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Medical Education Article

Challenges for Public Health Emergency Management: Collaboration and Coordination, Information Sharing and Communication

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Effective public health emergency management can reduce avoidable mortality and morbidity and reduce the economic and social impacts of pandemics and disease outbreaks. The effectiveness of an emergency response is based on the amount of information that is available at any given time. The effective emergency communication and coordination among partners is crucial. This article explores the concepts of public health emergency management, and discusses related problems and challenges of collaboration and coordination, information sharing and communication for public health emergency management, to provide an evidence base to inform the development of strategies for public health emergency management improvement.

Keywords: Public Health; Emergency Management; Collaboration and Coordination; Information Sharing; Communication

INTRODUCTION

Public health related crises such as influenza pandemics or the Ebola outbreak, have caused enormous negative impacts on health, economies, and even national security in the world. As well, they have caused significant political and social disruption (Rewar, Mirdha, & Rewar, 2015) (Maurice, 2016). Effective public health emergency management can reduce avoidable mortality and morbidity and reduce the economic and social impacts of pandemics and disease outbreaks (Craig, Kasai, Li, Otsu, & Khut, 2010). The effectiveness of an emergency management is based on the amount of information that is available at any given time(Gamhewage, 2016). In recent years, risk communication has emerged at the intersection of crisis, risk, and public health emergency communication. Effective emergency communication and coordination among partners is crucial(Dickmann, Abraham, et al., 2016). Developing an appropriate response to a public health emergency requires extensive information sharing and collaboration among all stakeholder organizations. However there have been difficulties for stakeholders in collaborating and sharing knowledge in response to a disease outbreak and pandemic crisis. Poor communication between responding agencies is a major obstacle to an effective emergency response. This article explores the concepts of public health emergency management, and discusses related problems and challenges of collaboration and coordination, information sharing and communication for public health emergency management, to provide evidence base to inform the development of strategies for public health emergency management improvement in future.

Public Health Emergency Management

Public health emergencies can be defined as unexpected events which threaten human health with severe injury mortality and morbidity, and which have impacts on the economy and the security and stability of the society, and which exceed the community's capacity to deal with it. Examples include outbreaks of infectious

diseases, natural and man-made disasters, food intoxication, environmental pollution, or occupational illnesses. The important idea is that these events have an impact on human health and that they are beyond the community's normal capacity to deal effectively with them. This wide definition enables a community to prepare itself for a wide range of risks and to develop its capabilities to deal with them effectively (Nelson, Lurie, Wasserman, & Zakowski, 2007).

In the past decade, a succession of public health emergencies has challenged preparedness and response capacities of government agencies, hospitals and clinics and public health agencies around the world.

Each event has significantly challenged the public health systems and impacted on the health and wellbeing of affected people. For example, the epidemic of the severe acute respiratory syndrome (SARS) not only challenged the health systems capacity to respond but also directly affected health workers with consequential effects on the capacity of the health services to function.

The Communicable Disease Surveillance and Response unit of the WHO Western Pacific Regional Office conceptualized a Framework for Action to guide the responses to disease outbreaks. This framework can be used more widely to convey the concept of comprehensive and integrated public health response structures, and identifies core needs to develop public health capacity development to deal with emergency related to all hazards. There are five core components of a response: surveillance, healthcare response, public health intervention, communication and command. Each component needs to be able to meet the requirements of all related stakeholders. To develop an effective response, it is necessary to prepare by setting up mechanisms to support coordination, communication and collaboration between stakeholders (Craig et al., 2010).

Effective preparedness and response are very important in reducing the impacts of all public health crisis emergencies (Yasmin et al., 2015). Constant preparedness and response capacity are required in the management of public health crises. (Lee, Oh, Park, Chu, & Son, 2013). There has been substantial attention to and investment in emergency preparedness and response capacity for emergencies with health impacts for more than a decade. The importance of robust emergency preparedness and response systems for health emergencies is highlighted by recent incidents such as the Ebola outbreak in West Africa and the emergence of Middle East Respiratory Syndrome Coronavirus (Yasmin et al., 2015).

Challenges for public health emergency management

During a public health emergency, there is a need for many types of information, which is held by many different agencies, but deeded by all. The effectiveness of an emergency response is based on the amount of information that is available at any given time, and effective emergency communication and coordination among partners is crucial. The massive numbers of public, non-profit, and private organizations involved in catastrophic disaster emergencies need to have horizontal as well as vertical communication and coordination. Recent infectious disease outbreaks, such as the Influenza Pandemic in 2009 and the Ebola outbreak in West Africa highlight the fact that current risk communication, governance and structural approaches to preparedness and response planning for infectious disease outbreaks are not sufficient to prepare for, or adequately engage with, the public and various stakeholders (Dickmann, Apfel, & Gottschalk, 2016).

