Senior clinical nurses effectively contribute to the pandemic influenza public health response

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KEY WORDS

Influenza pandemic, public health surge workforce, biopreparedness, public health emergencies

ABSTRACT

Objective
To describe the experience of engaging senior clinical nurses as surge staff in a pandemic public health response and determine the effect of an on-line training package and exercise participation on these individuals' perceptions and confidence of being deployed during an influenza pandemic.

Design
After action reviews, end of exercise surveys, and pre- and post-training risk perceptions questionnaire completion.

Setting
The study was conducted within the operational aspects of a public health exercise response to an influenza pandemic.

Subjects
Clinical nurse consultants, nurse educators and nurse managers sourced from areas defined as not clinically critical during the early containment phase of an influenza pandemic response.

Interventions
Four hour on-line training package and a four day influenza pandemic exercise.

Main outcome measures
Expert observation and self-perceived appropriateness of surge staff and measured changes in risk perception.

Results
Observers' comments and after action reviews indicated that by the end of the deployment, day surge staff were able to perform public health surveillance functions competently. The end of day survey showed that the on-line training package served as a useful reference document but alone was an inadequate means of equipping staff for deployment. Exercise pre- and post-perceptions surveys found that self-perceived knowledge and confidence in performing duties increased following the exercise from 46% to 93% ($p<0.01$) and from 46% to 90% ($p<0.01$), respectively.

Conclusion
Clinical nurse consultants, nurse educators and nurse managers working within a health authority are an appropriate surge workforce during public health emergencies if provided with appropriate training and support.

INTRODUCTION / RATIONALE

Nurses are an essential component of the Australian health care system (ANF 2005). During public health emergencies, such as an influenza pandemic, traditionally the focus has been on the nurse's clinical role, however large-scale and sustained public health emergencies require surge public health surveillance staff to ensure an effective and efficient response.

Public health surveillance during a pandemic involves: case ascertainment, case management (but not clinical management), infection control, contact tracing, monitoring cases and contacts in home quarantine, education of community and health staff and communication with a variety of people and organisations. Public health case management may involve liaising with clinicians concerning the case, clinical presentation and management, ensuring appropriate specimens have been collected, following up test results, provision of prophylaxis or treatment if not in hospital and monitoring of cases progress (Eastwood 2006). There are no clear guidelines on who should be utilised as public health surveillance surge capacity during a public health emergency and how they should be trained.

In the United States of America, epidemiology and public health students have been identified as a potential surge workforce for public health emergencies (Gebbie 2007). However, in Australia senior registered nurses may be a more appropriate surge workforce. According to the Australian Nursing and Midwifery Council (ANMC) a competent registered nurse works within four domains: professional practice, critical thinking and analysis, provision and coordination of care and collaborative and therapeutic practice (ANMC 2006). Therefore senior registered nurses use evidence for practice, take responsibility for complex situations, show leadership in clinical and professional settings, contribute to effective team work, and focus on improving the health of individuals and groups (ANF 2005). Thus, theoretically this group have many of the characteristics required for effective public health surveillance.

While the H1N1 pandemic of 2009 was milder than anticipated, public health systems were still required to surge to cope with the number of suspected pandemic cases and contacts involved and to maintain an effective response over the protracted 'Contain' phase (Bishop 2009). Health system surge capacity is traditionally described in terms of expansion of beds, triage space, personnel and supplies (Joint Commission on Accreditation of Healthcare Organizations 2003; Phillips and Knebel 2006).

Surge capacity also refers to a health care system's ability to rapidly expand to meet the increased demand for adequately qualified clinical and public health practitioners in the event of bioterrorism or other large-scale public health emergencies or disasters (Agency for Healthcare Research and Quality 2005). Public health surge capacity has been described as the capacity to implement core public health activities (Koh et al 2006). Activities during a public health emergency include: liaising with treating clinicians about suspected and confirmed cases; confirming that suspected cases meet a case definition and determining their likely source of infection and contacts potentially placed at risk during their infectious period, advising on case isolation, quarantining of contacts, and initiating other appropriate public health action to mitigate further transmission (HNEPH 2007). Making the shift from individual and clinically-based disaster care to population-based care may prove a major challenge during public health infectious pandemics (Burkle 2006).

