Disaster Health Management: Do Pharmacists Fit in The Team?

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Abbreviations

CPR - Cardio Pulmonary Resuscitation

DMATs - disaster medical assistance teams

EDs - emergency departments

FIP - International Pharmaceutical Federation

NCD’s - non-communicable diseases

PPRR - prevention/mitigation, preparedness, response, and recovery

US - United States

WADEM - World Association for Disaster and Emergency Medicine

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Abstract

Background: In addition to the traditional logistics role, pharmacists are undertaking important new roles in disasters. Despite this, little is known about the level of acceptance of these activities by other providers.

Problem: To determine the international opinion of disaster and health professionals regarding the emerging roles of pharmacists in disasters.

Methods: Delegates at the World Association for Disaster and Emergency Medicine (WADEM) 20th Congress in April 2017, in Toronto, Canada were invited to complete an anonymous survey posing eight questions regarding attitudes to pharmacists' roles in disasters. Quantitative data were analysed using IBM® SPSS® statistical software version 23 and qualitative data were manually coded.

Results: Of the 222 surveys handed out, 126 surveys were completed yielding a 56.8% response rate. Of the respondents, 96.8% (122/126) believed pharmacists had a role in disasters additional to logistics. Out of 11 potential roles pharmacists could perform in a disaster, provided on a 5-point Likert scale, eight roles were given a rating of 'Agree' or 'Strongly Agree' by 72.4% or more of the participants. Lack of understanding of a pharmacist's roles and capabilities was the highest described barrier to pharmacists' roles in disaster management.

Conclusions: This multidisciplinary disaster health 'community' agreed pharmacists have roles in disasters in addition to the established role in supply chain logistics. Participants accepted that pharmacists could possibly undertake numerous clinical roles in a disaster. Several barriers were identified that may be preventing pharmacists from being further included in disaster health management planning and response.

Introduction

As a result of climate change, weather-related natural disasters are increasing in frequency and severity.[1-8] Disaster risk reduction is now recognised as a global priority. In total, 187 countries recently signed the Sendai Framework for Disaster Risk Reduction by 2030, in testament to the recognition of this global priority.[9] The aim of the Sendai framework is to reduce the impact of disasters on loss of life, health and livelihood within communities and countries.[10] To achieve this, there needs to be a reduction in the vulnerability; the most effective way of attaining this is by employing prevention measures.[11] To counteract the vulnerability of communities due to the ageing population and the increase in chronic disease prevalence,[12] communities can build resilience to decrease the impact of disasters. Prevention measures in terms of mitigating the health impacts of disasters can be vaccinations and educating the members of communities on how to prepare their health for a potential disaster[13] – especially those with chronic diseases requiring medications.

Following disasters, one of the leading causes of death is the lack of access to everyday health care.[14] In acknowledgement of this, the Sendai Framework calls for healthcare services to become more resilient to ensure the provision of basic life-saving services continue during and after a disaster.[10] However, with the limited resources available in times of crises, it is vital to attend to not only the high-acuity patients, but also to the disproportionately large number of low-acuity patients adversely affected.[13] Vulnerable groups are known to be at increased risk of experiencing adverse health outcomes during a disaster. These individuals include the elderly, the very young, individuals with reduced mobility; individuals who are isolated or who don't speak the native language, those who ignore advice and warnings about the emergency; the homeless; and individuals with pre-existing chronic diseases.[13-16] Also, medications used to treat some chronic diseases can impair a person's ability to adequately cope with, or respond to, the disaster or emergency.[17]

The exacerbations of non-communicable diseases (NCD's) with their acute-on-chronic complications in multi-hazard disasters are well studied and mostly preventable, with adequate management and preparedness.[13]

Pharmacists are regarded as drug experts and have extensive knowledge of medications.[18,19] They are the third largest healthcare profession after doctors and nurses internationally, and are the most accessible healthcare professional to members of the community.[18,20-24] Pharmacists are considered members of the multidisciplinary health care team managing everyday adverse health events.[13] However, in the context of disasters, pharmacists are often forgotten or disregarded as a necessary disaster healthcare team member. The current 'disaster medicine' healthcare model, is focused primarily on the high-acuity patients with services provided by emergency services, doctors, and nurses. This 'disaster medicine' model has successfully responded to the health needs of people affected by simple disasters. However, the demographic of those adversely affected in a disaster is shifting from acute traumas to exacerbations of chronic diseases triggered by disruptions to continuity of care.[25] As the health system and resources become increasingly stretched, and as disasters increase in frequency and severity, there is an opportunity for pharmacists to make a more significant contribution to caring for this change in community's health.

