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Challenges and Resources for Nurses Participating in a Hurricane Sandy Hospital Evacuation

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Abstract

Purpose: Weather-related disasters have increased dramatically in recent years. In 2012, severe flooding as a result of Hurricane Sandy necessitated the mid-storm patient evacuation of New York University Langone Medical Center. The purpose of this study was to explore, from the nurses' perspective, what the challenges and resources were to carrying out their responsibilities, and what the implications are for nursing education and preparation for disaster.

Design: This mixed-methods study included qualitative interviews with a purposive sample of nurses and an online survey of nurses who participated in the evacuation.

Methods: The interviews explored prior disaster experience and training, communication, personal experience during the evacuation, and lessons learned. The cross-sectional survey assessed social demographic factors, nursing education and experience, as well as potential challenges and resources in carrying out their disaster roles.

Findings: Qualitative interviews provided important contextual information about the specific challenges nurses experienced and their ability to respond effectively. Survey data identified important resources that helped nurses to carry out their roles, including support from coworkers, providing support to others, personal resourcefulness, and leadership. Nurses experienced considerable challenges in responding to this disaster due to limited prior disaster experience, training, and education, but drew on their personal resourcefulness, support from colleagues, and leadership to adapt to those challenges.

Conclusions: Disaster preparedness education in schools of nursing and practice settings should include more hands-on disaster preparation exercises, more "low-tech" options to address power loss, and specific policies on nurses' disaster roles.

Clinical Relevance: Nurses play a critical role in responding to disasters. Learning from their disaster experience can inform approaches to nursing education and preparation.

Weather-related disasters have increased dramatically in recent years (Guha-Sapir, Hoyois, & Below, 2014) which has resulted in an increased emphasis on institutional preparation and training, particularly among emergency response and healthcare provider organizations. Hospital evacuations are rare events, usually caused by natural or

manmade disasters such as hurricanes, earthquakes, or chemical spills (Concanour et al., 2002). Forced hospital evacuations without power are even more rare (Chavez & Binder, 1996) and are usually caused by unanticipated loss of power and water damage (Schultz, Koenig, & Lewis, 2003). When hospitals experience a forced evacuation, healthcare providers become both victims and responders. Typically, disaster training in hospitals is directed at dealing with mass casualties rather than forced evacuation (Concanour et al., 2002).

Nurses play a critical role in disaster preparedness (Gebbie & Qureshi, 2006; Institute of Medicine [IOM], 2010), but many nurses are not confident of their abilities to respond effectively to disasters and are unsure of their roles (Baack & Alfred, 2013). Managing disasters presents significant challenges, including disaster-related stress (Collins, 2000). Those with experience and training report feeling more confident to respond (Adams & Canclini, 2008).

Hurricane (Superstorm) Sandy was designated a late-season post-tropical cyclone by the U.S. Weather Service just before it made landfall in Atlantic City, New Jersey, on October 28, 2012. The storm that began in the Caribbean and moved up the east coast of the United States eventually took 149 lives and left billions of dollars in damage to communities.

Preparations for Hurricane Sandy began in New York City Emergency Response agencies and hospitals the week before landfall. New York University Langone Medical Center (NYULMC) is located only one city block from the East River in the New York City borough of Manhattan. This was the second time in a little more than a year that NYULMC had been threatened by a climate event, Hurricane Irene occurring in August 2011. In preparation for Hurricane Irene, city and state officials had mandated NYULMC and two other hospitals to evacuate before the storm made landfall. These hospitals all experienced minimal damage as a result of Hurricane Irene and re-opened within hours of landfall. Prior to Hurricane Sandy, the city and state decided not to mandate evacuation, and hospitals implemented plans to shelter in place (SIP). At NYULMC, preparations included enhancing the physical barriers for flood protection that were used during Hurricane Irene. As many patients as possible were discharged. Within the hospital, some patients who would SIP were moved from units vulnerable to high wind on the east side of the building to less vulnerable units on the lower floors on the west side of the building. Patients heavily dependent on electronic equipment were also moved to areas of the hospital with more robust power capacity. Around 7 p.m. the evening of October 28, the barriers around the medical center that had been put in place in preparation for the storm were breached, flooding the cellar and ground floors, and causing a power failure throughout the hospital. Though emergency power sources were available for a period of time, it soon became apparent that the level of temporary power was not sustainable, and immediate evacuation of all patients and staff would be required.

