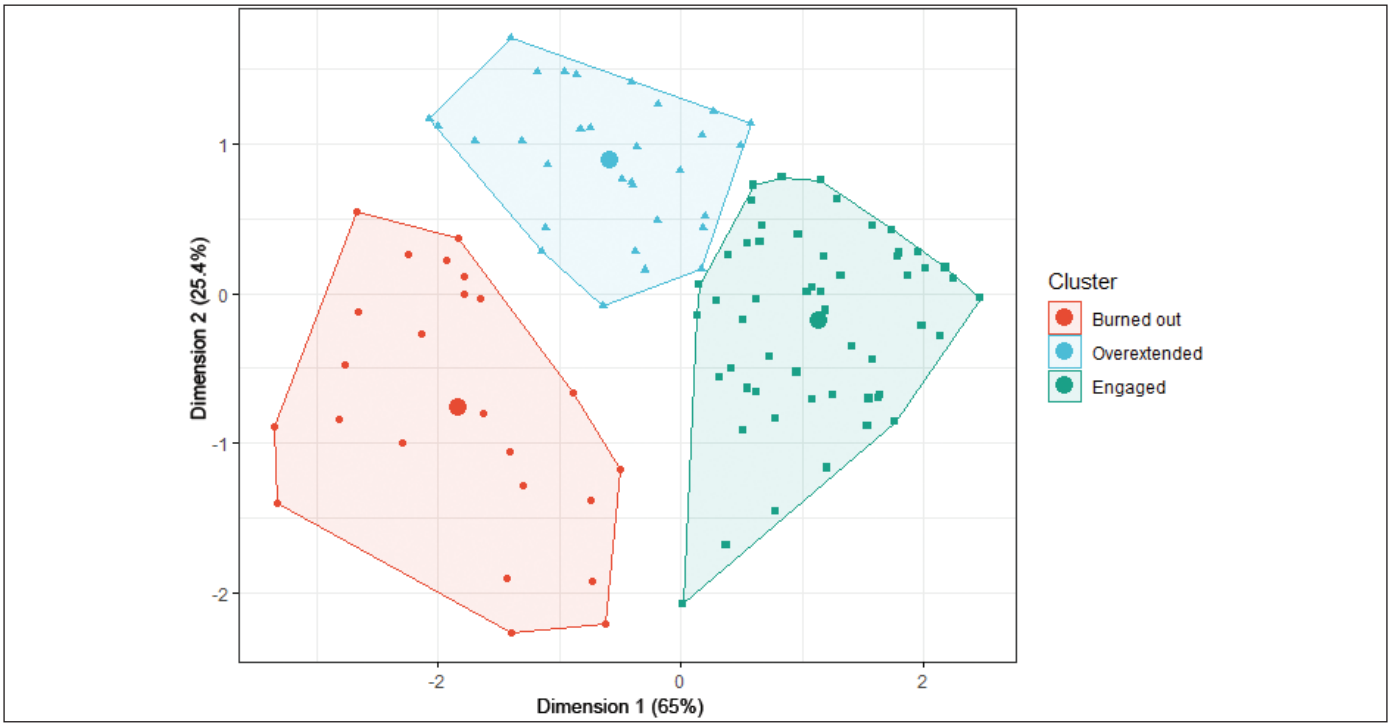

Figure 1: Cluster analysis of burnout dimensions of emotional exhaustion, cynicism, and personal efficacy.

Table 4. Cluster analysis means				
Cluster	N	Cluster means		
		Emotional exhaustion	Cynicism	Personal efficacy
Overextended	32	.82	.48	.49
Burned out	24	.82	.99	–1.51
Engaged	55	–.83	–.71	.37
Note: N indicates the number of respondents included in each cluster. Cluster means are standardized.				

These respondents feel efficacious in their work and are not emotionally exhausted or cynical about their jobs. The described clustering accounts for 62 percent of the total variance in the data.

DISCUSSION

In addition to the COVID-19 pandemic, the United States faced several devastating disasters including a record-breaking year in the Atlantic hurricane season with 30 named storms, devastating wildfires on the West Coast, and the costliest thunderstorm on record in the Midwest.[1] As jurisdictions across the country were faced with new challenges due to the COVID-19 pandemic in addition to a busy year of weather-related disasters, 2020 brought a lot of uncertainty to the field of disaster management, specifically regarding workforce availability and roles due to the associated risks of COVID-19. The co-occurring nature of the COVID-19 pandemic with these acute disaster events has the potential to overwhelm and overwork the disaster response workforce.[3] In this study, we addressed the occurrence of burnout in a sample of disaster response workers. Specifically, we addressed the rates of burnout in the disaster response workforce compared to the population, the impact of COVID-19 perceptions on burnout, and the organization of burnout symptoms into descriptive clusters.

