

Emergency Childcare for Hospital Workers During Disasters

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Objectives: The objectives were to determine the impact of emergency childcare (EC) needs on health care workers' ability and likelihood to work during a pandemic versus an earthquake as well as to determine the anticipated need and expected use of an on-site, hospital-provided EC program.

Methods: An online survey was distributed to all employees of an academic, urban pediatric hospital. Two disaster scenarios were presented (pandemic influenza and earthquake). Ability to work based on childcare needs, planned use of proposed hospital-provided EC, and demographics of children being brought in were obtained.

Results: A total of 685 employees participated (96.6% female, 79.6% white), with a 40% response rate. Those with children ($n = 307$) reported that childcare needs would affect their work decisions during a pandemic more than an earthquake (61.1% vs 56.0%; $t = 3.7$; $P < 0.001$). Only 28.0% ($n = 80$) of those who would need childcare ($n = 257$) report an EC plan. The scenario did not impact EC need or planned use; during scheduled versus unscheduled shifts, 40.7% versus 63.0% reported need for EC, and 50.8% versus 63.2% reported anticipated using EC.

Conclusions: Hospital workers have a high anticipated use of hospital-provided EC. Provisions for EC should be an integral part of hospital disaster planning.

Key Words: Pandemics, disaster planning, hospital surge, childcare

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The ability to retain and maintain staff during a disaster is crucial to disaster planning. One of the largest identified barriers to ability to work during disasters is health care personnel's childcare responsibilities.^{1–10} Hospital provision of emergency childcare (EC) for staff could provide an increased ability for a significant number of staff to work during a disaster.^{9,11,12} However, providing hospital-based or hospital-managed EC is a complex endeavor, and the scope of the need has not yet been delineated in the literature. Various methods have been suggested, including encouraging the development of personal/family disaster plans by hospital workers, staff sharing, providing an in-home option via a sitter, and providing an on- or off-site hospital-managed childcare.^{2,8,11,12} Planning for EC during biological events, such as a bioterrorism attack or pandemic, is even more challenging because of the potential propagation of the outbreak when children congregate in a childcare setting.⁶

It is imperative that hospitals have a defined plan to meet their staff's EC needs to have adequate health care personnel during a true disaster. Despite this, no previous research has been conducted to delineate health care personnel's anticipated needs related to EC, and no study has been conducted to determine the extent to which staff anticipate using hospital-based EC, if available. To address this gap, a survey of hospital employees at an academic, urban pediatric hospital in the Midwest United States was conducted. The primary objectives of this study were to determine

the impact of EC on health care workers' ability and likelihood to work during a pandemic versus an earthquake as well as to determine the anticipated need and expected use of an on-site, hospital-provided EC program. Secondary objectives were to determine existing EC plans and to estimate the details of use of an on-site, hospital-provided EC program.

METHODS

This work is part of a larger statewide study, distributed through the Missouri Hospital Association, examining hospital workers' willingness and ability to work during disaster scenarios and their personal preparedness plans. A link to an online survey was distributed to hospital workers at the urban pediatric hospital in August 2011. A reminder e-mail was sent 2 weeks later. The survey was also made available to personnel at the hospital's annual employee disaster fair held in August 2011. All employees/staff members were eligible to participate.

Survey Questionnaire

Instruments used in past research examining willingness to work during disasters were used to develop this study's questionnaire.^{2,4,7–9,11,13–18} The instrument measured the impact of childcare needs on ability to work during 2 scenarios (an influenza pandemic and earthquake), using a continuum of 0 to 100 (with 0 indicating complete disagreement and 100 indicating complete agreement with that statement). For each scenario, participants were also asked to separately rate their anticipated need and anticipated use of an on-site hospital-provided EC during both scheduled and unscheduled shifts. The rating was on a 5-point scale, with 1 being definitely no to 5 being definitely yes. Participants who indicated that they had responsibility for at least 1 child were asked to state the age(s) of their child(ren), the number of children they anticipated bringing in for EC per shift, and who would watch their child(ren) if EC was not provided by their hospital. They were also asked if they had an existing EC plan. Participant demographics were also assessed.

