Willingness of frontline health care workers to work during a public health emergency

Kirsty Hope et. al., report on the findings of a survey of frontline health staff to determine their perceived willingness to report to work given three public health emergency scenarios.

ABSTRACT

As the effectiveness of a health care response during a disaster depends on an available, skilled and motivated front line health workforce, it is essential to understand and address potential barriers to their participation. We conducted a survey of front line health staff employed in a large regional health workforce in Australia to determine their perceived willingness to report to work during three public health emergency scenarios (weather event, influenza pandemic and bioterrorism event). While willingness to report to work differed by scenario, our research indicated that a similar framework for preparing staff and their families could apply to all disaster scenarios. To ensure that frontline health staff will report to work when they are most needed, response plans should ensure personal confidence in their defined role, emphasising the value of their role and addressing their family concerns.

Introduction

When a disaster occurs, those who provide health care are subject to the same challenges as others in the affected area; they may be injured, lose family members, suffer significant damage to their property or experience significant emotional issues. Disasters often result in additional health service challenges, placing increased demands on health workers. These may include longer hours, deployment in other locations or functions, and dealing with personal loss, confusion or grief.

Health care workers must be prepared to deal with a range of disasters, including natural disasters, infectious disease outbreaks or even bioterrorism-related events. If physically able to attend work, some health workers may not be willing to report due to illness of dependents, fear, or closure of childcare facilities and schools.

A recent survey in Australia concerning an influenza pandemic situation found that 83% of health workers surveyed were prepared to report to work if a patient in their ward/department had an influenza-like illness (Seale 2009). This is consistent with surveys of health care workers in Singapore, Japan and Canada following SARS, in which many health workers acknowledged that the risks associated with SARS were part of their work, although high levels of fear and anxiety were identified across all occupational groups (Campbell 2006, Imai 2005, Koh 2005). A survey of paramedics also performed in Australia found that not all paramedics were willing to report to work during disasters. Concerns identified included health and safety, communication issues, the need for accurate and timely information, and suitable training (Smith 2007).

Courtesy: NSW Nurses Association

It is essential to address potential barriers to healthcare workers' participation in health emergencies.

While several studies focusing on willingness to report to work during public health disaster have been conducted in the United States (Balicer 2006, Barnett 2005, Chaffee 2009, Barnett 2009), their results may not be relevant to the Australia context. Reasons for the differences include the following: (1) different health care systems in the United States and Australia, (2) many of the US surveys focused on government public health workers, not frontline hospital staff, (3) different public health and healthcare professional culture in the United States and Australia, and (4) a differing

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perception and reality of the types of disasters or threats which may occur in Australia compared to the United States. We therefore conducted a survey of front line health staff in a large regional health workforce in Australia to determine their perceived willingness to report to work during three public health emergency scenarios (weather event, influenza pandemic and bioterrorism event).

Method

A cross sectional survey of Hunter New England Area Health Service (HNEAHS) employees defined as front line health staff for responding during a large scale public health disaster was conducted between 1 November 2007 and 30 January 2008. HNEAHS in Northern NSW covers both rural and metropolitan areas, with approximately 14,500 staff providing health care for approximately 840,000 people.

Front line health staff were defined as: hospital staff, selected community health staff (nurses, social workers, early childhood nurses, Aboriginal health workers and migrant interpreter services), all mental health staff and all pathology staff. In addition staff were only eligible for inclusion in the study if they were classified as full-time or permanent and thus had a contact number and payroll location. All staff meeting the inclusion criteria were identified in the HNEAHS human resource database.

A simple random sample of 1600 employees was selected using SAS version 9.1 (SAS institute Inc. Carey, NC, USA). Allowing for an expected response rate of 50% this number would allow precise estimation of outcomes of interest (i.e. 95% confidence intervals for proportions within ± 4%). It would also allow detection of difference in characteristics between those who were and were not willing to report to work of 10% for binary variables and 0.2 standard deviations for continuous variables, with a significance level of 5% and 80% power.