Collaboration and coordination

Many Scholars agree that emergency preparedness and response requires multi-sectoral cooperation and coordination (Cool et al., 2015; Heymann, Mackenzie, & Peiris, 2013; McCloskey, Dar, Zumla, & Heymann, 2014). Pandemic preparedness requires collaborative multi-sectoral planning to ensure an organized and coordinated response. Emergency response to a pandemic requires a coordinated effort among multiple levels of government and the private sector (Cantey et al., 2013). Response to disasters may require multiregional collaboration, and catastrophes that exact total destruction of critical community infrastructures necessitate national and international interventions. The provision of public health services depends on the preparedness of other sectors such as: law and order, transport and communications, essential services such as water and electricity and public works, search and rescue and fire services, social services and housing (WHO, 2007). For example, to decrease mortality and morbidity after an earthquake, the planning authorities need to manage land use and housing design to reduce damage. Researchers as well as practitioners often believe it is necessary for governments to build an environment that facilitates collaboration (Nohrstedt, 2013). The efforts to control SARS in 2003 were eventually successful, but only when there was a concerted effort by many different sectors of governments (Heymann et al., 2013).

A multi-sectoral approach to preparing for and

responding to an outbreak of an infectious disease offers several benefits:

1) Sharing information. Every sector needs up-to – date information to plan its own response;

2) Coordination of efforts. For example, mass immunization in schools needs Education Department and Health Department to collaborate. A single sector cannot accomplish the job. The Control of Zika by isolating patients/families requires collaboration of Transport Department, Security Units and Health Department (Cool et al., 2015);

3) Preparedness and prevention need to include a range of sectors, for example, housing to ensure that housing conditions are hygienic and do not facilitate transmission of disease.

Because of the multifaceted response of an infectious disease outbreak, and the impact of the outbreak on the many sectors of society, a well-defined command and control structure with strong leadership is required to coordinate the response, allocate resources appropriately, and ensure the dissemination of consistent information in a timely matter (Araz & Jehn, 2013).

One approach to collaboration and coordination is the WHO's whole-of-society approach to pandemic influenza preparedness. This approach "particularly emphasizes the significant roles played not only by the health sector, but also other sectors, individuals, families, businesses and communities, in mitigating the effects of a pandemic. Developing capacities for mitigating the effects of a pandemic, including robust contingency and business continuity plans is at the heart of preparing the whole of society for a pandemic. Activities such as capacity development, planning, coordination, and communication are cross-cutting and require action by all parties" (WHO, 2009).

In international sphere, Governments, WHO, UN agencies, humanitarian response systems, NGOs, civil organisations all have unique roles as well as overlapping ones. These need to be clarified, negotiated, communicated and acted on well before an outbreak and emergency (Gamhewage, 2016).

Effective and efficient coordination and collaboration is still a challenge for public health emergency preparedness and response (Kern, 2016). As Ministries tend to work in isolation from each other, it is difficult for groups to work together or share information. There are difficulties in working together, as there is no good mechanism for collaboration. A good mechanism, for example, permanent regular meeting of different departments must be established before a pandemic outbreak and must continue after an outbreak. Responsibilities need to be clear in all plan, so that different sectors can avoid causing unnecessary work or duplication of effort (Robey, Edwards, & Murphy, 2014).

Information sharing

Developing an appropriate preparedness and response to a public health emergency requires extensive information sharing and collaboration among a variety of loosely coupled stakeholder organizations (Ipe, Raghu, & Vinze, 2010). There are still many obstacles in practice.

Information is not always clear, or it may be ambiguous, and it is often constantly changing. This presents a challenge for stakeholders. For example, a review of the Toronto critical care experience of SARS highlighted that inaccurate information increased fear, anxiety and even chaos (Hawryluck, Lapinsky, & Stewart, 2005). Pandemics demonstrate the difficulties inherent in dealing with unclear and evolving information. During the response to Typhoon Haiyan, Cool et al said that "Getting essential public health information to the affected population and ensuring alignment with both national and international partners was challenging" (Cool et al., 2015). "Data are often ambiguous and not directly related to the problem at hand, uncertainties are ubiquitous, or the information is unavailable at a scale that local decision makers can use. Even in cases where the technical aspects of the information might be clear, it may lack obvious implications for practice. Such obstacles to the use of scientific information in emergency management are multiplied when a diffuse network must interpret and make use of the data" (Roberts & Wernstedt, 2016).