Success of public health surge staff depends on the adequacy of their pre-deployment training and intra-deployment support. Polivka et al (2008) identified twenty-five competencies for public health nurses using a three-round Delphi survey process. These included competence in recognising unusual events; understanding the incident command system, epidemiology, disease investigation, and surveillance; ability to mass dispense; and effective risk communication.

American and Australian data indicate staff who both perceive a threat but are confident in their role will report to work during an influenza pandemic and are willing to respond (Barnett et al 2009, Hope et al 2010, Qureshi et al 2002, Qureshi et al 2005).

At the end of 2008, before the 2009 pandemic, a field exercise was conducted over four days in a regional area of NSW that included presentation of suspected pandemic cases at 36 emergency departments, with 170 contacts identified. Fifty four senior nurses were deployed from their usual roles and rotated through operational public health surveillance pods/teams over the four days of the exercise. The exercise aimed to test: 1) the capacity of the regional area's EDs to identify a person with suspected pandemic Influenza, triage appropriately and complete case management; 2) the use of surge workforce in the Public Health Unit and the processes to engage, roster, and support the identified surge staff; and 3) the use of an on-line training package to prepare surge staff for the various roles.

The study / study aims

The aim of the evaluation was to determine the appropriateness of engaging advanced nurses as public health surge staff and determine whether the training package and exercise participation changed people's perceptions and confidence towards working during an influenza pandemic.

METHODS

On-line training package

An on-line training package was developed to provide information concerning an influenza pandemic, the attendant community, and individual threat posed and the role the advanced nurses may be asked to play. The package consisted of 13 modules including: an introduction to pandemic influenza; what is happening to prevent or control pandemic influenza; stress; infection control; surveillance; pandemic influenza case ascertainment; case management - hospitalisation, treatment and home quarantine; contact assessment and contact management - applying home quarantine and how to arrange for antiviral delivery. The package took approximately four hours to complete and could be accessed via the internet or was available on CD.

Evaluation

The evaluation consisted of three components:

1) Evaluators comments to gauge appropriateness of advanced nurses as public health surge personnel. Evaluators were required to provide observations in four domains: team work, communication, documents / materials and decision making (Center for Health Policy 2007);

2) Self-completed pre- and post-perceptions surveys completed by deployed staff to determine changes in personal risk perceptions following training and participation in exercise. The health worker public health emergency risk perceptions survey has been previously used in Australia (Hope et al 2010) and was adapted for this evaluation. The survey tool was originally designed by the Johns Hopkins School of Public Health's Centre for Public Health Preparedness (Balicer et al 2006). The survey included questions on knowledge, confidence, preparedness and willingness to work during an influenza pandemic. The respondents were required to use a 10-point scale from one (agree) to ten (disagree) when responding to questions. The post exercise survey also included two additional questions: Since participating in the field exercise how have you had the opportunity to utilise the skills and knowledge gained: a) during your normal duties; and b) with family and friends; and

3) End of day exercise participant survey to determine usefulness of on-line training package. This survey, developed by the exercise evaluation team, consisted of six rating questions covering the usefulness of the on-line training package, value of information provided before participation, usefulness of material provided during the exercise and level of support provided. The respondents were required to use a 10-point scale from one (poor) to ten (excellent) when responding to questions. Four additional open

ended questions were included to provide opportunities for unstructured feedback on the exercise, the pre-exercise engagement process, on-line training package and the support provided during the exercise deployment.