Survey content

The public health infrastructure survey tool designed by the Johns Hopkins School of Public Health's Center for Public Health Preparedness and used in the US context (Balicer 2006) was adapted for the Australian health context. Pre-survey interviews were conducted with 25 staff meeting the inclusion criteria to ensure survey content was appropriate for the Australian environment. The survey tool was amended accordingly, including terminology changes; two questions were added to all three scenarios: willingness to work in a different location, and confidence in working in a different location; and two questions were added to the influenza pandemic scenario: awareness of appropriate infection control measures and access to vaccine would improve confidence. The survey included questions on personal characteristics, such as professional classification, gender, age and clinical status. The respondents were required to use a 10-point scale from 1 (agree) to 10 (disagree) when responding to questions.

Survey delivery

A Computer Assisted Telephone Interviewing (CATI) system was used to contact randomly selected individuals. Employees were telephonically provided with a short background to the study and offered the choice of declining to participate, filling out the survey on-line or by email using a PDF version, or a paper version by fax or internal mail. If there was no contact with the employee at the first telephone call, up to six call-backs were made. Participants were excluded if they had resigned, were on long service leave, maternity leave or extended sick leave, if they were on secondment outside the health department or if they had relocated and their whereabouts were unknown. Participants received a follow-up telephone call or email if they had not returned the survey within three weeks. Ethics approval for the study was obtained from the Hunter New England Human Research ethics Committee.

Statistical methods

The data was cleaned and quality checked using SAS, version 9.1 (SAS Institute, Carry, NC, USA). Questions about scenario-related attitudes and beliefs were dichotomised into those who definitely agreed (1, 2 and 3) and others (4-10). The proportion of individuals willing to report to work for each scenario was determined with 95% confidence intervals. For each scenario these proportions were compared across standard socio-demographic variables and attitudes / beliefs using chi square tests. Multivariable logistic regression was used to explore the association between socio-demographic variables, attitudes/beliefs and willingness to report to work, with variables included in the initial model if their p value was less than 0.2 in univariable analysis.
A backward stepwise model was employed for removing variables with a p-value less than 0.1 on the likelihood ratio test. The Hosmer-Lemeshow test was used to assess the fit of the final models (Hosmer 2000).

Results

Response rate

Of the 14,000 HNEAHS employees 8,905 met the inclusion criteria for front line health workers during a public health emergency, and 1600 were randomly selected to participate in the survey. Two hundred and eighty seven were ineligible due to maternity leave (n=54,19%), long service leave (n=44,15%), annual leave (n=54,19%), extended sick leave (n=15, 5%), resignation (n=32, 11%), relocation/secondment (n=6, 2%), whereabouts unknown (n=42, 14%), uncontactable (n=32, 11%), changed work status to casual (n=6, 2%) and other leave (n=2, 1%). Of the 1313 eligible to participate, 868 (66%) returned completed questionnaires, 112 declined participation and 333 failed to return their questionnaire. The sample completing the questionnaire were from similar locations and settings as those not responding (Table 1) but there was a slightly higher proportion of patient support / administration staff and a slightly lower proportion of hospital support staff among those completing the questionnaire compared to those who did not.

Willingness to respond if required differed by emergency scenario; 78% (95%CI 75%-81%) of participants indicated they would be willing to report to work during a weather related event compared to 67% (95% CI 64%-70%) during an influenza pandemic and 52% (95%CI 48%-55%) during a bioterrorism event. Willingness to report to work did not differ significantly by clinical status or professional classification, however rural participants were more likely than urban participants to indicate a willingness to report to work during a weather related or a bioterrorism event as shown in Table 2. Participants who worked in a community health facility were more likely to indicate a willingness to report to work during a influenza pandemic scenario.

TABLE 1. Demographic characteristics of Hunter New England Area Health front line disaster response staff who did and did not respond to the survey, 2008.