Communication of accurate and relevant information is also a challenge. Data may be owned by a large number of organisations. Gathering the information and making sure that the relevant stakeholders can all access that information is not easy. The Toronto review chaos mentioned that the inability to provide the right information to the affected people resulted in increasing their fears (Hawryluck et al., 2005). For example, in Hurricane Katrina, the lack of appropriate procedures for information among state and local authorities caused emergency response personnel and the public with little capacity to exchange information vital for coordinating response actions (Comfort & Haase, 2006).These problems require strong management of communication and information. This means that there must be defined and practical information gathering and reporting procedures (Pou, 2008).

In addition, information management requires skill in data collection and strong technology for data analysis and dissemination (Roberts & Wernstedt, 2016). A study by Central American Network for Disaster and Health Information showed that despite the recognition that access to information is essential to disaster preparedness, inadequate information technology, lack of training for skills necessary to find and manage

information, and lack of awareness about what information is available often prevent or delay access to vital information by governments, health professionals, and communities before, during, and after emergencies (Seyedin & Jamali, 2011). For most emergencies, when most sectors require exact analysis and estimation of the development of emergency, traditional methods cannot meet our demands very well. Although, researchers hope to get access to more information about emergencies to find their development patterns, it is still so hard to collect such information in most cases. Experiments cannot be conducted on emergencies to obtain useful information (Song, Ge, Duan, & Qiu, 2016).

Information systems for public health emergency preparedness are emerging as powerful tools to address the information intensive nature of emergency preparedness and response. Identifying what information different groups wish to receive will be an important task in any future infectious disease outbreak (Dickmann et al., 2011).

Communication

Communicating with the public is a core part of an emergency response, and enhanced communication channels can also be used to convey routine health information. The goal of communications before and during a pandemic is to provide and exchange relevant information with the public, partners, and stakeholders to allow them to make well informed decisions and take appropriate actions to protect health and safety. This is a fundamental part of effective risk management (WHO, 2009).

Information and communication problems have been identified in several studies in the past. Poor communication made it difficult to put together a clear, accurate picture of the damage and what was happening at the local level. Research in the field of emergency response indicates that communication between responding agencies is a major shortfall in effective emergency response and that this failure of communication between organisations is not unique to developing countries (Seyedin & Jamali, 2011). For example, during the spring 2009 wave of the H1N1 influenza pandemic in thirty US cities, there were some notable instances of interdepartmental communication breakdown, health departments didn't develop better communication methods with the public, and work more closely with education officials to better understand the complexities involved in closing schools (Navarro, Kohl, Cetron, & Markel, 2016). The WHO influenza pandemic planning checklist suggests developing websites, leaflets, and fact sheets on topics related to pandemics. The same communication tools could be used for a broad range of health priorities. Local health departments need to maintain close working relationships and communication with other agencies in preparing for and responding to both natural and man-made all-hazards events (Shah, Newell, & Whitworth, 2016).

Interventions to communicate health risk and promote disease control measures depend upon increasing coordination among governments and different professional sectors and community leaders, and on the development and dissemination of formal guidance, resources, and implementation tools by multi-lateral international organizations and other relevant stakeholders (Schiavo, May Leung, & Brown, 2014). Professional stakeholders should be enabled to access reliable information rapidly through re-established channels; emphasis should be placed on establishing sustainable cooperation between experts and the media; and measures to improve trust in health authorities, such as the transparent communication of uncertainties, should be encouraged (Cloes, Ahmad, & Reintjes, 2015).

Risk communication is an interactive process of exchange of information and opinion among individuals, groups and institutions for risk management. The effectiveness of risk communication practices in helping stakeholders achieve three major communication objectives: providing the knowledge needed for informed decision making about risks; building or rebuilding trust among stakeholders; and engaging stakeholders in dialogue aimed at resolving disputes and reaching consensus (Covello, Peters, Wojtecki, & Hyde, 2001). It has been identified as a core competence for guiding public health responses to infectious disease threats (Cool et al., 2015).