Statistical Analysis

The data were cleaned and quality assured using SAS software®, version 9.1 (SAS Institute, 2004). The perceptions survey questions relating to personal confidence, knowledge and willingness to work were dichotomised into those who definitely agreed (1, 2 and 3) and others (4-10). As individuals who completed the pre- and post-perception surveys could not be identified due to prior agreement, it was not possible to compare individuals' responses, but descriptive statistics were utilised for comparison purposes. Comparison of proportions was undertaken using the chi squared statistic and a significance level of 5%. For the exercise participant survey quantitative questions were dichotomised into those who ranked the response as agreed (8, 9 and 10) and other (1-7). Qualitative thematic analysis was conducted by coding responses and then assigning higher order themes as appropriate.

FINDINGS

Appropriateness of senior registered nurses as public health surge staff

The after action reviews and evaluators noted that at the beginning of the deployment period surge staff were reliant on experienced public health team leaders, but as the day progressed they began competently taking responsibility for activities and functioning independently. Surge staff indicated that if they had continuing responsibilities from their usual positions that this added stress and may have negatively affected their functioning.

Training

Eighty seven percent (47/54) of the deployed surge exercise participants completed an end of day questionnaire. Participants indicated that the exercise was a positive experience and that they would be willing to perform these functions during a pandemic (table 1). Access to pre-exercise on-line training was helpful; however it was recommended that improved role definition, possibly supported by role playing, and would be helpful. Many reported limited available time to complete the package prior to deployment due to their existing job responsibilities. Job action sheets, response plans and case and contact forms proved difficult for surge staff; however they reported that support provided by team leaders assisted in making the experience a positive one.

Table 1: End of day surge staff survey results, HNEAHS, 2008.

Question	Agreement n(%)
The training provided prior to the exercise was valuable	12 (26%)
Was given adequate emotional support during the exercise to fulfil role	36 (77%)
Was given adequate technical support during exercise to fulfil role	30 (64%)
The materials provided were adequate during exercise to fulfil role	31 (66%)
Required role during the exercise was clear	21 (46%)
Willing to work in the future if required	36 (78%)

Risk perceptions

Ninety three percent (56/60) of deployed surge staff completed the pre-exercise perceptions survey. Of the 60 surge staff participating in the exercise (including staff on standby roster) 52% completed the post-exercise perceptions survey. Not all identified operational surge staff were available for the exercise due to annual leave, sick leave or urgent work commitments.

Perceived knowledge and familiarity with pandemic influenza increased following the exercise from 46% to 93% (p value <0.01), as did participants' self-reported ability to communicate with the public concerning an influenza pandemic (from 30% to 86%; p<0.01) (table 2). Confidence to perform duties and to work safely in their new environment also increased (from 46% to 90%; p<0.01 and from 36% to 86% p<0.01, respectively). Specific themes that emerged from the open ended responses included open discussion with family and work colleagues and a valuable learning experience.

Table 2: Public health surge staff pre- and post-influenza pandemic risk perception survey results, HNEAHS 2008.

Agreement	pre n(%)	post n (%)	x^2	p value
Pandemic likely to occur in the future	29 (48)	23 (77)	6.97	<0.01
Knowledge of public health impact	27 (46)	28 (93)	19.1	<0.01
Confident in the area health service's preparedness for an influenza pandemic	19 (31)	24 (80)	19.27	<0.01
Mentally prepared to respond to an influenza pandemic	25 (41)	24 (80)	12.32	<0.01
Knowledge of role during an influenza pandemic	7 (12)	30 (100)	64.48	<0.01
Confidence in skills	28 (46)	26 (87)	13.84	<0.01
Awareness of infection control	31 (51)	28 (93)	15.92	<0.01
Confident in safety while at work	21 (36)	25 (83)	18.15	<0.01
Confidence to perform public health duties	28 (46)	26 (90)	15.60	<0.01
Confidence to undertake case management	23 (38)	24(83)	16.00	<0.01
Confidence to undertake contact tracing	29 (48)	28 (93)	17.98	<0.01
Family prepared to function while respondent is at work during an influenza pandemic	25 (42)	24 (80)	11.83	<0.01
Discussed working during a influenza pandemic with family	13 (22)	23 (77)	24.60	<0.01
Able to communicate with public concerning an influenza pandemic	18 (30)	25 (86)	25.30	<0.01
Importance of role to the overall response	33 (56)	28(97)	15.05	<0.01
Willing to respond to future pandemic	28 (47)	23 (82)	9.42	<0.01

DISCUSSION

The workload in public health agencies during a pandemic is considerable and requires additional investment if the novel surge challenges are to be effectively met. The field exercise demonstrated to participants and expert observers that senior nurses were able to rapidly build on their existing skill base to function effectively in providing public health surveillance functions under the leadership of public health experts.