To date, pharmacists have had a minor role in disasters assisting with the logistics of drug acquisition, and supply chain management[26,27] - a role occupied in many cases by a logistician.[28] Arising after the events of September 11th 2001 in the United States (US), pharmacists have begun to be more actively involved in disaster medical assistance teams (DMATs). Despite their increased involvement, their role is still primarily logistical in nature, focusing on the procurement of drugs and medical supplies. Recently, there have been reports of pharmacists undertaking more clinical roles in disasters e.g. focusing on optimising medication management and patient care.[29-36] However, to-date, these 'new' roles have been

poorly documented, and would appear to have taken place in an ad-hoc fashion during the response phase of a disaster. The acknowledgment, or acceptance, of pharmacists and their contributions during disasters by the wider disaster health community is not well understood.

When a disaster strikes a community, in many circumstances those affected seek the assistance of pharmacists first before potentially being referred on to a doctor or hospital.[22,37] In the aftermath of a disaster and the potential collapse of the healthcare system,[38] pharmacists are on the frontline of continuity of care due to their accessibility to the community.[39] The US state of Alabama, recognised the invaluable assistance pharmacists could provide in reducing the overcrowding of the emergency departments (EDs) caused by the presentation of low-acuity NCD's patients who had lost their chronic disease medications.[36] The three-day emergency supply legislation was temporarily extended to 30 days for the duration of the declared disaster. This allowed pharmacists to attend to those patients often neglected during disasters - chronic disease patients.[36]

The anthrax crisis in Washington D.C. in 2001, saw a role expansion for pharmacists in developing screening tools and drug algorithms to streamline the drug treatment and prophylaxis choice based on patient NCD comorbidities and other co-factors.[31] It has been proposed that pharmacists in bioterrorism events could be involved in the triaging, counselling, educating of the public, and coordinating with other healthcare providers.[40] During Hurricane Katrina, pharmacists were reported to have assisted in a range of roles due to the limited healthcare resources available. They consulted on injuries, provided wound care, mixed intravenous medications, vaccinated patients, and set up pharmacy services in evacuation centres.[33,36] Pharmacists also assisted with triaging patients. This triaging role involved obtaining a medication history, assessing patients' medication needs, and where required, referring patients to physicians for further assessment or to pharmacists to obtain refills of their NCD medications.[32]

There has been a shift in community pharmacists' roles expanding public health access to the community. Pharmacies have become a pillar of the public health system providing vaccinations, health and medication education, and participating in national or epidemic initiatives.[41] These public health roles facilitate a disease prevention focus which aligns with the first of the four phases in disaster management – prevention/mitigation. Following this shift in role expansion, The International Pharmaceutical Federation (FIP) released guidelines on the next two phases of disaster management, pharmacy preparedness and response.[39,42] Despite this there has been no significant change in the role of pharmacists in disasters since the 1960's.[43] Hospital pharmacies generally have developed their own emergency management plans in the event of a disaster[44] but they are rarely included in broader disaster management policy within their healthcare system. Community pharmacies are generally not well-prepared with disaster and emergency plans or business continuity plans[45] and are not included in the wider community disaster policy.[46]

One of the significant barriers identified with the expansion of pharmacists into public health and disasters is that pharmacists are one of the only healthcare professionals providing health services to members of the community not recognised as a practitioner or healthcare provider.[47] Meaning pharmacists are limited by policy and legislation for the essential services they provide to the general public and community.[47] There are no current mechanisms in place for the reimbursement for pharmacies from local, state or federal governments, when they supply essential services, medications and pharmacy-related supplies to patients and members of the community who are unable to pay in a disaster.[46,47]

To address the apparent lack of evidence on the engagement of pharmacists in disaster events, this study sought to determine the international opinion of disaster and health professionals working within the disaster health management field regarding the roles of pharmacists in disasters. The following research questions were addressed:

1. Is there a role for pharmacists in disasters apart from logistics and supply chain management?

2. Do the roles pharmacists have performed in disasters and reported in the literature align with the opinions of international disaster management and health professionals regarding the roles they believe pharmacists can undertake during a disaster?