The purpose of this study was to explore, from the nurses' perspective, how they functioned in these extraordinary circumstances, what the challenges and resources were to carrying out their responsibilities, what lessons were learned, and what the implications are for nursing education and training for disasters response.

Methods

Study Design

We chose a mixed-methods approach to the study, beginning with in-depth qualitative interviews followed by an anonymous online survey. The qualitative interviews provided important information that informed the content of the quantitative survey. For example, nurses described in detail the challenges they had to face and what resources had helped them to adapt to those challenges. The methodology for the qualitative and quantitative study is detailed separately in the ensuing text. The protocol for the study was reviewed and approved by the New York University School of Medicine Institutional Review Board.

Phase 1: Qualitative Interviews

Sample and recruitment. We recruited a purposive sample of nurses who had experienced the evacuation based on practice area (cardiology, pediatrics, obstetrics, neonatology, oncology, general medicine, orthopedics), nursing experience (a range of less than 1 year to 20 years, with more nurses having 1 to 3 years of experience), and organizational role (staff nurse, nurse manager) in the disaster. We used text, e-mail, and phone to contact nurses and invite them to participate in a 1-hr interview to explore their experiences during and after Hurricane Sandy. Sixteen of the 20 nurses contacted agreed to participate (response rate 80%). Of those, 12 held staff nurse positions and 4 held management positions.

Data collection. Experienced qualitative interviewers (N.V. and V.H.R.) conducted 1-hr interviews with participants in a private setting between April and June 2013. We assured participants that no individual identifiers would be collected, that the interview would be audio-taped to insure the accuracy of the data, and

immediately after the transcription of the interview the audiotape would be destroyed. We gave participants an information sheet describing the study and contact information for the principal investigator (N.V.) and the New York University School of Medicine Institutional Review Board. Participants verbally agreed to participate.

Measures. The interview guide contained questions about professional background and role at NYULMC and potential challenges and resources for nurses during the evacuation, including emergency preparedness training experience prior to the hurricane, familiarly with hospital disaster policies and procedures, role in the disaster, communication and leadership during the disaster, and personal evacuation experience. To develop the interview guide, we drew on the extant disaster literature and information from a small group of NYULMC nurses with disaster experience.

Qualitative data analysis. All interviews were transcribed verbatim. Each member of the research team read all of the transcripts initially. Two members of the research team with extensive qualitative experience developed a detailed codebook using a three-step process, initially conducting open coding followed by focused coding and finally identification of major themes. Transcripts were coded and entered into ATLAS.ti 6.0 (http://atlasti.com/product/v8-windows/; ATLAS.ti Scientific Software Development GmbH, Chicago, IL, USA) by a trained qualitative researcher. A subset of 20% of the interviews was independently coded by a research student familiar with the study to establish interrater reliability (84%).

Phase 2. Quantitative Survey

The quantitative cross-sectional study consisted of an anonymous Internet-based survey that was conducted from July to September 2013.

Sample and recruitment. The sampling frame consisted of all registered nurses (RNs; $N = 1{,}668$) who were employed by NYULMC and worked on inpatient units on October 29, 2013. 528 of the nurses responded to the survey, for a 32% response rate. For the purposes of this analysis, only nurses that were present for the evacuation and responded to the survey were included ($N = 173$).

Nurses were recruited via e-mail using procedures described in the ensuing text. The confidential link to the e-mail addresses of all nurses who worked at NYULMC was obtained from the Senior Vice President and Chief Nursing Officer at the hospital. At no time did the researchers have a list of the nurses' e-mail addresses.