Recent infectious disease outbreaks, such as the Influenza Pandemic 2009 and the Ebola outbreak in West Africa highlight the fact that current risk communication, governance and structural approaches to preparedness and response planning for infectious disease outbreaks are not sufficient to prepare for or adequately engage with the public and various stakeholders. Risk communication coordination between and during outbreaks and health emergencies is essential. Enhancing capacities to support needed behaviour changes through the use of collaborative risk communication approaches can also help strengthen public health systems on all levels of governance, from the local to global (Dickmann, Apfel, et al., 2016).

CONCLUSION

Public emergencies have caused human injury or illness, and property loss and environmental harm in the past, and they continue to jeopardize the stability of society and endanger public safety. To manage public emergencies in order to reduce their impacts, effective preparedness and response are very important.

Developing appropriate preparedness and response to a public health emergency requires extensive information sharing and collaboration among a variety of loosely linked stakeholder organizations. Communication between responding agencies is a major challenge in effective emergency response. Effective and efficient coordination and collaboration, and information sharing are still challenges for public health emergency preparedness and response.

Consent to publish

All authors have approved this manuscript for submission, and claim that none of the material in the paper has been published or is under consideration for publication elsewhere.

Competing interests

The authors declare that they have no competing interests.

REFERENCE

Araz, Ozgur M., & Jehn, Megan. (2013). Improving public health emergency preparedness through enhanced decision-making environments: A simulation and survey based evaluation. *Technological Forecasting and Social Change, 80*(9), 1775-1781. doi: 10.1016/j.techfore.2012.09.018

Cantey, P. T., Chuk, M. G., Kohl, K. S., Herrmann, J., Weiss, P., Graffunder, C. M., . . . Painter, J. (2013). Public health emergency preparedness: lessons learned about monitoring of interventions from the National Association of County and City Health Official's survey of nonpharmaceutical interventions for pandemic H1N1. *J Public Health Manag Pract, 19*(1), 70-76. doi: 10.1097/PHH.0b013e31824d4666

Cloes, R., Ahmad, A., & Reintjes, R. (2015). Risk communication during the 2009 influenza A (H1N1) pandemic: stakeholder experiences from eight European countries. *Disaster Med Public Health Prep, 9*(2), 127-133. doi: 10.1017/dmp.2014.124

Comfort, Louise K, & Haase, Thomas W. (2006). Communication, coherence, and collective action the impact of hurricane katrina on communications infrastructure. *Public Works management & policy, 10*(4), 328-343.

Cool, Claravall, Hall, Taketani, Zepeda, Gehner, & Lawe. (2015). Social media as a risk communication tool following Typhoon Haiyan. *Western Pacific Surveillance and Response, 6*. doi: 10.5365/wpsar.2015.6.2.HYN_013

Covello, Peters, R. G., Wojtecki, J. G., & Hyde, R. C. (2001). Risk communication, the West Nile virus epidemic, and bioterrorism: Responding to the communication challenges posed by the intentional or unintentional release of a pathogen in an urban setting. *Journal of Urban Health-Bulletin of the New York Academy of Medicine, 78*(2), 382-391. doi: DOI 10.1093/jurban/78.2.382

Craig, A. T., Kasai, T., Li, A., Otsu, S., & Khut, Q. Y. (2010). Getting back to basics during a public health emergency: a framework to prepare and respond to infectious disease public health emergencies. *Public Health, 124*(1), 10-13. doi: 10.1016/j.puhe.2009.11.011

Dickmann, Abraham, Sarkar, Satyajit, Wysocki, Piotr, Cecconi, Sabrina, Apfel, Franklin, & Nurm, Ülla-Karin. (2016). Risk communication as a core public health competence in infectious disease management: development of the ECDC training curriculum and programme. *Eurosurveillance, 21*(14).

Dickmann, Apfel, & Gottschalk. (2016). Risk communication and generic preparedness: from agent-based to action-based planning-a conceptual framework. *British Journal of Medicine and Medical Research, 13*(10), 1-5.

Dickmann, Rubin, G. J., Gaber, W., Wessely, S., Wicker, S., Serve, H., & Gottschalk, R. (2011). New Influenza A/H1N1 ("Swine Flu"): information needs of airport passengers and staff. *Influenza and Other Respiratory Viruses, 5*(1), 39-46. doi: 10.1111/j.1750-2659.2010.00168.x

Gamhewage, G. (2016). Risk communication - A moving target in the fight against infectious hazards and epidemics. *Wkly Epidemiol Rec, 91*(7), 82-87.

