Disaster Medicine and Public Health Preparedness

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Household Preparedness and Perceptions of Workforce Preparedness During Pandemics: A Health Care Employee Survey at the US Department of Veterans Affairs

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Original Research

Cite this article: Der-Martirosian C, Balut MD, Dobalian A (2022) Household preparedness and perceptions of workforce preparedness during pandemics: a health care employee survey at the US department of veterans affairs. *Disaster Med Public Health Prep* **16**: 1953–1958. doi: https://doi.org/10.1017/dmp.2021.198.

First published online: 16 August 2021

Keywords:
health care worker; household preparedness; pandemics; US Department of Veterans Affairs; workforce preparedness

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Abstract

Objective: To examine the effects of household preparedness on perceptions of workplace preparedness during a pandemic among all employees at the US Department of Veterans Affairs (VA) medical facilities.

Methods: The VA Preparedness Survey (October–December 2018, Los Angeles, CA) used a stratified simple random, web-based survey. Multivariate statistical analyses examined the effect of household preparedness on perceptions of workforce preparedness during a pandemic: institutional readiness; desire for additional training; and understanding their role and its importance.

Results: VA employees totaling 4026 participated. For a pandemic, 55% were confident in their VA medical facility's ability to respond, 63% would like additional training, 49% understood their role during a response, and 68% reported their role as important. Only 23% reported being "well prepared" at home during major disasters. After controlling for study-relevant factors, household preparedness was positively associated with perceptions of workforce preparedness during a pandemic.

Conclusions: Efforts to increase household preparedness for health care employees could bolster workforce preparedness during pandemics. Organizations should consider robust policies and strategies, such as flexible work arrangements, in order to mitigate factors that may serve as barriers to household preparedness.

Introduction

Exploring the disaster preparedness of health care employees is of growing interest in the field of emergency management. Multiple studies suggest that health care workers often feel unprepared to respond to major disasters.[1–9] Studies suggest multiple factors may influence these perceptions, including confidence in their medical facility's disaster plans and ability to respond, understanding of their role at work, safety of self and family members, availability of personal protective equipment (PPE) and preventive pharmaceuticals, caretaking obligations, personal health issues, and insufficient training. All of these factors may impact health care workers' willingness or ability to report to work during disasters.[2,5–8,10–17] Some studies have also found that the degree of health care workers' preparedness at home directly influences their preparedness at work, as well as their ability and intention to respond.[1,10,18] Furthermore, it has been shown that health care workers are more willing to respond to natural disasters and mass casualty events compared to infectious disease pandemics and chemical or radiological events.[3,4]

One consistent feature of pandemic influenza, whether mild or severe, is a surge in demand for health care. Hospitalization due to the influenza A (H1N1) virus in the United States was estimated at approximately 274 304 between April 2009 and April 2010,[19] in contrast to an approximate annual average of 94 735 (range: 18 908–193 561) seasonal influenza-related hospitalizations during the 22 years of 1979 to 2001.[20] This surge in capacity often requires that hospital staff work additional hours under significant strain, including risk of illness and potential transmission to family members and friends. Of those who became ill or lost their lives during recent infectious outbreaks, a disproportionate number were health care providers.[11,21–23] Thus, worker absenteeism is expected to be one of the most significant challenges for hospitals during the peak of a pandemic.[5,6,8,10] In fact, during an infectious disease outbreak, national absenteeism rates for health care workers can range from 20–60%.[5–8,10] Such findings point toward the need for a better understanding of the factors that encourage health care staffs' willingness and ability to work, in order to more effectively prepare the health system for a pandemic. Extant literature contains little information about correlations between household

preparedness and workforce preparedness during a pandemic influenza. The pandemic outbreak of the novel coronavirus that causes coronavirus disease (COVID-19) underscores the need for training and other preparations for infectious diseases.

After the Department of Defense, the US Department of Veterans Affairs (VA) is the second largest US federal government agency, with more than 360 000 employees. The VA is also the nation's largest integrated health care system, providing care to more than 9 million veterans at 1255 health care facilities, including 170 VA medical centers and 1074 outpatient sites. Understanding the perceptions of workplace and household preparedness for all VA health care employees is critical to ensure the continued delivery of timely, high-quality care to our nation's veterans during and immediately after disasters. Consequently, the Veterans Emergency Management Evaluation Center (VEMEC) developed and conducted the first survey of disaster preparedness of VA health care employees nationwide. The VA All Employee Disaster Preparedness Survey (VA Preparedness Survey) focused on several key factors within the context of 3 different types of major disasters: natural, pandemic, and man-made. The survey questions focused on perceptions of institutional preparedness, the need for additional trainings, and understanding of individual response roles during the aforementioned types of disasters. This study examines exclusively the determinants of workforce preparedness among VA employees nationwide during a pandemic, focusing specifically on the effect of household preparedness after controlling for relevant factors that might have an impact on workforce preparedness.