This study makes three practical contributions. First, it compares a sample of disaster response personnel to a normative dataset representative of the general population to determine if disaster response personnel are experiencing burnout at higher levels than expected. This provides initial evidence of the state of the disaster response workforce 8–10 months into the COVID-19 pandemic and highlights the need for additional resources for these workers. Disaster response workers encompasses staff (n = 53), management (n = 31), volunteers (n = 12) and first responders (n = 7) who work in emergency management (n = 58), disaster services (n = 20), public health (n = 5), healthcare/medical (n = 3), and other organizations spanning community, education, and government services (n = 10). Disaster response workers reported significantly different levels of burnout on the subscales of emotional exhaustion, cynicism, and professional efficacy relative to the normative data. Specifically, respondents indicated higher levels of emotional exhaustion, cynicism, and personal efficacy than the normative dataset. The one-sample *t*-test offered a glimpse into the severity of burnout among the disaster response workforce 8–10 months into the COVID-19 pandemic. Although disaster response workers are feeling burned out regarding emotional exhaustion and cynicism, they still feel efficacious at work. According to sequential models of burnout,[28] this suggests that individuals who work in disaster response are at risk for developing classic burnout symptoms. Although these individuals currently feel efficacious in their work, they also feel exhausted and cynical. Furthermore, the size of these effects ranges from moderate to large, suggesting a meaningful difference in burnout symptoms from expected levels from the normative dataset.

Second, this study addresses the impact of perceptions of contagion during the COVID-19 pandemic on feelings of burnout. In addition to comparing the current sample to normative datasets, additional analyses were conducted to explore the impact of the COVID-19 pandemic on individuals' burnout. Disaster response personnel have been working for months against the backdrop of the COVID-19 pandemic. Perceptions of the likelihood of contracting

COVID-19 were related to increased feelings of emotional exhaustion and cynicism. This provides complementary evidence that concerns about the COVID-19 pandemic may be exacerbating workers' burnout. An initial study addressing burnout among healthcare professionals found that exposure to COVID-19 patients and a lack of personal protective equipment (PPE) were related to higher levels of burnout.[11] Broadening this study, the current findings suggest that perceptions of contracting COVID-19 or other infectious diseases may be related to the increased burnout; therefore, implementing worker protection (PPE, safety protocols, etc.) is paramount.[37]

Finally, this study uses unsupervised machine learning to conduct a *k*-means cluster analysis to examine the patterns of burnout in the sample. The *k*-means cluster analysis will subset the observed sample into groups that maximize the within-group similarity while also maximizing the between-group differences, allowing for descriptive groups to emerge to more robustly characterize the burnout experience of the disaster response workforce. The analysis indicates three overarching clusters for the sample of disaster response personnel: engaged, overextended, and burned out. Approximately 50 percent of the sample indicated that they were engaged with their work. These individuals report low levels of emotional exhaustion and cynicism and high levels of personal efficacy. This suggests that despite the COVID-19 pandemic, a substantial proportion of the disaster response workforce is still thriving. The overextended cluster describes individuals who can be considered of high risk for burnout; they are high on emotional exhaustion and cynicism, but still feel efficacious in their work. According to sequential models of burnout development, emotional exhaustion and cynicism tend to develop comparatively early in response to chronic job demands. However, decreased personal efficacy will eventually develop over time. Twenty-nine percent of the sample was categorized as overextended. Finally, the burnout cluster describes individuals who fit the traditional profile for burnout; they are high on emotional exhaustion and cynicism and low on personal efficacy. Although this cluster was composed of the smallest number of individuals (N = 24), it is still a surprisingly large proportion of the sample (20 percent). This indicates that approximately 50 percent of the disaster response workforce is burned out or at risk for burnout during the COVID-19 pandemic.

LIMITATIONS AND FUTURE DIRECTIONS

A limitation of this research is that the generalizability of the findings is constrained by the snowball sampling recruitment methodology. Additionally, because respondents were self-selected, the sample could be missing disaster response personnel who are experiencing extreme burnout. This could mean that burnout is more severe than what is reported here. This gap is important to recognize because burnout research has not focused on the disaster workforce, but mainly on healthcare workers.

Furthermore, the generalizability of these findings is limited, in part, by the representativeness of the sample, which is primarily composed of White males with extensive educational and professional experience. While this lack of diversity is typical of the disaster response workforce generally,[38,39] additional study is needed to explore the role of burnout in diverse samples. In particular, 2020 has been characterized by the largest racial justice protests in a generation.[40] Coupled with the racial and ethnic health disparities during the COVID-19 pandemic,[41] diverse groups may experience disproportionate levels of burnout that are not captured by the current sample. Future study should begin to address the impact of burnout in diverse populations, such as gender, race, ethnicity, sexual orientation, years of experience, income, and education levels.

Future research should also focus on strategies to prevent and reduce burnout among disaster response workers. Initial study has begun to explore different profiles of burnout, suggesting that different profiles of burnout may benefit from different interventions. [26] For the disaster response workforce, this suggests that different interventions may be needed to address individuals who are burned out or those who are overextended. Moreover, additional study is needed to address the contributing factors to high levels of burnout among the disaster response workforce as well as

the characteristics of those who continue to report high levels of engagement despite the demands to inform planning, prevention, and intervention efforts.

CONCLUSION

Disaster response personnel have been working behind the scenes to respond to the COVID-19 pandemic amid a record-setting year for disasters. Findings from this study indicate that while many respondents are still engaged with their work, half are burned out or overextended. As the pandemic moves into a new phase with vaccination distributions, it is important to recognize the toll of the co-occurring pandemic regarding ongoing expectations for managing this public health emergency along with the response to acute hazard events on the disaster response workforce. Additional study is needed to identify critical opportunities for interventions to minimize the risk of burnout and protect the health of disaster response workers.

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