Hawryluck, L., Lapinsky, S. E., & Stewart, T. E. (2005). Clinical review: SARS - lessons in disaster management. *Crit Care, 9*(4), 384-389. doi: 10.1186/cc3041

Heymann, David L., Mackenzie, John S., & Peiris, Malik. (2013). SARS legacy: outbreak reporting is expected and respected. *The Lancet, 381*(9869), 779-781. doi: 10.1016/s0140-6736(13)60185-3

Ipe, Minu, Raghu, T. S., & Vinze, Ajay. (2010). Information intermediaries for emergency preparedness and response: A case study from public health. *Information Systems Frontiers, 12*(1), 67-79. doi: http://dx.doi.org/10.1007/s10796-009-9162-3

Kern, Manfred J. (2016). Global Epidemics, Pandemics, Terrorism: Risk Assessment and European Responses.

Lee, H. Y., Oh, M. N., Park, Y. S., Chu, C., & Son, T. J. (2013). Public health crisis preparedness and response in Korea. *Osong Public Health Res Perspect, 4*(5), 278-284. doi: 10.1016/j.phrp.2013.09.008

Maurice, John. (2016). Cost of protection against pandemics is small. *The Lancet, 387*(10016), e12.

McCloskey, B., Dar, O., Zumla, A., & Heymann, D. L. (2014). Emerging respiratory tract infections 2 Emerging infectious diseases and pandemic potential: status quo and reducing risk of global spread. *The Lancet infectious diseases, 14*(10), 1001-1010.

Navarro, J Alexander, Kohl, Katrin S, Cetron, Martin S, & Markel, Howard. (2016). A Tale of Many Cities: A Contemporary Historical Study of the Implementation of School Closures during the 2009 pA (H1N1) Influenza Pandemic. *Journal of health politics, policy and law, 41*(3), 393-421.

Nelson, C., Lurie, N., Wasserman, J., & Zakowski, S. (2007). Conceptualizing and defining public health emergency preparedness. *Am J Public Health, 97 Suppl 1*, S9-11. doi: 10.2105/AJPH.2007.114496

Nohrstedt, Daniel. (2013). Explaining Mobilization and Performance of Collaborations in Routine Emergency Management. *Administration & Society*, 1-28. doi: 10.1177/0095399712473983

Pou, A. M. (2008). Hurricane Katrina and disaster preparedness. *N Engl J Med, 358*(14), 1524. doi: 10.1056/NEJMc086028

Rewar, Suresh, Mirdha, Dashrath, & Rewar, Prahlad. (2015). Treatment and Prevention of Pandemic H1N1 Influenza. *Annals of Global Health, 81*(5), 645-653. doi: http://dx.doi.org/10.1016/j.aogh.2015.08.014

Roberts, Patrick S, & Wernstedt, Kris. (2016). Using Climate Forecasts across a State's Emergency

Robey, T. E., Edwards, K., & Murphy, M. K. (2014). Barriers to computed tomography radiation risk communication in the emergency department: a qualitative analysis of patient and physician perspectives. *Acad Emerg Med, 21*(2), 122-129. doi: 10.1111/acem.12311

Schiavo, Renata, May Leung, May, & Brown, Mason. (2014). Communicating risk and promoting disease mitigation measures in epidemics and emerging disease settings. *Pathogens and global health, 108*(2), 76-94.

Seyedin, S. H., & Jamali, H. R. (2011). Health information and communication system for emergency management in a developing country, Iran. *J Med Syst, 35*(4), 591-597. doi: 10.1007/s10916-009-9396-0

Shah, Gulzar H, Newell, Bobbie, & Whitworth, Ruth E. (2016). Health Departments' Engagement in Emergency Preparedness Activities: The Influence of Health Informatics Capacity. *International Journal of Health Policy and Management, 5*(x), 1-8. doi: 10.15171/ijhpm.2016.48

Song, Zhi-Chao, Ge, Yuan-Zheng, Duan, Hong, & Qiu, Xiao-Gang. (2016). Agent-based simulation systems for emergency management. *International Journal of Automation and Computing, 13*(2), 89-98. doi: 10.1007/s11633-016-0958-6

WHO. (2007). Risk reduction and emergency preparedness. 1-22.

WHO. (2009). Pandemic influenza preparedness and response. A WHO guidance document.

Yasmin, Ghazal, Bonnie, Eileen, Charoula, Moira, & Brian. (2015). The evidence base of primary research in public health emergency preparedness: A scoping review and stakeholder consultation Health policies, systems and management. *BMC public health, 15*(1), 238.