Methods

The VA Preparedness Survey was a random, anonymous, 10-minute, web-based survey that was fielded from October through December 2018. Sociodemographic data collected by the survey included age, gender, education, military service, race, marital status, household composition (dependents under the age of 17), information on employment (length of employment at the VA and clinical vs non-clinical responsibilities), and having experienced a major disaster while at work (yes/no).

The study defined a pandemic or an epidemic as a widespread infectious disease such as a pandemic influenza. The key study questions and the 4 dependent variables for this paper are (1) perceptions about institutional readiness during a pandemic; (2) desire for additional training to prepare for a pandemic; (3) understanding of one's role during a pandemic response; and (4) perceptions about the importance of one's role during a pandemic. These key questions were measured using a 5-point Likert scale (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree). The survey also included a general question on disaster preparedness and planning at home: *How prepared do you feel your household is to handle a major disaster*? The response categories included Well Prepared, Somewhat Prepared, or Not Prepared at All. The survey instrument used several validated scales from various sources, including The Behavioral Risk Factor Surveillance System Questionnaire from the US Centers for Disease Control and Prevention, the American Community Survey from the US Census Bureau, and the VA Preparedness Survey.

The target population of the survey consisted of all full-time and part-time paid employees at VA medical facilities nationwide. The sampling frame was assembled by processing the most current e-mail data set of all employees at VA medical health care centers, excluding VA headquarters (central office) staff in Washington, DC, residents, students, work study members, trainees, fellows, contractors, interns, volunteers, and those with incomplete administrative information. The sampling frame consisted of 362 823 VA employees at medical facilities, and a stratified simple random sample of 25 000 was selected, 6250 from each of the 4 US regions (north, south, east, west). Four e-mail reminders were sent to study participants. A total of 4026 completed the 10-minute, web-based survey. The adjusted response rate was 25%. The data were weighted using post-stratification weighting procedures to represent national-level population(s) of all VA employees at medical facilities. The results presented in this paper are weighted to the national level.

Descriptive statistics using weighted percent illustrate the characteristics of the survey respondents. Similarly, univariate analyses include the weighted percent distribution of the response categories for the perceptions of workforce preparedness (4 dependent variables) and household preparedness (independent variable). Each dependent variable was dichotomized by combining the "strongly agree"/"agree" responses into 1 category and the remaining responses ("strongly disagree"/"disagree"/"neutral") into another category. To examine the association between household preparedness and perceptions of workforce preparedness, 4 multivariate logistic regression analyses were conducted, 1 for each dependent variable, controlling for relevant study covariates, such as age (18–44, 45–54, 55–64, 65+), gender (male vs female), race (white vs non-white), married (vs not currently married), having dependents less than 17 years of age (yes, no), responsible for assisting someone outside of the home (yes, no), clinical (vs non-clinical responsibilities), length of employment at the VA (< 1 year, 1–3 years, 4–5 years, 6–10 years, or 10+ years), having experienced a major disaster while at work (yes/no), and having served in the US Armed Services (yes/no). Additionally, in order to take into account the survey design weights, which in this case includes the sampling (probability) weights and the stratification, the svy prefix command in Stata Version 15 (StataCorp LP, College Station, TX) was used when conducting the logistics regression analyses. For this study, the svy prefix considers the weighting and stratification of the VA Preparedness Survey design to get the correct standard errors. Predictive marginal proportions were calculated to illustrate the differences in perceptions of workforce preparedness for the 3 levels of household preparedness. Statistical significance was set at $P < 0.05$. In accordance with the policies regarding activities that constitute human subjects research at VA Greater Los Angeles Healthcare System (VAGLAHS), this study was determined by the VAGLAHS Institution Review Board to be a non-research project.