Measures. We collected information on sociodemographic variables, including type of nursing education and clinical experience, potential challenges during the evacuation such as communication, leadership availability, adequacy of disaster preparedness training prior to the evacuation, and perceived threat to safety for patients and nurses. We also assessed potential resources that could support nurses in their disaster and evacuation roles, such as previous disaster experience and training in disaster preparedness, support from co-workers, family, and friends, personal resourcefulness, faith, spirituality, or religion. Prior to sending out the link to the survey, the survey was pilot tested by professional nurses on the study advisory group.

Data collection. Prior to initiation of the study, we sent an e-mail to the total sample describing the study purpose and alerting potential nurse participants that they would receive an e-mail with a link to the survey within a few days. Three days later, we sent a second e-mail providing a link to the online Qualtrics survey on a secure website at New York University. Qualtrics assigned an identification code to each respondent. Reminder e-mails were sent at the end of the second and third weeks after the initial e-mail. Of the 1,668 nurses contacted, 528 returned completed surveys, for a response rate of 33%.

Quantitative data analysis. Survey data were downloaded into an SPSS data file. Six cases were eliminated because they did not meet the inclusion criteria. Of the 528 nurses who returned surveys who met the criteria of working at NYULMC at the time of the hurricane, all those who did not participate in the evacuation were eliminated, leaving a sample of 173 for this analysis.

Results

Phase 1. Qualitative Interviews

Participants' qualitative interviews revealed the following themes.

Hurricane Irene influenced expectations about Hurricane Sandy. Because this was an unplanned evacuation that ended in hospital closure, nurses had to adapt to rapidly changing unpredictable events and circumstances. Hurricane Irene 1 year earlier had provided practice in evacuation that increased nurses' ability to carry out their responsibilities. However, that experience

also contributed to the erroneous belief that Hurricane Sandy would be a controlled event as Hurricane Irene had been. Hurricane Irene was described by these participants as taking place within a very controlled environment where electricity was available, elevators worked, there was time to make appropriate contacts with other hospitals, and all preparedness was completed a day in advance prior to the storm. Participants variously described that experience as "calm, easy, no stress." One felt "we were indestructible." Several participants described Hurricane Irene as "a drill" or "dry run" for Hurricane Sandy; thus, they expected that nothing "bad" would happen. One participant stated:

> In the back of my mind I literally just thought it was going to be similar to Irene, yeah the storm is coming, we'll have some flooding in the basement, and you know like they did before, a little water, and they'll dry it up and the hospital will open the next day like it did last time and we'll be back to business as normal. (P6)

As a result of that experience and the institutional decision to SIP, none of the study participants expected that it would be necessary to evacuate patients as a result of Hurricane Sandy until the power outage occurred.

Limited personal external disaster experience prior to Hurricane Sandy. Only three participants described any external formal experience or training in disaster preparedness, one with the Federal Emergency Management Agency (FEMA), one a member of the New York City Medical Response team, and one who came from another country where disasters of this kind were frequent. One who did have previous external experience with disasters reflected on the value she derived from that external experience:

> Well, kind of luckily, I'm a member of the local medical response type thing, so I've gone to a couple of their seminars, and their evacuations are much more kind of global, you know with chemical evacuation for those kind of emergencies, but it does give you an idea of how to triage people and um I guess just from experience you know how to triage people, like if we have to evacuate the patients, who should go first, what equipment is needed, and things like that, and you have good support, I won't say I'm an expert, by no means at all. (P16)

Hospital-based policy and nurses' training related to disaster. Most participants (80%) reported limited knowledge of hospital disaster policies and procedures, though many said there were manuals available on the patient care units and online but they had never accessed the information personally. When asked about hospital-based disaster training, many participants (60%) cited training in the use of Med Sleds (equipment used to move non-ambulatory patients down stairways in an emergency; http://www.medsled.com/; ARC Products LLC, Des Peres, MO, USA). However, many (70%) said they had no hands-on experience with the Med Sled and some did not have any orientation to it before the night of the evacuation. One participant described her disaster-related training: "We were trained on how to use the Med Sled but, like I said, we were in unfamiliar territory. All we were trained for was how to evacuate this unit" (P2).

