

# Prepared to Respond? Exploring Personal Disaster Preparedness and Nursing Staff Response to Disasters

Lavonne M. Adams, PhD, RN, CCRN; Joyce Melius, EdD, RN-BC, CCRN-K

## ABSTRACT

**Objectives:** This pilot study explored personal disaster preparedness of nursing staff and their ability and willingness to respond following a disaster.

**Methods:** All nurses from a single hospital were invited to participate; 91 completed an online survey asking them to rate their ability and willingness to report to work following the disaster scenarios and to indicate whether they had pursued various preparedness activities. Data were analyzed by descriptive and inferential statistics using Minitab 17 Statistical Software.

**Results:** Participants reflected a cross-section of major acute care units and nursing specialties. The majority of participants indicated being able and willing to report to work following the disaster scenarios. Personal disaster preparedness varied, with few activities pursued by the majority. Few scenarios produced a relationship between preparedness activities and ability or willingness to report to work.

**Conclusions:** Despite the majority of participants indicating they would be able and willing to report to work during a disaster, they acknowledged barriers affecting them. Most disaster scenarios showed no statistically significant relationship with preparedness activities. Nurses should consider barriers that affect their own availability for work following a disaster and identify potential solutions. Future research related to mitigation of possible barriers to surge capacity would be useful.

**Key Words:** disasters, disaster planning, preparedness, surge capacity

When public health emergencies or disasters occur, adequate staffing throughout the health-care continuum is essential for patient care and safety, staff health and safety, and sustainability of surge capacity. Health-care organizations making disaster plans assume that staff will be available to fulfill plan details. This assumption has been challenged, with multiple research studies indicating that health-care workers experience a variety of barriers and concerns related to reporting to work following a disaster.<sup>1-5</sup> Consistently identified barriers include childcare, eldercare, pet care obligations, fear and concern for family and self, personal health problems, and transportation problems.<sup>1-5</sup> Fewer staff may be available than anticipated,<sup>1,4</sup> potentially to the detriment of quality and safety.

As surge capacity research has uncovered barriers related to staff availability during disasters, it is important for researchers to explore factors that could promote staff ability and willingness to report (WTR) to work.<sup>2,4,5</sup> Personal or household preparedness has been studied in a variety of ways with different populations,<sup>6-8</sup> and development of a personal plan has been identified as a potential solution to barriers to staff response following disaster. Despite increasing

frequency of this recommendation, exploration of the impact of such plans on staff reporting to work has been limited,<sup>1</sup> with few studies specifically considering possible associations between personal preparedness on absenteeism or WTR described in health-care literature,<sup>1,3,7</sup> particularly with a wide range of disaster scenarios. Exploration into preparedness is complicated by its lack of a universally accepted definition<sup>1,8</sup> or measurement instrument,<sup>7,8</sup> although common elements of preparedness include obtaining knowledge of preparedness activities, development of communication and evacuation plans, stockpiling of supplies, and assembly of supply kits.

To enhance understanding of personal preparedness as a potential mitigating factor against staffing limitations, it is essential to include it as a focal point of surge capacity research. Specific aims of this study were to identify:

1. Ability and willingness of nurses to report to work in time of disaster
2. Barriers to nurses' ability and WTR to work in time of disaster
3. Personal disaster preparedness of nurses

## METHODS

This pilot study used online survey methodology to examine health-care personnel's ability and WTR to work based on a variety of disaster scenarios, barriers to their reporting to work, personal disaster preparedness, and demographic data. The survey consisted of demographic items, 8 disaster scenarios, and 12 preparedness activities. Participants were asked to rate their ability and WTR to work following the disaster scenarios. The demographic items and the disaster scenarios were based on the "Disaster Survey" created by Qureshi et al.,<sup>5</sup> modified with permission of Dr. Qureshi, and piloted and used in a North Texas health network with consistent results. Because each scenario was different and could reasonably be expected to elicit different responses to ability or willingness, we did not combine them into a single "score" for either ability or willingness. Each scenario was, therefore, analyzed individually.

Participants were asked to indicate whether they had pursued each preparedness activity, all of which had been frequently cited in literature. The items related to personal disaster preparedness were obtained from an investigator-designed survey used in a previous study of preparedness in north central Texas community members. To avoid combining disparate items into a single measure of "preparedness," each preparedness activity was viewed separately.