Results

Table 1 lists the sociodemographic characteristics, employment background, general health status, and previous experience with disasters while at work, for the 4026 VA employees who responded to the VA Preparedness Survey. The sample characteristics are 36% male, 69% white, 28% were 18–44 years old, 31% were 45–54 years old, 34% were 55–64 years old, 7% were 65 years old and over, 70% were married, 33% have dependents less than 17 years of age living at home, 27% reported being responsible for helping someone who does not live at home, and 35% served in the US Armed Services. With regards to VA employment, 62% reported spending at least 20% of their work time performing clinical duties, and length of employment at the VA varied: 10% < 1 year, 20% 1–3 years, 13% 4–5 years, 20% 6–10 years, and 37% 10 years and greater.

https://doi.org/10.1017/dmp.2021.198 Published online by Cambridge University Press

Table 1. Characteristics of VA employees

	Weighted Percent
Male	36
White	69
Age Categories:	
18–44	28
45–54	31
55–64	34
65+	7
Education:	
AA or less	41
BA	25
MA or higher	34
Married	70
Dependents less than 17 years of age	33
Responsible for assisting someone who does not live in the household	27
Served in the US Armed Services	35
Has clinical duties	62
Number of years at the VA:	
< 1 year	10
1–3 years	20
4–5 years	13
6–10 years	20
> 10 years	37
Experienced a major disaster while at work	24
General health status:	
Excellent	19
Very good	41
Good	32
Fair/poor	8
Household preparedness:	
Well prepared	23
Somewhat prepared	58
Not prepared	19

About a quarter (24%) also reported having experienced a major disaster while at work. For the main independent household preparedness variable, only 23% reported being "well prepared" to handle a major disaster (see Table 1).

Table 2 illustrates the weighted percent distribution of responses for the 4 dependent variables identified for this study. Among respondents who reported "strongly agree" or "agree" (columns 1 and 2) to the 4 statements on workforce preparedness during a pandemic, 55% reported being confident in their VA medical facility's ability to respond to an epidemic; 63% would like additional training to prepare for an epidemic; 49% understand their role in their VA medical facility's overall response to an epidemic; and 68% reported that their role in the overall response to an epidemic is important (see Table 2).

Table 3 presents the predicted marginal probabilities of "strongly agree" or "agree" perceptions of VA workforce preparedness during a pandemic by household preparedness. According to the multivariate regression analyses, household preparedness is associated (P-values < 0.0001) with perceptions of workforce preparedness after controlling for employee characteristics (age, race, gender, education, marital status, having dependents less than 17 years of age, military status, clinical duties/responsibilities, length of time at the VA). There are sizeable differences in perceptions of workforce preparedness by the 3 levels of household preparedness. Survey respondents who reported being "well prepared" at home have a higher marginal probability (66%) with regard to having confidence in their medical facility's ability to respond to an epidemic compared to survey respondents who reported "somewhat prepared" (54%) or "not prepared at all" (40%) at home. We see the same pattern for the other 2 perceptions of workforce preparedness. For understanding my role during a pandemic, the predicted marginal proportions for all 3 response categories – "well prepared," "somewhat prepared," and "not prepared at all" – are 65%, 49%, and 29%, respectively (see Table 3). Similarly, for perceiving my role to be important during a pandemic response, the predicted marginal proportions are 75%, 69%, and 58%, respectively. For wanting additional trainings, we see the opposite pattern, where the predicted probabilities are lower for "well prepared" (57%) compared to "somewhat prepared" (63%) or "not prepared" (72%) (see Table 3). In sum, there seems to be a positive association between household and workforce preparedness.

Discussion

As the largest integrated health care system in the United States, the VA plays an important role in the nation's disaster preparedness and response.[24] In fact, one of the VA's health care missions is to provide backup medical resources to both the military health system and to local communities following terrorist incidents and other major disasters.[25] As such, the VA has responded to numerous national emergencies[26] and has also provided care for non-veterans during such events.[26–29] During the COVID-19 pandemic, as of June 2, 2020, the VA has provided care to approximately 260 non-veteran patients who tested positive for the virus and more than 850 VA employees supported non-VA facilities in 10 states.[29] Nevertheless, we found that just 55% of VA employees are confident in their medical facility's ability to respond to a pandemic, and 63% would like more training to improve their level of preparedness for pandemics.

Perceptions of physical safety and confidence in their facility's ability to handle and respond to an infectious outbreak have been reported to influence health care workers' willingness and ability to report to work.[5,7,8,10–12] However, previous studies have found that only approximately half of health care respondents perceived their work environment to be safe during a pandemic.[2,5,10,12] Concerns about transportation to and from work were also cited as a potential barrier, particularly in urban areas, where public transit may be suspended during an outbreak to reduce the potential spread of an infection.[8,10,12] The availability of PPE and preventive medications, or vaccines, has also been reported as one of the most significant influencers to improving confidence in workplace safety or willingness to respond.[7,8,10,13,14] During the 2003 severe acute respiratory syndrome (SARS) epidemic, the likelihood of infection was strongly associated with a perceived inadequacy of PPE supply.[16] Unfortunately, results of a nationwide survey conducted by the National Nurses United found that a majority of hospitals and health care facilities in the United States were unprepared to contain or handle COVID-19 cases.[30] The survey showed that a high percentage of hospitals did not have plans, procedures, and policies in place for COVID-19, that hospitals either lacked sufficient stocks of PPE or were not providing sufficient PPE to staff, that tests for COVID-19 were unavailable or insufficient for staff and

https://doi.org/10.1017/dmp.2021.198 Published online by Cambridge University Press