Methods

Study Design and Participant Recruitment

This study utilised quantitative research methodology to survey the global disaster health community on their opinions of the roles they believe pharmacists could undertake in disasters. A convenience sample of individuals attending the 20th World Association on Disaster and Emergency Medicine (WADEM) Congress in Toronto, Canada from April 25-30th 2017 was utilised for this study. The anonymous and confidential survey allowed for a free expression of attitudes and beliefs that may not be expressed in a more intimidating setting like an interview.

The Congress attendees comprised 900 delegates representing over 60 nationalities. There were 222 paper copies of the survey randomly handed out to attendees. Survey participation was limited to the physical distribution of the survey by two researchers to the conference delegates. Individuals were provided with a participant information sheet with the survey, and consent was implied by the returning of a completed or partially completed survey. Participants' confidentiality was ensured though the use of an anonymous survey. This study had ethics approval from QUT Health Research Ethics Committee - Approval Number 1700000048.

Data Collection Instrument and Data Analysis

In the absence of an existing survey tool to gauge disaster and healthcare professionals' opinions on the role of pharmacists in disasters, a survey was developed, and pilot tested prior to release for this conference. This survey comprised 11 demographic questions, and eight questions on the participant's opinion as to the role of pharmacists in disasters. The survey included a question which listed all the roles undertaken by pharmacists in disasters identified in the literature. Participants indicated their level of agreement with each of these roles on a 5-point Likert scale (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree and N/A= not applicable). The demographic questions assessed the participant's age, gender, healthcare profession, experience in previous disasters (natural and manmade) and pharmacist involvement in disasters in their country. Completed surveys were handed into the WADEM exhibit stand which was located at the entrance to the foyer of the trade exhibition of the conference. The responses were then manually entered into KeySurvey® (an online data collection survey tool). Each question was analysed separately for its respective sample size, to account for any missing data. Internal reliability of the 5-item Likert scale instrument in this sample was tested using IBM® SPSS® statistical software version 23 Cronbach's alpha reliability statistic, which was 0.79. All quantitative data was analysed using the IBM® SPSS® statistical software version 23. The qualitative questions were manually coded and categorised by two researchers for inter-rater reliability and presented as themes.

Results

Of the 222 surveys handed out, 126 survey responses were collected – yielding a response rate of 56.8%. Of the 126 survey participants, 27.7% (33/119) were emergency physicians or general practitioners (GPs), 10.9% (13/119) were nurses or nurse practitioners, 8.4% (10/119) were pharmacists, and seven participants (7/126) opted not to disclose their

profession (Figure 1). The sample size varies for some survey questions as respondents chose not the answer a question.

Respondents represented 22 different countries with the largest representation of 31.1% (38/122) being from the Congress host country Canada, followed by 23.8% (29/122) from the United States (Figure 2). All respondents were over the age of 21, with 43.7% (55/126) being in the > 51 years age bracket. Gender was fairly even (51.6% (65/126) male: 48.4% (61/126) were female).

Of the respondents, 43.7% (55/126) had been in their respective professions for 21 or more years (Table 1). Most of the participants, 52.4% (66/126) had responded to between 1-5 disasters in an official capacity relating to their stated profession, whilst 17.5% (22/126) of the participants may have responded to a disaster but not in an official capacity related to their profession (Table 2).