Scenarios

Participants were presented with the 2 disaster scenarios, namely, an influenza pandemic in which a vaccine was not available and an earthquake. A biological and nonbiological scenario was chosen so that the 2 could be compared; a pandemic and an earthquake were specifically chosen because of participants' recent experience with an influenza pandemic (ie, 2009 H1N1) and local geologic hazards. Participants were told that their employer would provide personal protective equipment in the pandemic scenario and that their home was undamaged and household members were unharmed in the earthquake scenario. Both scenarios involved school and daycare closures.

Validation

A group of 10 US disaster preparedness researchers provided feedback on content validity of the questionnaire. The content validity index (CVI) was computed for each item by this CVI panel of researchers.¹⁹ No items had a CVI of less than 0.80, so none was deleted. Items were revised based on feedback from the CVI panel. The final survey contained 16 questions plus demographic

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items. The questionnaire was then pilot tested using a group of 10 hospital employees from a variety of occupations.

Data Analysis

The SPSS 20.0 was used for all analyses. Descriptive statistics were used to describe the extent to which hospital workers believe that the need for childcare will affect their ability to work and the extent to which those who have children will need and use EC during scheduled and unscheduled work shifts. Descriptive statistics were also used to calculate the anticipated number of children that health care personnel expect to bring to a hospital-based EC program on various work shifts and during scheduled and unscheduled shifts. Independent samples *t* tests were used when comparing agreement that the need for childcare would affect the decision to come to work during a pandemic versus an earthquake among those who have at least 1 child. A Pearson product-moment correlation coefficient was computed to assess the relationship between the need for childcare affecting ability to work and anticipated use of EC during scheduled and unscheduled shifts during a pandemic and an earthquake. Hierarchical logistic regressions were used to determine predictive models for anticipated use of EC during scheduled and unscheduled shifts during both disaster scenarios. Good model fit, indicated by a nonsignificant χ^2 value, was calculated with the Hosmer-Lemeshow goodness-of-fit test²⁰ for each regression. For univariate analyses, χ^2 tests were used to determine whether independent variables (demographics and having EC plans) were significantly associated with anticipated use of EC. Only variables that were significant on univariate analysis were included in the multivariate logistic regression analyses to describe factors associated with anticipated use of EC during scheduled and unscheduled shifts. Factors that were insignificant on multivariate analysis were dropped from the model(s). Only final models are reported. A critical *P* value of 0.05 was used for all analyses. The study was considered exempt by the university's institutional review board.

RESULTS

In all, 685 hospital workers participated in the survey, giving a response rate of 40%. Of those who answered the demographic questions (participants had the option of leaving the questions blank or answering "I don't want to answer"), the majority of the respondents were female (96.6%, *n* = 543), were between the ages of 25 and 64 years (87.8%, *n* = 597), had a minimum of a bachelor's degree (39.7%, *n* = 269), were white (79.6%, *n* = 537), and worked full-time (77.9%, *n* = 517). Most worked either day shift (50.9%, *n* = 344) or swing shift (45.7%, *n* = 309). Participants were from all clinical and nonclinical areas of the hospitals and included hospital administrators. Almost half of all respondents (46.0%, *n* = 315) self-identified as being nonclinical, including such occupations as laboratory, pharmacy, housekeeping, dietary, pastoral care, research, and technical support. Of the clinical staff who participated (*n* = 370), the largest group of responders (49.5%, *n* = 183) were registered nurses or licensed practical nurses.

Almost half of the total respondents (44.8%, *n* = 307) reported having at least 1 child they would be responsible for the care of in the event of a disaster. The rest of the results reported will reflect this cohort of 307 respondents with children. The ages of the children are listed in Table 1. Of those with at least one such child, 14.0% (*n* = 43) indicated that they had a child with a "special need," defined as having a physical and/or developmental limitation requiring assistance; 9.1% (*n* = 28) reported having a child who would need medication, and 4.9% (*n* = 15) had a child requiring assistance with mobility, respiration, or feeding.

TABLE 1. Ages of Children of Hospital Workers

Age Ranges of Children,* y	N = 573	
	n (%)	
≤1 y	46	(8.0)
2 y	45	(8.0)
3–4 y	64	(11.1)
5–8 y	104	(18.2)
9–11 y	80	(14.0)
12–14 y	85	(14.8)
≥15 y	149	(26.0)

*All staff children, not just those requiring care.