Characteristic	Respondents n =868 n (%)	Non-respondents n=445 n (%)	Chi squared	df	p value#
Professional Classification					
Doctor	46 (5%)	36 (8%)			
Nurse	438 (50%)	227 (51%)			
Allied Health	72 (8%)	26 (6%)			
Administration/Clerk	155 (18%)	51 (11%)			
Pathology/Technical	90 (10%)	46 (10%)			
Hospital Support Services*	67 (8%)	59 (13%)	23.13	5	<0.01
Location					
Rural	452 (52%)	222 (50%)			
Urban	416 (48%)	223 (50%)	0.56	1	0.45
Facility Setting					
Acute	406 (47%)	218 (49%)			
Community	462 (53%)	227 (51%)	0.58	1	0.45

* including catering services, linen services

Multivariable analysis indicated that those factors associated with a respondent's willingness to report to work differed for the three scenarios. The three variables significantly associated with higher odds of willingness to report to work during all three scenarios were: perceived confidence in own skills, likelihood of being asked to respond and family preparedness (Table 3).

For a weather-related event, additional significant variables were working in a rural location, ability to communicate with public, confidence in personal safety while at work and confidence in ability to perform duties. For an influenza pandemic, additional significant variables were perceived likelihood of the event occurring in the region, confidence in being able to safely get to work, confidence in being able to work in a different location, ability to communicate with the public, confidence in the Area Health Service preparedness and access to vaccine would improve confidence. The final model for a bioterrorism event also included full-time work load, confidence in being able to safely get to work, confidence in personal safety while at work, confidence in ability to work in a different location, and ability to communicate with the public (Table 3).

On the basis of the Hosmer-Lemeshow goodness of fit test the final models for each scenario fitted the data well (weather event: x^2=7.54, df=8, p=0.48, influenza pandemic: x^2=6.29, df=8, p=0.61 and bioterrorism event: x^2=6.90, df=8, p=0.55).

Discussion

Willingness to report to work differed by scenario. A higher proportion of staff indicated willingness to report to work for a weather-related disaster than for other disasters. Previous studies, including an Australian study of paramedics, also found that willingness to present to work was greatest for conventional disasters, such as weather related events, and lowest for non-conventional disasters, such as those caused by infectious diseases (Qureshi 2005, Smith 2009). This may relate to familiarity, with most local health workers having some experience of working during a local natural disaster in the recent past (Cretikos 2007).

Frontline health workers were less willing to report to work if they reported a lack of confidence in their skills, lack of family preparedness or indicated a belief that their role may not be important. Staff confidence in their ability to perform their role and staff perception of likelihood of being asked to respond appear to be pivotal factors in their willingness to respond, requiring not only a clear role delineation but ideally prior opportunities to perform this role. Field or desktop exercises may assist in increasing familiarity with an individual's roles during a response to a disaster (Collander 2008, Johns Hopkins University Evidence-based Practice Centre 2004).

Family preparedness has been a missing element in most disaster plans. Many health workers have other people to consider when making the decision to report to work (Dalton 2008). Staff need to be equipped with the skills to discuss such events with their family members, develop their own family plan and also be assured of reliable communication links and the welfare of family (Barnett 2005, Qureshi 2002, Chaffee 2009). During SARS, many family members of health workers working at affected hospitals were discriminated against in the community (Koh 2005, Campbell 2006). Communication plans need to address these broad family issues.

Previously-identified barriers to participation in responding to a disaster include transport problems, care for children, elderly or pets, lack of knowledge concerning risk and responders role, and fear or concern for family and self (Smith 2007, Cretikos 2007, Ehrenstein 2006). Where available, provision of appropriate vaccinations or antivirals and effective communication are important strategies for improving participation of health workforce during an influenza pandemic (Cretikos 2007).

A previous study of local public health workers from four health regions in the United States found that "concerned and confident" workers – i.e., those with a sense of threat, coupled with a sense of efficacy toward responding to that threat – had the highest rates of willingness to respond to an influenza pandemic (Barnett 2009). Our study found similar findings, with those believing an influenza pandemic was likely in the region having higher odds of reporting to work (OR2.8 95%CI 1.8-4.4). Our study also found similar scenario-specific trends, with a terrorism event producing the lowest willingness to respond.