Senior nurses are already experts in their field, and are thus able to rapidly prioritise tasks. While the nurses were placed in an unfamiliar work environment, their existing daily skills i.e. communicating with patients and families, undertaking assessments, decision making based on findings, dealing with medication and working in stressful environments, appeared to prepare them well for the deployment (Brenner 1984). The skills and confidence developed during the exercise were demonstrated during the 2009 first wave of the influenza A H1N1 (pH1N1) pandemic response when the same Clinical Nurse Consultants, Nurse Educators and Nurse Managers performed as the public health surge workforce.

While finding the appropriate surge staff is the first step, they must be engaged and trained appropriately to ensure they are willing to report to work (Barnett et al 2005). A constraint disclosed by surge staff during the exercise were existing deadlines and responsibilities related to their substantive jobs. This demonstrates the importance of engaging their existing line managers to ensure reallocation of these responsibilities during public health surge deployment to avoid unnecessary additional stress.

While senior nurses may be asked to respond during an influenza pandemic, they also must be willing and able to report to work. For many, while they have the underlying skills needed, they are not experts in the area of communicable disease, reducing their confidence to deal with the situation. Research concerning the willingness to report to work indicates about 16% of public health employees are not willing to report to work during an influenza pandemic in the United States of America (Barnett et al 2009) and 33% of front line health workers would not report to work in a similar study in Australia because of perceived increased risk to themselves or their families (Hope et al 2010).

The field exercise appeared to change specific surge staff perceptions towards working during an influenza pandemic. A previous study on the willingness of health workers to report to work during an influenza pandemic indicated that factors influencing reporting to work were: family preparedness, confidence in skills required, confidence to work in a different area knowledge or role, likelihood of event, the health services preparedness, and confidence in communicating with the public on the topic. By providing background information and then putting that training into action during an exercise, surge staff learnt about an influenza pandemic and some of its potential consequences. In addition they had the opportunity to work with people they would later work with during the pandemic response, they were able to actively carryout their role and practice communicating with people concerning an influenza pandemic. The evaluation also indicated many discussed the exercise and what might occur if a pandemic emerged with family and colleagues.

A previous review was inconclusive on the role of training interventions for health care workers in improving their knowledge and skills in disaster response (Williams et al 2008). The field exercise used in this study has shown that providing training and then putting the training into action is an appropriate strategy. While the training package requires some alteration it served as a good reference for the surge staff involved, but by itself appeared inadequate to effectively train surge staff alone.

Limitations

This study focused on the operational aspects of a public health containment response to an influenza pandemic only. While this study focused on deployment of senior nurses as operational public health surge personnel it is likely that other professionals could also be utilised such as allied health professionals, environmental health officers, and possibly even health students. The deployment of environmental health officers was confirmed during the recent pandemic response.

While this study provides some evidence that background information and exercises do assist in preparing staff to work during an influenza pandemic, the study was limited by small sample size, the response rate to the post-exercise survey and the inability to match individual changes in perceptions.

CONCLUSION

Exercise deployment and evaluation confirmed that advanced nurses, such as clinical nurse consultants, nurse educators and nurse managers, working within a health authority are an appropriate surge workforce during public health emergencies. With appropriate support and training, advanced nurses can quickly develop the necessary skills to function during public health emergencies, including the containment response to pandemic influenza. Consideration needs to be given to reallocating senior nurses' other responsibilities during deployment to limit unnecessary additional stress.

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