### Sample and Setting

All nurses (over 500) employed by a metropolitan North Central Texas hospital were invited to participate in the study; 91 participants completed the survey.

### Study Procedures

The study was approved by the Institutional Review Board of the primary investigator's University before implementation. Nurses were invited to participate in the study by means of email that included an introductory letter and a link to an anonymous Qualtrics<sup>9</sup> survey, with data only accessible to researchers (neither of whom were supervisors of participants). The letter explained the study's purpose, benefits, risks, and privacy and rights protections, and provided contact information for questions related to the study. This information was repeated on the first screen of the survey, which served as consenting document.

### Data Analysis Procedures

Data were exported from Qualtrics<sup>9</sup> and analyzed with descriptive and inferential statistics using Minitab 17.<sup>10</sup> All items in the survey were used in the analysis. Several items were grouped into ranges or categories for easier analysis. The Pearson *r* was used as a descriptive statistic to test for relationships between variables. Relationships between the disaster scenarios and personal disaster preparedness items tool were analyzed using a correlational matrix. For this study, significance was considered to be any *P* value less than 0.05.

## RESULTS

Participants were nurses reflecting a cross-section of the major acute care units and nursing specialties. The majority (73%) worked full time 8- or 12-h day shifts. The majority (83.5%) ranged in age from 30 to 59 y, which is consistent with the overall nursing population. The majority reported being responsible for childcare (54.9%) and for care of pets or livestock (76.9%). The majority lived in the county where the facility was located or in the adjacent county, with 98% commuting to work by private vehicle.

We examined data for differences in response among various demographic groups, including age range, years of experience, and type of unit or specialty. No appreciable trends were identified; statistical significance could not be achieved due to the small sample size in which participants were not fully distributed across all potential categories.

Many participants indicated being able or willing to report to work following the disaster scenarios (Table 1). Despite these findings, participants acknowledged barriers to reporting to work, with "child care obligations" and "pet care obligations" being cited most frequently for inability to report to work, and "fear/concern for my family" and "fear/concern for my personal safety" being cited most frequently for unwillingness to report to work.

To determine if family and personal obligations produced differences in ability and WTR to work, we tested for relationships between each disaster scenario and responsibility for children, elders, pets/livestock; and having a spouse/partner expected to work during the disaster. No statistical significance was found for any of these relationships.

We tested for relationships between family and personal obligations and concern for bioterrorism. Responsibility for children was found to have a significant relationship ( $r^2 = .207$ ;  $P = 0.049$ ); those with children expressed more concern than those without children.

Personal disaster preparedness ranged from 12% (having a disaster kit for car) to 64% (safe storage for important documents). Participants having taken disaster response training (43%) reported undertaking some type of preparedness activity, including having some combination of water supplies, food supplies, weather radio, and communication plan. Most participants (88%) indicated at least some willingness to learn more about disaster preparedness.

To determine if undertaking various preparedness activities produced relationships in ability and WTR to work, we tested for relationships between each disaster scenario and each preparedness activity (Table 2). Most disaster scenarios showed no statistically significant relationship with preparedness activities.

TABLE 1

	Ability			Willingness		
	Able	Percent respondents (N) Not able	Not sure	Willing	Percent respondents (N) Not willing	Not sure
Winter mix of 1 inch of ice and snow in a 24-h period occurs where you live.	78%(71)	6.6%(6)	15.4% (14)	86.8% (79)	3.3% (3)	9.9% (9)
Smallpox outbreak in southwest Fort Worth; 200 patients admitted to 10 hospitals.	79.1 (72)	4.4 (4)	16.5 (15)	72.2 (65)	7.7 (7)	20 (18)
Chemical terrorism attack at DFW Airport with 5000 victims brought to hospitals throughout the metroplex.	83.3 (70)	3.6 (3)	13.1 (11)	78.9 (71)	3.3 (3)	17.8 (16)
Tornadoes injure hundreds of people in Mansfield, Arlington, and Fort Worth. Flash flooding has been reported throughout the metroplex and expected to worsen.	70 (63)	5.5 (5)	24.4 (22)	68.5 (61)	6.7 (6)	24.7 (22)
Explosion at Globe Life Ball Park in Arlington with 2000 seriously injured brought to hospitals in the metroplex.	87.6 (78)	0 (0)	12.4 (11)	89 (80)	0 (0)	10.1 (9)
Radioactive bomb explodes in The Parks Mall in Arlington; thousands of people flocking to ERs in the metroplex.	75.3 (64)	5.9 (5)	18.8 (16)	70 (63)	7.8 (7)	22.2 (20)
Outbreak of 15 cases of SARS in the facility in which you work.	75.8 (66)	3.4 (3)	20.6 (18)	70.8 (63)	7.9 (7)	21.4 (19)
Outbreak of pandemic influenza in the metroplex.	86.7 (78)	1.1 (1)	12.2 (11)	84.4 (76)	3.3 (3)	12.2 (11)