Impact of Childcare Need on Decision to Work During an Earthquake or Pandemic

Workers responsible for a child (*n* = 307) reported a higher agreement that the need for childcare would affect their decision to come to work during a pandemic compared with an earthquake (61.1% vs 56.0%; *t* = 3.7, *P* < 0.001). There was a strong, positive correlation between those whose work decisions were affected by EC needs during a pandemic and the intent to use hospital-based EC during scheduled (*r* = 0.48, *P* < 0.001) and unscheduled shifts (*r* = 0.60, *P* < 0.001); a similar strong, positive correlation was found for the earthquake scenario during scheduled (*r* = 0.56, *P* < 0.001) and unscheduled shifts (*r* = 0.70, *P* < 0.001).

Existing EC Plans

Of the 307 participants with at least 1 child, 93.7% (*n* = 257) of workers reported that they would need childcare during a future disaster. Of those who would need childcare (*n* = 257), only 28.0% (*n* = 80) reported having an EC plan. Participants were asked to identify the person(s) who would care for their child(ren) in the scenarios presented if an EC program was not available; they could indicate more than 1 choice. The most frequently reported backup caregivers were nonsibling relatives (73.0%, *n* = 224); the second most frequent response was that the child(ren) would stay home alone/provide self-care (24.1%, *n* = 74). Less frequently reported emergency caregivers included babysitters/nannies (18.2%, *n* = 56), neighbors or friends (17.3%, *n* = 53), or older siblings (14.7%, *n* = 45). Fourteen percent (13.7%, *n* = 42) were unable to identify another caregiver if they could not bring their child(ren) to an on-site EC program. Of the 119 who reported having a child 14 years or older, 67.2% (*n* = 80) reported that the teenager would be able and willing to help watch younger children in the on-site hospital-based EC facility if their school/job was closed.

Anticipated EC Needs During a Pandemic or Earthquake

Although having a need for EC impacted worker *decision* to work differently based on scenario, there were no significant differences between workers' anticipated actual EC *needs* during a pandemic versus an earthquake; therefore, data were aggregated for these questions. Of those with at least 1 child (*n* = 307), 28.3% (*n* = 87) of workers reported that they would definitely or probably need EC during a scheduled shift; an additional 12.4% (*n* = 38) said that they were not sure. The need for EC increased significantly when workers were asked if they would need it during an unscheduled work shift (47.2% definitely or probably; 16.0% not sure; χ^2 = 95.4, *P* < 0.001).

Anticipated EC Use During a Pandemic or Earthquake

Workers who indicated that they had at least 1 child (n = 307) were asked whether they anticipated using an on-site hospital-provided EC program during a pandemic or earthquake and during scheduled and unscheduled shifts. Factors significantly associated with anticipated use of on-site EC during a scheduled or unscheduled shift included having a younger child, age of worker (being younger), and race (for pandemic scenario only, black, Asian, or "other") (Tables 2 and 3). In addition, being a clinical worker was associated with a higher likelihood of reporting anticipated use of EC during a scheduled shift, but not during an unscheduled shift (Tables 2 and 3). Nonsignificant variables for anticipated use of an on-site EC program included number of children, having a child with special needs occupation, work setting within the hospital, education level, work status (full time, part time, or as needed), shift worked, previous Incident Command System training, previous participation in hospital disaster drills, and having an EC plan.

There were no significant differences between the percentage of respondents who anticipated using an on-site EC facility/program during a pandemic versus an earthquake; therefore, data were aggregated for these questions. When examining only those who reported having at least 1 child (n = 307), 35.2% (n = 108) reported that they would definitely or probably use EC during a scheduled shift; an additional 15.6% (n = 48) said that they were not sure, for a total use range of 35.2% to 50.8% (Table 4). The anticipated use for on-site EC increased when workers were asked if they would use it during an unscheduled work shift (47.2% definitely or probably; 16.0% not sure; $\chi^2 = 138, P < 0.001$) for a total range of 47.2% to 63.2% use.