(Table 1)

(Table 2)

In this study, 96.8% (122/126) of respondents believed pharmacists had a role in disasters additional to the logistics and supply chain management and 87.9% (109/124) believed assisting in disasters was within a pharmacist's current scope of practice. With regards to other specific roles that pharmacists could have in disasters, roles that pharmacists have previously performed in disasters were collated from an extensive review of the literature. Table 3 rates the opinions of the participants on whether pharmacists should be undertaking these specific roles in a disaster or emergency setting. Eight of the listed roles were given a rating of 'Agree' or 'Strongly Agree', by 72.4% or more of the participants (Table 3).

(Table 3)

The results presented in Table 3, suggests that there was an overall acknowledgement that pharmacists should be doing more than just logistic and supply chain management in disasters. Triaging and screening in evacuation centres received equal participant ratings of 34.5% (42/122) 'Neutral' to 34.5% (42/122) 'Agree and Strongly Agree'. The cardio pulmonary resuscitation (CPR) and first aid/wound care roles were only moderately higher with an 'Agree' or 'Strongly Agree' rating by 42.6% (52/122) of the participants. Just over half, 57.1% (68/119) of the respondents had prior knowledge of pharmacists undertaking these types of roles in a disaster.

Participants had the opportunity to answer open-ended questions in the survey on their opinions of roles pharmacists could perform in the preparing and responding to a disaster and what they believed to be some of the barriers to pharmacists undertaking additional roles to logistics and supply chain management in disasters.

(Table 4)

Table 4 outlines the major themes identified by participants of roles pharmacists could undertake in preparing and then in responding to disasters. Educating patients especially those requiring ongoing medications and chronic diseases was the most suggested role, pharmacists could assist within their current scope of practice in preparing for a disaster. Ensuring continuity of care with supply of medications through logistics and medication management was considered the most valued role in the response phase of a disaster for pharmacists. A physician from Canada suggested "Education. Helping community prepare by ensuring medications always filled, facilitate and encourage vaccination, logistics during response, patient advocate in response, help assist and facilitate pt/md [patient and doctor] relationship. some community response for low acuity patients." A public health professional

from Canada identified a “key issue for many [patients/disaster victims] is medication renewal including Methadone/opiate to decrease withdrawal”. A disaster volunteer pharmacist from the UK recommended pharmacists could fulfil roles in “logistics/ supply chain management, medicines management, clinical input (triage, assessment, prescribing), educator of public and other healthcare professionals providing expertise in medicines/medicine management and optimisation.”

Ninety-five participants elected to share their opinions on the barriers to pharmacists being involved in disasters. The two main barriers themes identified by the respondents were ‘lack of understanding of the value pharmacists can provide in disasters’, and ‘prejudices of other health care professionals’. Other barrier themes that emerged were ‘lack of inclusion as a disaster team member’, ‘lack of pharmacy disaster training or education’, ‘insufficient interest from the pharmacy profession’, ‘legislative constraints’, and ‘funding or reimbursement issues’. Some participants claimed there shouldn’t be any barriers holding pharmacists back from being more involved in disasters, as response is the first priority.

A Volunteer from South America wrote, “In my country they are perceived as actual part of the health team, but I don't think they normally include in disaster preparedness plans. There is a belief that disaster preparedness is all about rescue.” A pharmacist from the United Kingdom suggested the barrier is because there is “No defined role other than as logisticians and supply chain managers; other health professionals don't know what pharmacists can contribute. This is changing slowly in the UK among aid organisations as some of them recognise the value pharmacists bring.” An Australian Academic stated the barrier is the “Perception that they only count pills and have no real medical knowledge. STIGMA.”

Discussion

The level of experience these study's participants have in this field, both in their respective professions and in responding to disasters, gives credibility to the results of this survey. Having been in disaster zones themselves, they are aware of what works and what doesn't, and what is needed to provide optimal healthcare to mass casualties with limited resources. This study demonstrated that the international disaster health community believes pharmacists should have more roles in disasters in addition to logistics and be more regularly included in the disaster management team. The international disaster health professionals rated the pharmacist's roles in a disaster - Cardio Pulmonary Resuscitation (CPR), First aid/Wound care, and Triage lower on the consensus. This is not suggesting pharmacists are unable to perform these roles but rather, questioning where on the priority list of high importance these roles are for pharmacists in a disaster. It is recognised that optimal healthcare requires a multidisciplinary team approach to increase the healthcare professional resources available.[13]