Table 2. Perceptions of VA workforce preparedness* during a pandemic (N = 4026)

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I feel confident in my facility's ability to respond to a pandemic.	14%	41%	28%	11%	6%
I would like additional training to prepare for a pandemic.	19%	44%	26%	9%	2%
I understand my role in my facility's overall response to a pandemic.	12%	37%	30%	16%	5%
My role in my facility's overall response is important during a pandemic.	25%	43%	26%	4%	2%

*Weighted percent.

Table 3. Adjusted perceptions* of workforce preparedness for pandemics by household preparedness

	Well Prepared at Home	Somewhat Prepared at Home	Not Prepared at Home
I feel confident in my facility's ability to respond to a pandemic.	66%	54%	40%
I would like additional training to prepare for a pandemic.	57%	63%	72%
I understand my role in my facility's overall response to a pandemic.	65%	49%	29%
My role in my facility's overall response is important during a pandemic.	75%	69%	58%

*Predicted marginal proportions of "Strongly agree" or "Agree" after adjusting for age, gender, race, marital status, education, veteran status, household composition, VA employment characteristics, disaster experience at work, and general health status.

patients, and that communication to staff by employers was poor or nonexistent.[30]

The workload of health care professionals during an infectious disease outbreak will likely be immense, and significant changes in roles and responsibilities may be required. Studies have shown that health care workers with a specified role were significantly more likely to respond during a pandemic than those without a specified role,[1,8,12] and those with a higher perceived importance of their role during a pandemic response were also more willing to report to work during a disaster.[8,10,12,14,15] However, some studies have reported that health care workers are somewhat unfamiliar with what their specific job responsibilities would be during a pandemic.[10,17] While a majority (67%) of VA employees believed their role during a pandemic response was important, only half understood their role in their facility's overall response to a pandemic.

Health care workers who had disaster training or believed that they were prepared to respond have been reported to be more likely to report to work during a pandemic.[2,8,15] Advanced training in pandemic preparedness was shown to have both a significant association with increased confidence in self-protection practices[15] and a decreased likelihood of infection[16] during the SARS epidemic. In addition, hospital staff with previous experience in a pandemic response have been cited as more likely to perceive adequate readiness for future outbreaks.[8,11,13] A significant majority of health care professionals have expressed their desire for additional training to prepare for a pandemic outbreak,[2,6,14,17,18] including 63% of VA employees surveyed in this study. Yet, previous studies have shown that disaster training, particularly drills focusing on pandemic preparedness or training on safely donning and doffing PPE, is infrequent or inadequate.[2,6,7,17,30]

Women health care workers have been cited as less willing to respond during infectious disease outbreaks,[3–5,8] particularly among women with dependents.[3,4,6–8,10,14] Fear or concern for one's family is consistently cited as the most significant barrier to willingness to report to duty during a pandemic.[6–8,12,14,15,17] Younger respondents are more likely to be absent than their older colleagues,[1,3,6,10,17] and respondents with personal health problems are reported to be less willing or able to respond.[7,14] Health care workers with a lower level of education are also less likely to report to work.[7,10] In contrast, being a veteran[1,13] and being a clinician[3,8,15,17] have been cited as factors to willingness to respond to disasters. These observations suggest a potential for absenteeism for regularly scheduled shifts during a pandemic outbreak at the VA, as a majority (64%) of VA employees were women, 33% had a dependent less than 17 years of age, 28% were 44 years of age or younger, 41% have an associate's degree or less, and 8% were reported to be in "fair/poor" health.

Studies have found that health care workers tend to have better personal disaster preparedness than non-health-care professionals.[3,31] However, rates are still low, with only 23% of VA employees having stated that they felt "well prepared" at home for a disaster. This is consistent with other studies examining aspects of personal preparedness of health care workers.[1–4,13,31] Lack of time or financial resources is generally the most commonly cited barrier to household preparedness, as well as lack of knowledge of how to achieve preparedness.[31] Being a veteran[13,18,32,33] and having previous experience with a disaster[13,34] were reported to be positively associated with personal preparedness. Prior studies suggest that improving household preparedness will likely increase willingness to report to work or increase level of workforce preparedness during disasters,[1,10,18] as there will be fewer distractions at home.

