

Level of Disaster Preparedness in Patients Visiting the Emergency Department: Results of the Civilian Assessment of Readiness for Disaster (CARD) Survey

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Abbreviations:

CARD: Civilian Assessment of Readiness for Disaster
ED: Emergency Department
FEMA: Federal Emergency Management Association

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Abstract

Background: Patients seeking care in public hospitals are often resource-limited populations who have in past disasters become the most vulnerable. The objective of this study was to determine the personal disaster preparedness of emergency department (ED) patients and to identify predictors of low levels of preparedness. It was hypothesized that vulnerable populations would be better prepared for disasters.

Methods: A prospective cross-sectional survey was conducted over a one-year period of patients seeking care in a public university hospital ED (census 65,000). Exclusion criteria were mentally impaired, institutionalized, or non-English speaking subjects. Subjects completed an anonymous survey detailing the 15 personal preparedness items from the Federal Emergency Management Agency's disaster preparedness checklist as well as demographic characteristics. Summary statistics were used to describe general preparedness. Chi-square tests were used to compare preparedness by demographics.

Results: During the study period, 857/1000 subjects completed the survey. Participants were predominantly male (57%), Caucasian (65%), middle-aged (mean 45 years), and high school graduates (83%). Seventeen percent (n = 146) reported having special needs and 8% were single parents. Most participants were not prepared: 451 (53%) had >75% of checklist items, 393 (46%) had food and water for 3 days, and 318 (37%) had food, water, and >75% of items. Level of preparedness was associated with age and parenting. Those aged 44 and older were more likely to be prepared for a disaster compared to younger respondents. (43.3% vs 31.1%, $P = .0002$). Similarly, single parents were more likely to be prepared than dual parenting households (47.1 vs 32.9%, $P = .03$).

Conclusions: This study and others have found that only the minority of any group is actually prepared for disaster. Future research should focus on ways to implement disaster preparedness education, specifically targeting vulnerable populations, then measuring the effects of educational programs to demonstrate that preparedness has increased as a result.

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Introduction

Creating a culture of personal preparedness for disaster has been one of the major goals of the Ready campaign of the Federal Emergency Management Association (FEMA).¹ Begun in February 2003, the Ready campaign is "designed to educate and empower Americans to prepare for and respond to emergencies including natural and man-made disasters. The goal of the campaign is to get the public involved and ultimately to increase the level of basic preparedness across the nation." The Ready campaign seeks to have Americans: 1) create an emergency supply kit; 2) make a family emergency plan; and 3) know the appropriate response to different types of disaster (shelter in place versus evacuate).¹

Despite recent disasters such as 9/11 and Hurricane Katrina, the available research indicates that Americans remain unprepared for disasters.²⁻⁴ Wingate has suggested that public health preparedness efforts should define vulnerable populations and focus on

their needs.⁵ A large percentage of the population seeking care in an emergency department as their means of primary health care are sicker, more disabled, and more chronically ill.⁶ Vulnerable populations and those who use the emergency department as their primary source of health care have the potential to strain disaster resources and potentially shift care from those in critical need.

Several studies have investigated the disaster preparedness of specific vulnerable populations. Baker et al reported on the preparedness level of families with children having special health care needs compared to those in the general population and found that those families with special needs children actually had a lower level of preparedness than the general population.⁷ Barata et al studied 1272 patients presenting to a New York emergency department and found that most did not have a household disaster plan, nor did they know of disaster plans at their work or school.⁸ Zils et al studied patients in a Milwaukee emergency department and showed that those patients were less prepared than the general population.⁹ In both the New York and Milwaukee studies, households with children tended to be better prepared for disaster.^{8,9}

The Civilian Assessment of Readiness for Disaster (CARD) Survey was developed to determine the disaster preparedness of emergency department patients and to identify predictors of low levels of preparedness. This study further focused on two vulnerable populations, families with special health care needs and single parents. It was hypothesized that these vulnerable groups would be better prepared for disaster.

Methods

Research Design

Utilizing a cross-sectional study design over a one-year period, subjects who had completed their initial physician evaluation in the emergency department were surveyed. Subjects were approached by trained research assistants who provided the subject with information regarding participation in the CARD survey. If the subject expressed interest, the research assistant provided the subject with verbal information about the study using a standardized script and obtained the subject's verbal consent. Subjects willing to participate were provided with the survey and asked to complete and return it to the research assistant. The survey was designed to either be filled out by the participant or read to them by a research assistant depending on participant preference. This study was approved by the Institutional Review Board of the University of North Carolina.