A few nurses identified general disaster training topics they learned about in formal hospital disaster training: "I hadn't much experience to be honest in terms of training. We had basic training, you know, what numbers to call, like fires or spills ... but not specifically what happens if there is a hurricane" (P5).

In contrast, many participants did feel they had the ability to successfully transport critically ill patients off the unit and to triage which patients could go home and which required further hospitalization.

Perceived ability of nurses to respond effectively to disaster. Many participants stated they did not feel prepared for the actual hospital evacuation (as compared to a unit evacuation). A younger nurse expressed her thinking at the time she first learned about the evacuation: "I felt like I had no idea what I was doing. I don't know what my role is" (P5). Another participant experienced similar feelings when she heard about the coming evacuation: "I couldn't imagine evacuating in the middle of a hurricane" (P10). However, the few participants with external disaster training did feel prepared.

Clarity of expected roles in disaster. Participants characterized their role with regard to the care of the patients more clearly than how they fit into the disaster command structure of the hospital. One experienced nurse explained what she believes about nurses' understanding of their roles in the organizational structure of the hospital disaster response command structure:

> I think organizationally that that command structure, I'm not really sure that all of it, that it really gets down to all the staff, quite honestly. I think the staff probably know what happens on their unit and they defer to the nurse manager if there's an issue on their unit, ... if it's who to shut off oxygen or what to do, they go to the nurse in charge. So I think ... that they probably just look at the person on their unit as opposed to the whole structure ... ." (P3)

Another participant described her view of the nurses' role in relation to the patient:

> I think I was expected to help out to, if there is evacuation, make sure evacuate the patient in a safe way. And also make sure that before you evacuate, each patient must have, you have to have enough stuff to, to take care of the patient. So this is my main concern and main responsibility." (P7)

Nurse managers ($n = 3$) all articulated their disaster-related responsibilities for nursing staff: providing support and leadership, and identifying means and channels of communication with nurses both within the hospital and at home.

Hospital preparations undertaken prior to the storm. All participants described multiple activities undertaken by the nursing department of the hospital to manage the disaster prior to the evacuation. The first activity was action to insure adequate staffing, including identifying accommodations for nurses to sleep in the hospital to insure a round-the-clock staffing pattern for an indeterminate period of time. This included consolidating and reassigning nurses internally and setting an expectation that nurses would report to duty unless they lived too far away or had significant competing demands.

A second major area of hospital disaster preparedness activities for nursing included triage and discharge of patients who could be discharged and making contact with potential transfer hospitals (this only happened with a few units).

Nurses participated in the relocation of patients within the hospital prior to the storm (same day). Patients were moved away from the east side of the hospital because it was the most vulnerable to the storm. Moves were both horizontal (east to west) as well as vertical (down to lower floors), and patients were consolidated where possible to areas with the best (newly remodeled) emergency power capacity. Nurses prepared the patients for this relocation as "a safety precaution" to "decrease potential fear and panic in the patients." The relocation was described this way by one participant:

> They had done a horizontal evacuation ... the whole east side of the hospital to the west side ... because the east side had all of those big windows facing the river, high winds ... before anything had even happened ... just in expectation of how things were gonna go. (P1)

Another participant noted the attention to potential power shortages: "Earlier that same day the hospital had been moving people around so that patients were consolidated in the areas they knew the emergency power was the best" (P7).

Effects of power loss on nurses' ability to function. Nurses reported two major effects of power loss on their ability to function. The first was the ability to care for patients who required equipment run on electricity. Back-up generators provided an initial power source as did battery back-up, but nurses were also at times manually replacing electronic equipment functions (particularly when transporting patients down the stairs during the evacuation) as well as recharging equipment where possible on other units or floors where there were free outlets.