While willingness to report to work differed by scenario, our research indicated that a similar framework for preparing staff and their families could apply across disaster scenarios. When developing disaster response plans, health authorities should consider the following six areas: 1) determine roles and type of staff required, 2) accurately determine likely threats to staff and their families resulting from fulfilling their role (predict concerns), 3) provide basic education on disaster response, the threat of different types of disasters and the roles staff may be asked to fulfil (do not assume health workers know their role), 4) develop strategies to ensure staff confidence in their role and to mitigate risk in the workplace, 5) develop strategies to assure staff members of the importance of their role and to assist them to assist their families to function during a disaster, and 6) develop strategies to maintain knowledge and engagement of health workforce. Similar strategies have been proposed in the United States focusing on role education and role importance (Barnett 2009).

While this study is limited by its cross sectional design, the results provide a starting point to engage health workers in the response planning process. The information gathered will guide planning activities. As is common with similar study designs, results reflect respondents' intentions rather than actual responses but do provide a baseline against which actual responses should be measured following the occurrence of a public health emergency. This will be of particular interest after the widespread introduction of pandemic H1N109 influenza in Australia.

TABLE 2. Demographic characteristics, attitudes and belief associations with willingness to report to work if required during each emergency scenario, HNEAHS, 2008.

	Weather-related event		Influenza pandemic		Bioterrorism event	
	n (%)[@]	p-value[#]	n (%)[@]	p-value[#]	n (%)[@]	p-value[#]
Clinical Status						
Clinical	423 (78%)		361 (66%)		277 (51%)	
Non-clinical	236 (78%)	0.93	202 (68%)	0.67	153 (52%)	0.96
Professional Classification						
Doctor	33 (79%)		29 (67%)		29 (67%)	
Nurse	324 (77%)		275 (65%)		207 (50%)	
Allied Health	71 (86%)		59 (69%)		42 (49%)	
Hospital Support	75 (84%)		59 (63%)		44 (48%)	
Administration / Clerk	87 (73%)		79 (66%)		59 (50%)	
Pathology / technician	75 (85%)	0.25	69 (79%)	0.20	53 (62%)	0.11
Gender						
Male	152 (81%)		126 (67%)		111 (60%)	
Female	512 (77%)	0.24	442 (67%)	0.89	320 (49%)	0.01
Work Load						
Full time	425 (79%)		372 (69%)		300 (57%)	
Part Time	234 (76%)	0.23	195 (63%)	0.08	132 (43%)	0.13
Age (years)						
20-29	55 (73%)		44 (59%)		40 (54%)	
30-39	111 (73%)		91 (59%)		60 (40%)	
40-49	231 (76%)		195 (65%)		146 (49%)	
50-59	223 (82%)		198 (73%)		153 (58%)	
>60	48 (84%)	0.14	44 (79%)	0.01	34 (62%)	<0.01
Dependents						
Yes	359 (77%)		306 (66%)		226 (49%)	
No	300 (79%)	0.59	260(69%)	0.39	203 (55%)	0.10
Location Type						
Urban	297 (72%)		264 (64%)		194 (48%)	
Rural	371 (83%)	<0.01	309 (69%)	0.13	241 (55%)	0.05
Facility type						
Acute	301 (77%)		224 (62%)		192 (49%)	
Community	367 (79%)	0.42	329 (71%)	<0.01	243 (54%)	0.17

TABLE 2. Cont...