Setting

This study was conducted in the Emergency Department of the University of North Carolina Hospitals in Chapel Hill, North Carolina (USA). The University of North Carolina Hospitals is a suburban, public, tertiary-care academic medical center that serves the greater Raleigh-Durham-Chapel Hill metropolitan area and is also a regional referral center for patients throughout North Carolina and the surrounding states. The hospital has a full complement of specialists, services, and clinics. The ED is staffed by board-certified emergency medicine attending physicians and supports an emergency medicine residency. The ED serves approximately 65,000 patients annually.

Participants

Subjects were all adult (≥ 18 years old) emergency department patients seeking care in the University of North Carolina

Items	Yes %	n
Food - 3 days	65.8	564
Water - 3 days	49.4	423
Checklist Items		
Toilet Paper	73.5	630
Working Flashlight	73.1	626
Personal Hygiene Kit	71.0	608
1 Change of clothes per person	70.0	600
Non-electric can opener or utility knife	69.4	595
Blanket	68.0	583
Emergency phone numbers	65.3	560
Essential medications	65.0	557
Anti-bacterial hand wipes or gel	63.1	541
Spare Batteries	62.9	539
Extra house/car keys	61.6	528
First Aid Kit	59.0	506
Mess Kit	58.6	502
Working radio	54.6	468
Cash or Traveler's Check	46.3	397

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Table 1. FEMA 15-Item Checklist Plus Food and Water

Hospitals Emergency Department from July 2007 through August 2008. Exclusion criteria were mentally impaired, institutionalized (ie, a prison or nursing home), or non-English speaking subjects as determined by the nurse caring for the patient.

Measures

The survey consisted of two sections: 1) general disaster preparedness; and 2) participant demographics. For section 1, the CARD survey consisted of 22 questions assessing personal disaster preparedness, including the 15 items on a readiness checklist derived from FEMA's Ready campaign, as well as knowledge of work and school emergency plans, and creation of a family meeting place (Table 1).¹⁰ The demographic section collected information including age, gender, education, race, income, and living environment.

Data Analysis

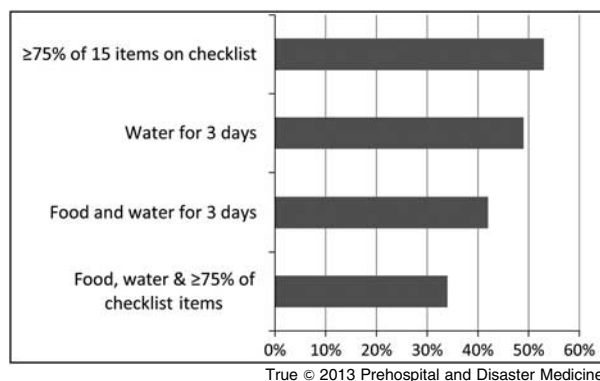
For general preparedness, "prepared" was defined as having food and water for all members of the household for a minimum of three days and at least 75% of the additional items included on the FEMA readiness checklist. To determine if preparedness differed by gender, age, socioeconomic status, race, education, or living environment, chi-square or Fisher's exact test was used. Data are presented as frequencies with percentages. Ninety-five percent confidence intervals (CIs) were calculated where appropriate. A *P* value of $< .05$ was considered statistically significant. All analyses were performed using SAS statistical software (Version 9.2, SAS Institute, Cary, North Carolina USA).

Demographic Parameter		n	%	General Disaster Preparedness ^a			Difference	95% CI
				n	%	P value		
Gender	Male	483	56.8	178	36.9	.721	3.4%	-5.3-7.9
	Female	367	43.2	140	38.2			
Age (years)	18-43	424	49.7	132	31.1	.0003	12.10%	5.7-18.5
	>44	430	50.4	186	43.3			
Racial Identity	African American/Black	236	28.3	78	33.1	.45		
	White/Caucasian	543	65.2	212	39.0			
	Hispanic/Latino	23	2.8	8	34.9			
	Other	31	3.7	12	38.7			
Education	No High School	20	2.4	3	15.0	.15		
	Some High School	119	14.3	45	37.8			
	High School/GED	332	39.9	120	36.1			
	College/Technical Degree	361	43.4	143	39.6			
Household Income (US \$)	<10,000	105	14.2	39	37.1	.06		
	10,000-19,999	106	14.3	38	35.9			
	20,000-29,999	102	13.8	45	44.1			
	30,000-39,999	98	13.2	24	24.5			
	≥40,000	329	44.5	126	38.3			

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Table 2. Demographics

^ahaving food and water for all members of the household for a minimum of three days and at least 75% of the additional items included on the FEMA readiness checklist.



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Figure 1. General Preparedness

Results

Of 1000 subjects approached, 965 (96.5%) agreed to participate. Of these, 96 surveys were excluded due to incompleteness, and an additional 12 participants were excluded when subsequently found to live in a nursing home. Final sample size was 857. Most participants were white (65.2%), middle-aged (mean 45 years) males (56.8%) who had graduated high school (83.2%) and had an annual income < US \$40,000 (44.5%) (Table 2).