In addition, medical records and medication carts are also electronic; thus, nurses had to improvise access to both. Because patients were to be transported to other hospitals, medical record data needed to accompany them. Nurses printed electronic medical data prior to power loss in some cases and wrote medical summaries to accompany patients when that was not possible. Medication carts were kept open in anticipation of power failure or broken into if necessary. As one participant remembered, "The nurse managers really scrambled and thought quickly about 'let's get the medication, let's print out the MAR [electronic medical record], let's get the face sheet and vital information they needed'" (P3). Another participant noted, "Nurses went around when the lights started to go and they opened all of the med carts because they open by code" (P7).

The second major effect of power loss was on nurses' ability to communicate with each other, with nursing leadership, or with families. Most participants described the significant problem of limited communication options. With loss of power, hospital telephones went out, cell phones, including smart phones, could not be charged, computers were not available, and, without elevators, face-to-face communication became more difficult.

> I think the most frustrating part was the communication. We didn't have phone service, our emergency phone, no electricity, no computers, we're so focused on technology now ... my only way to communicate was to use my Blackberry, the telephone and our cell phones and hopefully they didn't die because we couldn't charge them ... so it was communication. (P6)

Nurses' preparation of patients and families for evacuation. One pediatric nurse described the challenge of communicating about the need for

evacuation while trying to insure that family members and patients did not become anxious:

> You know you couldn't be outwardly afraid because the parents are freaking out because you had to be a stronghold for this patient's family … you kind had to put on a brave face and relay the plan to the parents…. (P1)

Nurse participants described making lists of what each patient would need to take with them and began to gather those things together such as a schedule of medications, vital signs, and downloaded electronic medical record data. Nurses sometimes had to go to other floors, recovery rooms, and intensive rooms to find medication if they did not have sufficient doses to send. Patients who were postoperative or in pain were given pain medication prior to evacuation. In some cases, all of this was done in an hour.

Patients were triaged for evacuation based on acuity. In some situations, the plan for order of the evacuation was changed in midcourse when it appeared to not be working (i.e., evacuating sicker patients first meant slowing down the process because they took longer and everyone still had to wait for ambulances at the bottom), showing adaptability to the circumstances. Nurse participants stressed the importance of remaining calm with patients and families, who responded well as a consequence, and thus the nurses remained calm themselves.

Transport of patients to ground floor during evacuation. The physical evacuation of patients down stairwells took place in two buildings of NYULMC over a period of many hours; the Tisch Hospital (from the 17th through the 8th floor) and Swartz Health Care Center tower (13th through 9th floor). Only a few patients who were left in the hospital were able to walk down the staircases themselves. Physical aspects of the evacuation were described in detail by many participants. The majority of patients (80%–90%) had to be evacuated on Med Sleds, which required heavy lifting for staff. "Doing that over and over again is exhausting" (P9).

One participant described how slow the process was:

> If you have ever seen an evacuation with a Med Sled, … it's very slow because you … have to be careful of the person in the sled. There's a carabiner that goes on the top and like hooks on to the top of each railing so that, heaven forbid one of us slip and let go, it would continue to have that support. So, every time you did a half a flight of stairs, you have to unhook the carabiner … so it was a long process. (P1)

Mutual support during the stairway evacuation was described by many participants: And I worked with people I'd never seen before … but we all had the same goal to bring this patient down safely (P12).

> Every single person that worked in any kind of a department here … like the guys in the suits were up here with hard hats and jeans on and everybody in the world seemed like was up here helping us to move. (P7)

Many participants described the assistance provided by the New York Fire Department and the New York City Police Department as very important to the success of the evacuation. Overall, most participants described the stairway evacuation as "organized," "seamless," "extremely professional," "calm," "very, very orderly," "everyone worked together," "everyone listened to the leader," and "there was never an argument."