Including pharmacists in the local, state, and national disaster plans of the four phases of a disaster (disaster prevention/mitigation, preparedness, response, and recovery (PPRR)) would help in achieving the Sendai Framework's target of decreasing the disruption to basic health services.[10] Access to medications can have a significant impact on the overall outcome for a patient and the healthcare system in terms of adequate response and recovery. But without proper prevention and preparedness steps that include pharmacists, the health response and recovery actions risk being inadequate or inappropriate. Pharmacists 'triage' and 'prescribe' on a daily basis in the community setting, recommending over-the-counter medications and referring to other healthcare providers where necessary. Their professions experience in this area lends voice to the argument for utilising them in this role in a disaster setting. This was evident in the 'Thunderstorm Asthma' event in Melbourne, Australia in

2016 where community pharmacists were crucial in aiding in this health crisis. Without their involvement, the health impact and mortality rate could have been significantly higher.[48] This greater contribution pharmacists have been making, needs to be recognised and written in to disaster management plans in the preparedness phase or the response to a disaster will be inappropriate and suboptimal.

If the international disaster health community is in agreement with increasing the scope of pharmacists' involvement in disaster management, what are the barriers preventing pharmacists from being further included in these disaster health teams? Several issues were raised by the study participants as to why pharmacists are not included to a larger extent. The two major barriers to greater participation by pharmacists in disaster health management identified in this study were the 'lack of understanding of what roles pharmacists are capable of performing during a disaster', and the 'perceived turf encroachment or prejudices by other health professions'. This could be due to a lack of awareness of pharmacists' total skillset. Some physicians, nurses and members of the public believe pharmacists are best to continue with the mechanical functions of pharmacy - dispensing and labelling medications or coordinating the logistics and supply chain management of drugs, rather than the clinical aspects of pharmacy which require more independent judgement or access to patient records.[49,50] The clinical roles pharmacists can and have been performing in disasters have only recently been incorporated into the PPRR phases in guidance provided by FIP in 2016.[42] Pharmacists need to embrace an advocacy role to communicate how they can contribute to disaster management within their local, state and federal disaster health teams and community. They could begin by effectively engaging in state and federal planning activities.

The perceived prejudices of other healthcare professionals and alleged 'turf' encroachment over pharmacists being included in disaster health team's causes concern for some participants. Some of the other barriers mentioned in this study (legislative constraints,

funding/reimbursement issues, lack of disaster training, and potential lack of pharmacy interest) could explain why even with overwhelming support from the disaster health community identified in this study, pharmacists are not further integrated in disaster management. Current legislation, allows pharmacists to use their clinical judgement in providing up to (in most countries/states) a three-day emergency supply of essential ongoing medications. Some countries and states have introduced an extension to this legislation, allowing in a state-declared disaster for the three-days to be extended up to 30 days.[51] However, with the limitation of the three-day emergency supply rule in most countries and states, pharmacists are hindered in their ability to ensure continuity of care for patients with chronic diseases as the impact of disasters generally lasts longer than three days. Some US states have recognised the valuable assistance pharmacists can provide in reducing the large number of patients with chronic diseases presenting to hospital emergency departments by allowing for temporary amendment to the legislation (e.g. extending the three-day emergency supply rule up to 30 days).[51] A clinical audit of community pharmacies in England, discovered emergency supplies were most often accessed by the elderly for long-term chronic conditions.[52] Reason for requesting emergency supplies were related to delays with prescriptions and needing supplies over weekends or holidays.[52]Pharmacist's role in providing emergency supplies is identified as important for potentially alleviating the burden on other healthcare services (hospitals, after-hours general practitioners, etc.).[52]

Communities can have an expectation that pharmacies will be open during and after a disaster and will supply medications (prescriptions and over-the-counter medications) and pharmacy related items (nappies, oral rehydration, tampons, water, etc.) for other health-related needs during the crisis.[46] There is no financial reimbursement from governments for pharmacies when they provide essential services and supplies to patients in need during a disaster.[46] Some pharmacies may not be able to survive this financial impact on their business

or will choose not to assist their communities in a disaster based on this financial burden.[46]). Essential services provided by healthcare businesses should be included in disaster funding arrangements to ensure continuation of primary healthcare in times of crisis.