General disaster preparedness was inadequate. Only 451 (52.6%) had >75% of checklist items, 393 (45.9%) subjects had

food and water for three days, and 318 (37.1%) had both food, water, and >75% of items (Figure 1). Most subjects (69.0%) did not have a gathering location in case of emergency, and 65.0% (n=555) did not have a family emergency preparedness plan.

Level of preparedness was associated with age. Participants 44 and older were more likely to have food, water, and >75% of checklist items when compared to younger age respondents (43.3% vs 31.1%, difference = 12.1%, 95% CI: 5.7%-18.5%, P = .0002) Level of preparedness was not associated with gender, education, race or income (P> .05 for all, Table 2).

Subjects with Special Needs and Single Parents

One hundred and forty-six (17.1%) respondents reported having people in their homes with special needs. Of these, 55.5% had >75% of items on checklist, 45.9% reported having food and water for three days, and 36.3% had food, water, and >75% of items on the list. Subjects with special needs were no more prepared than subjects without special needs (P> .05 for all, Table 3).

Two hundred and ninety-five respondents (34.4%) had children living at home. Of these, 70 (23.7%) reported being a single parent. Compared to two-parent homes, single parents were more likely to have food and water for ≥ 3 days (57.1% vs 41.3%, P = .03), and more likely to have food, water, and >75% of items on the list (47.1% vs 32.9%, P = .03, Table 3).

Parameter		N	Food and Water ≥3 days				>75% of Items				Food, Water >3 days & >75% of Items			
			n	%	P Value	Difference (95% CI)	n	%	P Value	Difference (95% CI)	n	%	P Value	Difference (95% CI)
Parenting	Dual	225	93	41.3	.03	15.8%	126	56.0	.89	1.1%	74	32.9	.033	14.2%
	Single	70	40	57.1		(2.4-28.5)	40	57.1		(-12.2-14)	33	47.1		(1.3-2.7)
Special Needs	Yes	146	67	45.9	1.00	0.1%	81	55.5	.93	0.8%	53	36.3	.85	0.09%
	No	709	325	45.8		(-8.9-8.9)	388	54.7		(-9.4-8.1)	264	37.2		(-7.9-9.2)

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Table 3. Preparedness Based on Parenting and Special Needs

Discussion

The emergency department patient population surveyed was not prepared for disaster. Those over the age of 44 were more likely to be prepared, presumably because they had more personal experience with disasters. Single-parent households were also more prepared, while persons caring for people with special needs did not demonstrate an increased level of disaster preparedness. Nevertheless, while some populations were better prepared than others, no population was well prepared for disaster.

Clearly, the current method of disaster preparedness education is ineffective. While there are excellent Web sites and helpful information available, this information is not reaching the general public. Since many of this patient population may not have regular access to the Internet, incorporating disaster preparedness into the school-age curriculum may help families overall prepare for disaster. Incorporating education into parent-teacher conferences or other school-wide events could broaden the audience even further. Specifically targeting families with single parents and special needs children through the school system could assure that these vulnerable populations receive this valuable information. For those without children, partnering with local businesses to provide education to employees about disaster preparedness could be an effective solution. The current methods are, in the authors' opinion, too generic, and perhaps a more personal and targeted message would be more effective.

Making disaster preparedness education part of the discharge process from the hospital or emergency department would potentially increase awareness for this clearly underprepared patient population. Additionally, making education materials entertaining and accessible would catch the interest of a wider audience. The Centers for Disease Control have an online blog

for public health matters titled "Preparedness 101: Zombie Apocalypse," which outlines the ways in which one would prepare for an invasion of zombies.¹¹ While this is clearly an implausible scenario, the article goes on to liken the zombie apocalypse to other natural disasters and subsequently gives valuable information about disaster preparation. Campaigns like this that use popular culture to present this information may be more effective in reaching the intended audience.

Limitations

There were some limitations to this study. The stress of requiring care in the ED may impact the ability to accurately answer survey questions. Additionally, the portion of the population that is non-English speaking was excluded, and the survey was limited to those receiving care at the University of North Carolina. Non-English speaking patients are another vulnerable population that may have changed the outcomes of the survey or added to the ability to identify predictors of low levels of preparedness. Though subjects were asked about items on the checklist, it was not ascertained whether they had packed a bag should evacuation be required. This may have caused overestimation of the number of survey responders who were truly prepared for disaster.

Conclusion

This study and others have found that only the minority of any group is actually prepared for disaster. Future research should focus on ways to implement disaster preparedness education, specifically targeting vulnerable populations, then measuring the effects of educational programs to demonstrate that preparedness has increased as a result.

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