This study has limitations. First, the survey focused on perceptions of workforce preparedness and readiness to respond during disasters but did not ask questions about an actual event. The main goal of the study was to gather information about VA preparedness nationwide, and therefore, collecting information on a specific event was not possible. Perceptions of institutional readiness may not reflect actual, objective readiness. Second, since this survey was conducted via e-mail and online, the survey results might underrepresent the perspectives of employees who do not use e-mail frequently, although the survey was kept open for about 4 months. Finally, the results of our study are not necessarily

https://doi.org/10.1017/dmp.2021.198 Published online by Cambridge University Press

generalizable outside of the VA. However, VA health care workers do not differ in their training and socialization for their professions, and our results are similar to those reported in prior, smaller studies. Moreover, the sociodemographic characteristics of the VA workforce are not markedly dissimilar to those of other US health care facilities, except with regard to the number of workers who served in the military. As noted, prior military service generally correlates with better household preparedness, suggesting that the preparedness of other non-VA, US health care workers may be somewhat less compared to that of VA health care workers.

Conclusions

Health care workers play a critical role in disaster response when an event occurs, yet, as demonstrated by the COVID-19 pandemic, an infectious pandemic would place a significant burden on health care systems. The demand for increased emergency care, intensive care unit, and inpatient care would be substantial. In addition, the infectious disease outbreaks that plagued the late 20th century, such as early years of the HIV/AIDS epidemic, and the epidemics of the 21st century, such as avian influenza A, SARS, and Ebola, as well as the 2009 H1N1 pandemic, were noteworthy for an unwillingness of some health care workers to place themselves at risk of exposure to these diseases.[5,9,11,35] Accordingly, understanding health care professionals' perceptions of their workforce preparedness and the factors that influence it could help develop and implement more effective disaster programs, policies, and procedures, which in turn should ultimately lead to a better prepared, more resilient health care system for future crises. The outbreak of the novel coronavirus that causes COVID-19 underscores the need for training and other preparations for infectious diseases. While intention to respond to a pandemic was not specifically investigated in our study, the examined factors (sociodemographic characteristics, confidence in institutional preparedness, understanding of response role, and household preparedness) have repeatedly been shown to influence health care workers' level of workforce preparedness, and therefore, their willingness and ability to report to work during an infectious disease outbreak.

The findings from this study point to a need for effective, hospital-based communication and training strategies that will boost employees' willingness and ability to respond. Communicating with VA staff regarding assurances of compliance and safety standards should increase their confidence in their institution's ability to respond. This could include the provision of information and training about the use of PPE, ensuring adequate supplies of PPE and other protective measures, preventive medications and vaccines for staff and family, information about the medical facility's pandemic plan and infection control practices, and transportation options to and from work. In addition, training should emphasize individual response roles during a pandemic, particularly the importance of their own individual roles, as perception of the importance of one's role in the agency's overall response has been cited as one of the most important factors associated with willingness to report to work during a pandemic.[10,14,15] While it can be difficult to designate predetermined, specific roles, a set of potential roles should be defined and introduced to all employees. This can be accomplished through annual education and simulation drills regarding pandemic preparedness knowledge.

The findings indicate that household preparedness is a strong predictor of workforce preparedness and suggest that additional focus on enhancing household preparedness of health care workers by their employers could markedly improve organizations' preparedness for public health emergencies. As childcare, eldercare, and pet care obligations are frequently reported to be barriers to willingness or the ability to report to work during a pandemic,[3,4,6,7,10,14] organizations should develop robust policies and strategies, such as flexible work arrangements, in order to mitigate factors that may serve as barriers to household preparedness. Numerous low-cost strategies to enhance preparedness exist, including written disaster plans that address the needs of dependents of employees. In addition, efforts to promote wider use of basic disaster kits, perhaps even supplying some items to employees, should be explored. Finally, training modalities should address both workplace and household preparedness for workers on a regular basis.

Acknowledgments. This material is based upon work supported by the United States Department of Veterans Affairs, Veterans Health Administration, Office of Patient Care Services. The views expressed in this manuscript are those of the authors and do not necessarily reflect the position or policy of the Department of Veterans Affairs or the United States Government.

Author Contributions. AD and CDM participated in the design of the study and the collection of study data. All authors participated in the analysis and interpretation of data and in the writing of the manuscript. All authors read and approved the final manuscript.

Conflict(s) of Interest. The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this paper.

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https://doi.org/10.1017/dmp.2021.198 Published online by Cambridge University Press