Abbreviations: DFW, Dallas-Fort Worth; ER, emergency room; SARS, severe acute respiratory syndrome.

## DISCUSSION

The range of ability and WTR to work following the disaster scenarios included percentages higher than those in studies using a similar instrument.<sup>4,5</sup> Unlike other studies that have reported decreased WTR for chemical, biological, radiological, or nuclear (CBRN) or infectious disease events,<sup>3-5</sup> 70% or more of this study's participants indicated they would be willing to report for such events. These findings are somewhat surprising because disaster scenarios that include CBRN events or infectious diseases rank high on scales examining fear and risk perception,<sup>11</sup> and studies of health-care workers have suggested that WTR decreases as perceived risk increases.<sup>2</sup> It is possible that nurses who chose to complete the survey were more able and willing to report to work than those who did not complete the survey.

Despite most participants indicating they would be able and willing to report to work during a disaster, they acknowledged barriers affecting them, as has been the case in other studies.<sup>2,4,5</sup> "Fear/concern for my family" and "child care obligations" were the chief reasons cited as barriers to willingness and ability to report to work, which is consistent with other studies that found statistically significant associations between presence of dependents in the home and predicted absenteeism.<sup>3,4</sup> The presence of such barriers does not necessarily mean that health-care workers will not report to work. Nevertheless, because common barriers exist, it is important not only to identify and acknowledge them, but also to explore potential options to mitigate their impact.

Although no mass transportation is available to this hospital, few participants reported transportation concerns. We would

TABLE 2

Personal Disaster Preparedness (N=91)

Personal disaster preparedness items: Yes and No answers. If answered No then asked the probability that participant may plan to do in the future. Not at all, somewhat probable, probable, very probable, definitely (circle numbers in column)