Limitations

Due to the similar nature of the professional backgrounds of the conference attendees, the use of a convergence sample from this single conference may limit the extrapolation of the international results to the larger global disaster health community. However, the WADEM congresses attract different health and emergency service professions from many different countries. This study covered 22 countries and eight different professions related to disaster and emergency medicine, allowing for some generalisation of the results from the cross-section sample. The advantage of this study was that its scope was not limited to a single disaster event. Participants based their responses on experiences across a number of disasters. Participants were not defending actions taken in the aftermath of a single event.

It should also be noted that the term ‘triage’ has a different connotation depending on the perspective of the profession and without further explanation in the survey to the role pharmacists would specifically have in ‘triaging and screening in evacuation centres’, this could have affected the survey response. Therefore, the authors recommend defining this term in future surveys asking this question.

Further research could continue to unpack the effectiveness of new roles of pharmacists in disasters. Improved understanding of the barriers to better integration of the profession in disaster management and response teams is also required. Clarification on pharmacist’s roles and responsibilities could aid the utilisation of pharmacists’ extensive skillset in disasters.

Conclusion

Pharmacists have historically been involved in disasters in logistics and supply chain management roles. They have not been included as a member of disaster health teams until recently; however, the role is still largely logistical in nature. There is strong consensus among the international disaster health community that pharmacists should have a clinical role in disaster management with greater integration as regular team members in disaster health teams. The international disaster health community acknowledged and agreed on several roles pharmacists could be undertaking in a disaster. However, several barriers were identified potentially impeding pharmacists from undertaking these roles. These hindrances to further acceptance of pharmacists as an essential disaster health team member could be overcome with role clarification of the roles and responsibilities of pharmacist's in a disaster. Pharmacists can increase awareness through advocacy in their local, state and federal communities.

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Figure 1: Disaster management and health professionals who participated in the study

Figure 1: Continents Represented by Participants

Table 1: Years of experience in profession

	Number of Participants	**Percentage (%)**
0-5 years	23	18.3
6-10 years	17	13.5
11-15 years	12	9.5
16-20 years	19	15.1
21+ years	55	43.7
Total	126	100

Table 2: How many disasters participants had officially responded to in profession

	Number of Participants	**Percentage (%)**
0	22	17.5
1-5	66	52.4
6-10	12	9.5
11-15	9	7.1
16-20	7	5.6
21+	10	7.9
Total	126	100

Table 3: Health professional opinion ratings on specific roles pharmacists have undertaken in the literature from previous disasters.

	Disagree & Strongly Disagree	**Neutral**	**Agree & Strongly Agree**	**N/A**	**Total (n=)**
Logistics of pharmaceuticals and stockpile management	0	5	**116**	1	122
CPR and assisting in 'first response'	24	42	**52**	4	122
Providing first aid and wound care	23	44	**52**	3	122
Triaging and screening in evacuation centres	35	42	42	3	122
'Prescribing' continuing chronic disease medications	4	10	**107**	1	122
'Prescribing' vaccinations	5	13	**92**	8	118
Administering vaccinations	4	12	**99**	4	119
Developing drug algorithms and guidelines to streamline patient diagnosis and treatment options	4	15	**98**	2	119
Assist decision-making on health issues in disaster management	6	21	**92**	0	119
Communication advocate between different healthcare professions	9	24	**86**	0	119
Educate public on health risks in disasters and those most vulnerable	7	19	**93**	0	119

Table 4: Themes identified for pharmacists' roles in preparing and responding to disasters

Preparing for a disaster	**Responding to a disaster**
Education	Logistics
Stockpile Management	Medication Management
Logistics	Dispensing
Vaccinations	Included as a Disaster Team Member
	Vaccinations
	Education