Availability of support from nursing leadership during evacuation. Both newer and more experienced nurses described the importance of support from nursing leadership and other leaders in enabling them to fulfill their roles during the evacuation:

> I got good direction from the people I needed to get direction from, I felt good in terms of my ability to take care of the patient, to take the patient out … my nurse manager was right there…. (P1)

And another explained:

> The leadership was great. Our senior leadership was there (at the command center). Our nurse manager was there … our medical director. And whatever they got from the command center, they were good at disseminating the information to us. (P4)

In contrast, one participant did not experience the level of support needed because of the loss of communication once the power was lost:

> I have to say unfortunately, during that night, I did not get a lot of support from the administration because we don't even have communication at that time … the only immediate communication is from my medical director. (P13)

Implications for education and training. Most participants expressed a need for more training in disaster preparedness in professional education and in the workplace.

> But from my experience we didn't know what to expect. So, there was a bit of a culture shock associated

> with this, even the hospital administration may have been prepared for this but we didn't know who we have to talk to, how to get the ambulances here, they were prepared, we weren't … so in the future I think that part of nursing education … there should be a component … disaster preparedness. What happens in the event of a disaster, if you are working in a hospital, what may you be called on to do. (P2)

A participant suggested nurses across the city should be educated about the possibility that nurses could be deployed to other hospitals in a disaster, and what expectations would be for receiving facilities:

> I think nurses all across the city need to be educated about … disaster, nurses from 99 different hospitals may show up [at yours] to work…. This is our expectation about how you are going to behave towards them … what you are going to do to make the transition for them easier. (P2)

Quantitative Survey

The majority of the 173 participants were female (89%), White (73%), and never married (47.9%), and about one third (37%) had children. The vast majority of participants (74%) had received a bachelor of science in nursing degree. All of the nurses who participated in the Hurricane Sandy evacuation had participated in the evacuation for Hurricane Irene the previous year. Echoing the findings in the qualitative interviews, only 32% of participants stated that their prior disaster preparedness training had prepared them for the actual evacuation (**Table 1**). Communication became a major issue due to loss of power for Internet and land phones; thus, the primary mode of communication nurses reported during the disaster was face-to-face communication (72%) followed by personal cell phone (24%). Once power was lost, 73% of nurses perceived a serious or growing threat to safety of patients and nurses. The majority of participants (75%) reported their disaster and evacuation leaders were nurses, which was an important resource for them. Fortunately, 90% of participants described the evacuation route as easy to follow despite crowding and limited lighting.

The most common resources identified (see **Table 1**) by participants that helped them to carry out their roles in the evacuation were support from co-workers (77%), support from nursing leadership (55%), their own resourcefulness (51%), and the fact that others remained calm (45%). Other, less frequently mentioned, resources included faith or religious beliefs (16%), previous disaster experience (15%), previous disaster training (12%), belief that the hospital was well prepared (12%), support of family and friends (11%), and helping others (9%).

Table 1. Challenges and Resources of Nurses Who Participated in the Hurricane Sandy Hospital Evacuation ($N = 173$)

	n (%)
Nurses who participated in Hurricane Irene evacuation	173 (100%)
Potential challenges in the evacuation	
Previous disaster preparedness training helped me manage in this disaster (Agree/strongly agree)	55 (32%)
Primary mode of communication during the disaster and the evacuation (Face to face due to lack of internet, phone or cell power)	124 (72%)
Perceived threat to safety of patients and nurses due to power loss (Very serious or growing problem)	117 (73%)
Availability of leadership during the disaster and evacuation	
Nursing leadership	130 (75%)
Physician leadership	11 (7%)
Difficulty of evacuation route	
Easy to follow	155 (90%)
Potential resources to help nurses carry out their role in the evacuation	
Support from co-workers	132 (77%)
Support from leadership	95 (55%)
Personal resourcefulness	88 (51%)
Others remained calm	77 (45%)
Faith/religious beliefs	28 (16%)
Previous disaster experience	25 (15%)
Previous disaster training	21 (12%)
Felt hospital was well prepared	20 (12%)
Support of family and friends	19 (11%)
Other	16 (9%)
Providing support to others	5 (9%)