Anticipated EC Needs Versus Anticipated Use of On-Site EC Program

Comparisons were made to delineate the anticipated need for on-site EC from anticipated use of such a program. Hospital personnel reported significantly more needs for EC than anticipated use of an on-site EC program for scheduled and unscheduled shifts ($X^2 = 285.0, P < 0.001$, and $X^2 = 415.3, P < 0.001$, respectively). However, among hospital personnel who had at least 1

TABLE 2. Factors Related to Anticipated Use of EC During a Pandemic*

Variable	Unscheduled Shift		Scheduled Shift	
	OR (95% CI)	P	OR (95% CI)	P
Age of youngest child, y				
≤5	11.3 (4.2–30.5)	<0.001	7.1 (2.5–20.7)	<0.001
6–10	11.4 (4.2–30.8)	<0.001	9.9 (3.5–28.2)	<0.001
11–12	4.8 (1.6–15.0)	0.006	7.9 (2.4–25.8)	0.001
Age of worker, y				
≤34	4.5 (1.5–13.4)	0.007	4.4 (1.3–15.5)	0.020
35–44	3.1 (1.0–9.3)	0.042	2.2 (0.64–7.8)	0.205
45–54	2.8 (0.84–9.3)	0.094	3.8 (1.0–14.3)	0.050
Black, Asian, or other	4.0 (1.3–12.1)	0.014	3.6 (1.3–9.8)	0.011

*Controlled for worker sex.
Referent for age of youngest child, 13 to 22 years; age of worker, 55 years or older; race, white or Hispanic.
CI indicates confidence interval; OR, odds ratio.

TABLE 3. Factors Related to Anticipated Use of EC During an Earthquake*

Variable	Unscheduled Shift		Scheduled Shift	
	OR (95% CI)	P	OR (95% CI)	P
Age of youngest child, y				
≤5	7.9 (3.0–20.9)	<0.001	5.3 (1.8–15.6)	.003
6–10	8.8 (3.3–23.8)	<0.001	8.1 (2.8–24.0)	<0.001
11–12	5.6 (1.9–16.5)	0.006	6.1 (1.9–0.0)	0.003
Age of worker, y				
≤34	6.4 (2.1–19.4)	0.001	4.9 (1.4–16.5)	0.011
35–44	3.9 (1.2–11.9)	0.019	2.3 (0.65–7.9)	0.205
45–54	2.9 (0.85–9.8)	0.091	2.5 (0.64–9.3)	0.188
Clinical worker	NIM	NIM	3.6 (1.3–9.8)	0.011

*Controlled for worker sex.
Referent for age of youngest child, 13 to 22 years; age of worker, 55 years or older.
CI indicates confidence interval; NIM, not in the model; OR, odds ratio.

child and reported that they would need EC (n = 87), most (88.5%, n = 77) reported that they anticipate using an on-site EC program. There were no significant differences between anticipated use of an on-site EC program for those who expressed a need for EC and whether it was a scheduled or unscheduled shift.

Anticipated Use of On-Site EC Facility/Program Across Work Shifts

To assess anticipated use of on-site EC during different work shifts, participants were asked how many of their children would likely require the use of on-site EC during each shift. Workers who had at least 1 child (n = 307) indicated that they planned to bring in a mean of 1.9, 1.6, and 1.4 children during day, evening, and night shifts, respectively, for EC during a disaster (Table 4). There were no differences between the expected number of children to be brought in for EC and workers' occupation or shift normally worked.

DISCUSSION

This study's findings reinforce previous research showing that EC needs are a significant barrier to health care personnel's ability to work during disasters.^{1–10} The need for EC is perceived as a larger barrier during a pandemic compared with an earthquake, even though both scenarios used in this study involved a stipulation that schools and daycares were closed. Because this

TABLE 4. Estimated EC Needs

	Expect to Use EC (Range From Probably/Definitely to Unsure/Probably/Definitely)	
	Scheduled Shift	Unscheduled Shift
Staff with responsibility for ≥1 child	35%–51%	47%–63%
Shift	No. Children Expected to Need EC Per Shift	
Day shift	1.9 child per staff who has ≥1 child	
Evening shift	1.6 child per staff who has ≥1 child	
Night shift	1.4 child per staff who has ≥1 child	

study did not assess the exact reasons for this finding, we can only speculate on possible explanations. It is possible that participants assumed that their child(ren) would be ill during a pandemic and they would need to stay home to care for the sick child(ren) or unable to attend an EC program, creating a major barrier to work. It is also possible that health care personnel anticipate daycares and schools more likely to close during a pandemic compared with an earthquake, and this influenced their perception of EC as a higher barrier to work during a biological event compared with a natural disaster, even though both scenarios indicated that schools and daycares were closed. Future research should attempt to better explain this finding because it has important implications for disaster planning and response.