	Weather-related event		Influenza pandemic		Bioterrorism event	
	n (%)[@]	p-value[#]	n (%)[@]	p-value[#]	n (%)[@]	p-value[#]
Attitudes / Beliefs						
Likelihood of event occurring in region	492 (81%)	<0.01	253 (81%)	<0.01	35 (53%)	0.81
Public health consequence would be severe if occurred	387 (83%)	<0.01	510 (71%)	<0.01	356 (56%)	<0.01
Likelihood of being asked to report	357 (89%)	<0.01	365 (64%)	<0.01	245 (56%)	<0.01
Previous training	85 (80%)	0.58	88 (72%)	0.24	19 (48%)	0.60
Knowledge of public health impact	184 (87%)	<0.01	209 (75%)	<0.01	69 (66%)	<0.01
Confidence in area health service preparedness	228 (87%)	<0.01	196 (89%)	<0.01	45 (73%)	<0.01
Mentally prepared	419 (90%)	<0.01	317 (88%)	<0.01	139 (85%)	<0.01
Knowledge of role	212 (89%)	<0.01	179 (84%)	<0.01	79 (77%)	<0.01
Confidence in skills	510 (89%)	<0.01	399 (83%)	<0.01	230 (79%)	<0.01
Confidence safe to work	251 (92%)	<0.01	446 (80%)	<0.01	258 (78%)	<0.01
Confident will be safe while at work	391 (92%)	<0.01	276 (89%)	<0.01	132 (86%)	<0.01
Confident to perform duties	463 (90%)	<0.01	328 (82%)	<0.01	190 (82%)	<0.01
Family prepared to function in their absence	363 (93%)	<0.01	342 (87%)	<0.01	219 (80%)	<0.01
Discussed with family the possibility of working	214 (90%)	<0.01	130 (23%)	<0.01	53 (12%)	<0.01
Confident to work in a different location	337 (89%)	<0.01	306 (88%)	<0.01	214 (85%)	<0.01
Able to communicate with the public	216 (92%)	<0.01	165 (80%)	<0.01	40 (67%)	0.02
Importance of role in response	242 (87%)	<0.01	280 (81%)	<0.01	165 (68%)	<0.01
Successful performance of role is important	345 (85%)	<0.01	317 (76%)	<0.01	188 (63%)	<0.01
Awareness of infection control procedures			373 (76%)	<0.01		
Access to a vaccine will improve confidence			381 (93%)	<0.01		

*total numbers differ slightly due to missing data

[@] number and % willing to report to work

[#] p values for chisquare test

TABLE 3. Multivariate final models for front line health workers' willingness to report to work if required during a weather related, influenza pandemic and bioterrorism emergency scenario, HNEAHS, 2008.[£]

	Weather-related event model		Influenza pandemic model		Bioterrorism event model	
	OR*	**95%CI**	**OR***	**95%CI**	**OR***	**95%CI**
Work Location						
Urban	1.0					
Rural	2.1	1.4-3.3†				
Work Load						
Full time					1.6	1.0-2.3†
Part time					1.0	
Confident in their own skills						
Yes	3.0	2.0-4.8††	1.9	1.2-3.0†	2.5	1.6-3.8††
No	1.0		1.0		1.0	
Family prepared to function during their absence						
Yes	4.0	2.4-6.7††	2.5	1.6-4.0††	3.2	2.0-5.1††
No	1.0		1.0		1.0	
Likelihood of event occurring in the region						
Yes			2.8	1.8-4.4††		
No			1.0			
Confident that can safely get to work						
Yes			3.3	1.5-3.6††	2.8	1.9-4.3††
No			1.0		1.0	
Confident to work in different location						
Yes			2.1	1.3-3.5†	4.8	2.9-7.9††
No			1.0		1.0	
Confidence in personal safety while at work						
Yes	2.6	1.5-4.4†			3.1	1.6-6.0††
No	1.0				1.0	
Communicate with public						
Yes	1.9	1.0-3.5†	0.5	0.3-0.9†	0.3	0.1-0.7†
No	1.0		1.0		1.0	
Likelihood of being asked to respond						
Yes	2.7	1.7-4.3†	2.5	1.6-3.9††	3.4	2.3-5.1††
No	1.0		1.0		1.0	
Confident to perform duties required						
Yes	1.8	1.1-3.0††				
No	1.0					

TABLE 3. Cont...

	Weather-related event model		Influenza pandemic model		Bioterrorism event model	
	OR*	**95%CI**	**OR***	**95%CI**	**OR***	**95%CI**
Confidence in the Area Health Service's preparedness						
Yes			2.7	1.5-4.9†		
No			1.0			
Access to vaccine will improve confidence**						
Yes			8.2	4.9-13.7††		
No			1.0			
Discussed with family						
Yes					0.4	0.2-0.8†
No					1.0	

[£] Table only displays data for significant variables in the final model for each scenario

* Adjusted for professional classification, age and gender.

** Access to a vaccine will improve confidence" was only asked for the influenza pandemic scenario.

[†] p<0.05 †† p<0.001

Conclusion

Health workers may be required to work during a number of different disasters scenarios. To ensure they will report to work when they are most needed, response plans need to ensure personal confidence of frontline health staff in their defined role, emphasise the value of their role and address their family concerns.

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