Discussion

We explored the experience of nurses in a large urban medical center responding to a major hurricane, hospital evacuation, and subsequent hospital closure for several months. Nurses participating in the evacuation encountered numerous unanticipated challenges in responding to the disaster but overcame many by drawing on personal, interpersonal, system, and community resources, reflecting the dynamic interrelations among various personal and environmental factors described in Broffenbrenner's (1977) Social Ecological Model (SEM). This theory-based framework posits that there are five interrelated levels of the SEM that determine behavior: individual, interpersonal, community, organizational, and policy/enabling environment. As the nurses' narrative accounts illustrated, the support they received

spanned these levels. Nurses credited their personal resilience (individual level), support from co-workers (interpersonal level), support from organizational leaders (organizational level), support from family and friends (community level), and external support from emergency response agencies (policy or enabling environment) as resources that emerged and helped them to address the many physical and environmental challenges the disaster presented.

The challenges nurses encountered began with the unanticipated flooding from the storm that resulted in power loss and subsequently necessitated the hospital evacuation. However, despite the lack of disaster training and education, nurses developed creative responses that drew on multiple resources. For example, the power outage impacted two major areas: patient care and staff communication. Without power, patient electronic equipment was a major concern. To address this problem, nurses devised a plan to use back-up generators and batteries, located outlets for charging equipment, and prepared for manual use of equipment. Because medications are now located in electronically operated carts, nurses immediately unlocked medical carts and located alternate sources for medications (intensive care unit, operating room, pharmacy). Patients being transferred to other health facilities needed to arrive with pertinent medical information. Nurses printed out information needed for transfer while generator power was available and later, when adequate power was unavailable, hand-wrote the summary notes of patients' conditions and needs that was needed for transfer of patients. To address the impact of power loss on staff communication, nurses implemented use of Blackberries where possible and physically went from one unit to another (nurse leaders) for face-to-face communication.

The study confirms the findings in the limited literature on nurses and disaster preparedness. It demonstrated that nurses do play a critical role in responding to disaster (Gebbie & Qureshi, 2006; IOM, 2010) and that those with experience and training report feeling more confident in their ability to respond (Adams & Canclini, 2008).

Conclusions

The narrative accounts and quantitative survey data in this study revealed important lessons learned from this weather-related disaster. It is essential to enhance the resources that can support nurses facing such challenges. FEMA recommends the use of exercises such as an "all hazards approach" where professionals work together to plan necessary steps to prepare for, respond to, and recover from hazards of all types, including climate-related (hurricane) and manmade disasters. They also recommend the use of "table top" exercises where team members engage and work together to manage the response to a hypothetical incident. These exercises can greatly enhance the ability of participants to function in future events. In particular, disaster preparedness training and policies and procedures for nurses practicing in institutional settings should include preparation for short- and long-term power outages. There is a need to develop and make available more "low-tech" options in the event of power loss (Med Sleds are a good example of replacing elevators) and alternatives for situations when high-tech equipment is not usable. Finally, the dramatic increase in climate-related events worldwide over the past two decades demonstrates the compelling need to learn from these events and to routinely include disaster preparedness in nursing education and training.

Limitations

There are limitations to this study. Qualitative data are not generalizable to other settings; however, they can contribute to an understanding of the experience of participants in disaster events. Also, the study was conducted 6 to 10 months after Hurricane Sandy and the hospital evacuation; thus, study participants' recall could be affected. Despite these limitations, there is remarkable uniformity to the qualitative reports, and these accounts are consistent with the quantitative findings.

Clinical Resource

American Nurses Association. Disaster preparedness & response. http://www.nursingworld.org/disasterpreparedness

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