	Yes % (n)	No % (n)	Winter Mix		Smallpox Outbreak		Chemical Terrorism		Tornado		Explosion at Sports Arena		Radioactive Bomb		SARS Outbreak		Flu Pandemic			
			Willing	Able	Willing	Able	Willing	Able	Willing	Able	Willing	Able	Willing	Able	Willing	Able	Willing	Able		
Do you have a disaster kit at home?	32%	29	68%	62	.059 .580	.181 .087	-.037 .731	.114 .286	.049 .658	.070 .510	-.161 .130	-.159 .137	-.040 .712	.067 .534	-.026 .815	.061 .567	-.044 .687	.165 .122	-.165 .119	.038 .725
Do you have a disaster kit for the car?	13%	12	87%	79	.021 .841	.041 .701	-.066 .537	.070 .510	.014 .899	-.099 .353	-.094 .379	-.125 .245	.037 .729	.013 .906	-.054 .625	.010 .922	-.088 .418	-.077 .472	-.145 .171	-.082 .444
Do you have an emergency communication plan for your family and/or significant others?	49%	45	51	46	.054 .610	.050 .640	-.035 .744	.152 .154	.097 .380	.159 .135	-.182 .085	-.097 .365	-.038 .721	-.041 .703	.141 .199	.200 .059	.121 .265	.253 .017*	-.017 .875	.083 .435
Do you have a weather radio?	43%	39	57	52	.047 .655	.181 .086	-.013 .905	.157 .140	.174 .113	.034 .751	-.165 .119	-.108 .315	-.159 .137	-.012 .912	-.074 .502	.037 .731	.115 .289	.240 .024*	-.112 .292	-.006 .958
Do you have an emergency food supply?	39%	35	61	54	.178 .096	.291 .006*	.026 .812	.009 .934	.134 .230	.065 .547	-.045 .678	-.042 .702	.195 .071	.255 .017*	.069 .537	.110 .309	.013 .909	.009 .537	.059 .584	.077 .476
Do you have an emergency water supply?	31	28	69	62	.051 .631	.216 .041*	-.077 .470	-.074 .491	.107 .337	-.062 .562	-.089 .407	-.031 .776	.184 .085	.255 .035*	.015 .894	-.006 .954	.021 .846	-.138 .198	.045 .674	-.005 .964
Do you have important documents stored in a safe place?	74	64	26	23	.209 .052	.043 .694	-.051 .638	-.101 .356	-.030 .788	-.033 .761	.227 .035*	.278 .010*	.118 .283	-.006 .953	.127 .255	-.033 .766	.075 .501	-.024 .968	.056 .607	-.036 .742
Do you have copies of important documents ready for transport?	43	39	57	51	.113 .288	-.106 .322	-.127 .233	-.004 .967	-.016 .884	.127 .236	.137 .199	.084 .438	.052 .630	-.009 .937	.022 .841	.185 .083	.020 .858	.137 .203	.003 .980	.066 .539
If you have pets, do they have ID tags?	69	59	31	26	-.062 .572	-.179 .101	.007 .948	.144 .191	-.062 .584	-.014 .901	-.058 .598	-.026 .813	-.111 .319	-.060 .590	-.022 .847	.019 .865	.117 .298	.103 .355	-.148 .181	-.033 .764
Have you taken training in personal protective equipment		82		18	.003 .977	.139 .194	.003 .978	.172 .106	-.005 .964	.049 .650	.008 .945	.075 .486	-.126 .245	.001 .994	.060 .592	.038 .723	.137 .209	.196 .068	-.032 .766	.002 .989
Have you taken disaster response training?	56	50	44	39																
Have you joined a voluntary organization that responds to disasters?	10	9	90	82	.054 .613	.118 .266	-.154 .147	-.007 .951	-.094 .397	-.043 .687	-.073 .498	-.073 .498	-.143 .184	-.039 .716	-.024 .826	.105 .329	-.018 .868	.100 .353	-.115 .285	.014 .893
Are you interested in learning more about disaster preparedness?	88		12																	

\*Pearson correlation, P value significant  $\alpha < 0.05$ .

Abbreviations: ID, identification; SARS, severe acute respiratory syndrome.

anticipate that transportation limitations could be of concern in severe winter weather due to its low frequency/high impact on the region, yet few participants indicated that this scenario would affect their reporting to work. In contrast, the tornado/flooding scenario is a high frequency event for the region, and it produced the lowest levels of ability and WTR to work, and the highest percentage of “not sure” responses. It is possible that responses to severe weather scenarios were affected by experience with or frequency of such occurrences.

The majority of our study participants indicated being able and willing to report despite not having completed various preparedness activities. These findings differ from literature citing a potential connection between preparedness and WTR,<sup>6</sup> but are consistent with the findings of other studies of hospital workers<sup>1</sup> and emergency department staff<sup>3</sup> that found no statistically significant associations between personal preparedness and willingness to respond. With personal preparedness frequently recommended as a method to increase WTR during disasters, its limited relationship with WTR is somewhat surprising. Reasons for a lack of consistent connection are yet unknown; potential confounding factors may include the absence of a standard definitions and measurement instruments. It is possible that the multifactorial nature of WTR is so complex that preparedness by itself does not affect WTR significantly. It may be useful to explore combinations of other variables including disaster-specific education, sense of professional duty, organizational climate, and practical experience with disasters.<sup>2</sup> It is also possible that prospective studies into WTR do not effectively address actual behavior; perhaps retrospective studies of actual behavior following a disaster or public health emergency linked to personal preparedness at the time of the event would produce more accurate findings. Further research exploring this relationship would be valuable because much is still unknown.

The only preparedness activities completed by a majority of participants were “taken training in personal protective equipment” (82%), “safe storage for important documents” (64%), “pets have ID tags” (59%). Consistent with disaster literature,<sup>1,3,8</sup> all other activities were completed by 45% or fewer of the participants. Even when defining personal disaster preparedness generally as “meeting major goals of prepar[ing] supplies and creat[ing] a family or household plan,”<sup>8</sup> (p.218) disaster literature reveals overall underpreparedness for disasters and a wide range of personal preparedness.<sup>8</sup> Studies involving household or personal preparedness are hampered by the lack of a universal definition and valid, reliable instrument. Further study into development of standard metrics and definition will be beneficial for future research.