This study found that approximately one third to one half of all hospital-based staff who have at least 1 child expect to use hospital-based EC. In addition, those with children indicated that they expect to need EC for approximately 1.4 to 1.9 children per shift on average, depending on the shift. With 44% of employees surveyed having at least 1 child that averages 62 to 84 children for every 100 workers, it is clear that the need for and intended use of hospital-based EC are substantial. This, in turn, suggests that investing significant resources in a hospital-based EC program is one way to potentially reduce absenteeism. This study found that the anticipated need for childcare increased significantly when personnel were asked to work an unscheduled shift. Allowing staff to work their usual shifts as much as possible may help alleviate some of the burden on a hospital-based EC program. Another option is to allow health care personnel's teenage children to be employed or work as volunteers in the on-site childcare program, as a large percentage of staff with teenagers indicated that their teenaged child would be available and willing to assist in such a program. Although teenagers could not supervise an entire EC program, they could potentially work with adult staff to provide care.

Because hospitals may not be able to meet the full EC needs of staff during a disaster, it is likely beneficial for hospital administrators to find ways to aid staff in identifying other sources of EC, such as encouraging the development of EC plans as part of personal/family disaster planning. Less than a third of the hospital personnel in this study reported having EC plans in place. In addition, a fair number of staff indicated that they had no idea who would care for their children if an EC program was not in place. This represents a real potential barrier to health care personnel working during a disaster, which could be alleviated or at least greatly reduced with preplanning.

An important finding in this study is that workers who reported having a child with special needs, such as the need for specific equipment to assist in eating, breathing, or movement, are more likely to need and use EC compared with personnel who do not have a child with special needs. Thus, either hospital-based EC programs will need to be able to provide care for these children or the hospital can anticipate those parents being largely absent during disasters when daycares and schools are closed. Given previous research that indicates low rates of disaster planning by families with children with special needs, hospitals may benefit by focusing on this group of workers by encouraging personal/family disaster planning.²¹

One surprising finding in this study was that health care personnel were likely to anticipate using hospital-based EC during a pandemic equally as during an earthquake. Given the potential for disease spread in childcare settings during pandemics,⁶ a lower planned use of hospital-based EC during pandemics was anticipated. This finding is even more interesting given that these same hospital personnel reported that the need for childcare during a pandemic would affect their decision to work more than during

an earthquake. These findings underscore the importance of having EC plans for biological events, regardless of whether the childcare is provided on or off site. It is also critical to recognize that hospital personnel may not realize the potential threat of disease spread in childcare settings during biological events or that this possible hazard does not negate their need for EC. It is vital that childcare providers and programs have protocols to assess children for signs and symptoms of communicable diseases, restrict symptomatic children from attendance, and implement infection prevention interventions, such as strict hand hygiene and environmental decontamination, to reduce the risk of disease transmission.²²

The major strengths of this study are that it is the first to assess both anticipated need and use of on-site EC among health care staff during disasters and it examined both biological and natural disaster scenarios. This study benefited from assessing an entire hospital's personnel pool, as opposed to assessing only clinical staff, which increases the study's generalizability. However, this study was conducted in only 1 academic, urban, pediatric hospital in the Midwest and, therefore, may not reflect suburban or rural hospitals or those in other states. It is also possible that there may have been some selection bias in the study, given that staff who are more interested in disaster preparedness more likely responded to the survey than those who were less interested in this topic. Despite these limitations, this study provides critical information for hospital disaster planners in terms of preparing for EC needs of health care personnel.

CONCLUSIONS

Health care personnel report a high anticipated use of hospital-based EC, and this need may outstrip hospital abilities to provide this childcare. This, in turn, may limit hospitals abilities to provide for patient care during disasters. Because planning for EC in advance may help mitigate staff absenteeism, provisions for EC should be an integral part of all hospital disaster plans.

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