## LIMITATIONS

Because this was a pilot study, the research was conducted in a single hospital in a specific geographic region and targeted only

nurses; findings thus cannot be generalized to other regions or other essential personnel. The small percentage of responses to the survey also limit generalization, as does potential selection bias, because those who completed the survey could have been more interested in or prepared for disaster than those who did not complete the survey.

Although the consent screen explained that all data were anonymous, confidential, and accessible only to the researchers, it is still possible that respondents thought their employer could become aware of their responses because the survey link was sent to their work email. Such a concern could have inhibited candor or participation of potential respondents. Additionally, social desirability bias could have occurred, with participants providing responses that would portray themselves in a favorable or heroic manner, or “expected answers” they thought the researchers wanted to hear.

## CONCLUSIONS

Health-care providers’ commitment to a personal disaster plan is a logical element to promote surge capacity, yet more study must be undertaken to provide support for this recommendation. This study explored both barriers to ability and WTR to work following a disaster and personal preparedness as a potential mitigating factor for these barriers. Future studies should include a full range of essential personnel within the health-care continuum in multiple settings and locales, with emphasis on development of reliable, valid instruments to measure personal preparedness and exploration of other factors that may contribute to WTR.

## About the Authors

Texas Christian University Harris College of Nursing & Health Sciences, Fort Worth, Texas (Dr Adams) and Southwestern Adventist University, Keene, Texas (Dr Melius).

Correspondence and reprint requests to Lavonne M. Adams, Texas Christian University Harris College of Nursing & Health Sciences, TCU Box 298620, Fort Worth, TX 76129 (email: [L.adams2@tcu.edu](mailto:L.adams2@tcu.edu)).

## Funding

Sigma Theta Tau International Beta Alpha Research Grant (2015).

## REFERENCES

1. Brice JH, Gregg D, Sawyer D, et al. Survey of hospital employees’ personal preparedness and willingness to work following a disaster. *Southern Med J*. 2017;110:516-522. doi: [10.14423/SMJ0000000000000680](https://doi.org/10.14423/SMJ0000000000000680)
2. Connor SB. When and why health care personnel respond to a disaster: the state of the science. *Prehosp Disaster Med*. 2014;29:270-274. doi: [10.1017/S1049023X14000387](https://doi.org/10.1017/S1049023X14000387)
3. Mercer MP, Ancock B, Levis JT, et al. Ready or not: does household preparedness prevent absenteeism among emergency department staff during a disaster? *Am J Disaster Med*. 2014;9:221-232. doi: [10.5055/ajdm.2014.0174](https://doi.org/10.5055/ajdm.2014.0174)

## Personal Preparedness and Response to Disasters

4. Adams LM, Berry D. Who will show up? Estimating ability and willingness of essential hospital personnel to report to work in response to a disaster. *Online J Issues Nurs*. 2012;17(2):8.
5. Qureshi KA, Gershon RR, Sherman MF, et al. Health care workers' ability and willingness to report to duty during catastrophic disasters. *J Urban Health*. 2005;82:378-388.
6. Gowing JR, Walker KN, Elmer SL, et al. Disaster preparedness among health professionals and support staff: what is effective? An integrative literature review. *Prehosp Disaster Med*. 2017;32:321-328.
7. Labrague LJ, Hammad K, Gloe DS, et al. Disaster preparedness among nurses: a systematic view of literature. *Int Nurs Rev*. 2018;65:41-53.
8. Kohn S, Lipkowitz Eaton J, Feroz S, et al. Personal disaster preparedness: An integrative review of the literature. *Disaster Med Public Health Prep*. 2012;6:217-231.
9. Qualtrics software [computer program]. Version December 2015. Provo, UT: Qualtrics. 2014. <https://www.qualtrics.com>.
10. Minitab 17 Statistical Software [computer program]. Version 17. State College, PA: Minitab, Inc. 2010. [www.minitab.com](http://www.minitab.com).
11. Smith EC, Burkle FM, Archer FL. Fear, familiarity, and the perception of risk: a quantitative analysis of disaster-specific concerns of paramedics. *Disaster Med Public Health Prep*. 2011;5:46-53. doi: [10.1001/dmp.10-v4n2-hre10008](https://doi.org/10.1001/dmp.10-v4n2-hre10008)